

RESEARCH ASSESSMENT 2018–19

UNIVERSITY OF HELSINKI

Anssi Mälkki, Johanna Kolhinen, Maiju Raassina and Riitta Väänänen (eds.)

Research Assessment 2018–19 University of Helsinki (RAUH)

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| Assessment results and reports

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ABSTRACT

Research Assessment 2018-19 University of Helsinki (RAUH)

Publisher: University of Helsinki

Anssi Mälkki, Johanna Kolhinen, Maiju Raassina and Riitta Väänänen (eds.)

The aim of the Research Assessment 2018–2019 University of Helsinki (RAUH) was to produce information that can be used for enhancing quality and supporting strategic decision-making at the University of Helsinki. The assessment covered all research carried out at the University, assessed in 39 Units in four assessment Panels. The complete report of the assessment consists of two parts Vol I: Assessment results and reports and Vol II: Assessment method.

The assessment was carried out by international peer-review panels. The Units of Assessment (Unit) were defined to be Faculties, Institutes, Departments, disciplines or combinations of disciplines, where common goals and development plans are, or could be, established. The Panels representing the areas of assessment were Humanities, Life Sciences, Natural Sciences and Social Sciences. The process

was led by the assessment Steering Group, nominated by the University Rector, and managed by the Research Assessment Office.

The three themes for the assessment were scientific quality, societal impact and research environment and viability. Each theme was assessed individually on a scale weak-good-very good-excellent. The assessment material consisted of self-assessment reports prepared at the Units and metric data, including bibliometric analyses of publication activity for relevant fields of research. Of each theme, the strengths and development areas were identified and recommendations made both at the Unit and the Panel level.

The overall results on scientific quality show that research is of high international quality throughout the

University. In all Panels, there are Units whose research is considered outstanding or cutting-edge in their field. The assessment revealed that research at the UH also has outstandingly high societal impact. Grades Very good or Excellent were awarded to nearly all Units, and 46-100% of Units received grade Excellent in their societal impact, depending on the Panel. Research environment and Unit viability proved to be in a good state overall.

Three themes stand out as recommendations from more than one Panel: Taking care of curiosity-driven and interdisciplinary research inherent to the research-intensive university; Securing an attractive research environment and infrastructure with well-functioning career paths and services; Agreeing on common ways of operating on different levels of organisation, and issues related to equality and inclusivity.

Keywords: University, research assessment, qualitative assessment, enhancement-led assessment, development work, strategic development

TIIVISTELMÄ

Helsingin yliopiston tutkimuksen arviointi 2018-19 (RAUH)

Julkaisija: Helsingin yliopisto

Anssi Mälkki, Johanna Kolhinen, Maiju Raassina ja Riitta Väänänen (toim.)

Helsingin yliopiston tutkimuksen arvioinnin 2018-2019 tavoitteena oli riippumattoman vertaisarvioinnin keinoin tuottaa tietoa, jota voidaan hyödyntää tutkimustoiminnan laadun kehittämisen ja yliopiston strategisen suunnittelun ja päätöksenteon tukena. Arviointi kattoi kaiken tutkimustoiminnan yliopistossa ja sitä varten koottiin 39 arvioitavaa yksikköä, joita koskevat tiedot annettiin arvioitaviksi neljässä asiantuntijapaneelissa. Loppuraportti koostuu kahdesta osasta: ensimmäinen osa sisältää arvioinnin tulokset ja paneelien tuottamat itsenäiset raportit ja toisessa osassa kuvataan arvioinnin toteutus.

Arvioinnin tekivät kansainvälisistä asiantuntijoista kootut arviointipaneelit. Arvioitava aineisto koottiin arviointia varten määritettyinä kokonaisuuksina, arvioitavina yksikköinä (Units of Assessment tai Unit). Nämä koostuivat tiedekunnista, erillisistä laitoksista, osastoista, tieteenaloista

tai useita tieteenaloja sisältävistä tutkimusta tekevästä ryhmästä siten, että yksiköllä tuli olla, tai sille olisi voitu määritellä yhteisiä tutkimuksen tavoitteita ja sen kehittämisen suunnitelmia. Nämä yksiköt arvioitiin humanististen tieteiden (humanities), yhteiskuntatieteiden (social sciences), luonnontieteiden (natural sciences) ja elämäntieteiden (life sciences) paneeleissa. Toteutusta johti yliopiston rehtorin nimeämä ohjausryhmä ja toimeenpanosta vastasi yliopiston tutkimuspalveluihin tätä varten perustettu arviointitoimisto.

Tutkimustoimintaa arvioitiin kolmesta näkökulmasta: tutkimuksen tieteellinen laatu, yhteiskunnallinen vaikutavuus ja tutkimusympäristö ja yksiköiden toimintakyky. Kukin näkökulma arvioitiin itsenäisesti asteikolla heikko – hyvä – erittäin hyvä – erinomainen. Arvioinnin aineistona olivat yksiköissä tuotetut itsearviointiraportit ja näitä tukeva määrällinen aineisto, sisältäen julkaisutoiminnan biblio-

metrisen analyysin sille soveltuville tieteenaloille.

Arvioinnin tulokset osoittavat, että Helsingin yliopiston tutkimuksen tieteellinen laatu on korkeaa kansainvälistä tasoa: huippuja löytyy joka paneelista. Myös arvioitavien yksiköiden yhteiskunnallisen vaikuttavuuden ja vuorovaikutuksen arvioidaan olevan pääasiassa erinomaista tai erittäin hyvää. Melkein kaikki yksiköt asettuivat kahteen ylimpään kategoriaan ja 46-100 % sai arvosanaksi erinomainen, paneelista riippuen. Yksiköiden tutkimusympäristön ja elin-kelpoisuuden arvioitiin yleisesti olevan hyvällä tasolla.

Kehittämiskohteissa toistuvat ihmisten ja toiminnan johtamisen teemat: uteliaisuuden perustuvan ja monitieteisen tutkimuksen vaaliminen, houkuttelevan tutkimusympäristön varmistaminen (ml. tutkimuksen infrastruktuurit, toimivat urapolut ja palvelut), yhteisistä toimintamalleista sopiminen ja yhdenvertaisuuteen liittyvät kysymykset.

Avainsanat: Yliopisto, tutkimuksen arviointi, laadullinen arviointi, kehittävä arviointi, kehittämistyö, strateginen kehittäminen

SAMMANDRAG

Utvärdering av forskningen vid Helsingfors universitetet 2018-19 (RAUH)

Utgivare: Helsingfors universitet

Anssi Mälkki, Johanna Kolhinen, Maiju Raassina och Riitta Väänänen (red.)

Utvärderingen av forskningen vid Helsingfors universitet utfördes 2018–2019 med ambitionen att ta fram data som kan användas i kvalitetsutvecklande syfte och till stöd för det strategiska beslutsfattandet vid universitetet. Utvärderingen omfattade all forskning vid universitetet. Sammanlagt utvärderades 39 enheter fördelade på fyra utvärderingspaneler. Den fullständiga utvärderingsrapporten består av två delar: Del I presenterar utvärderingsresultaten och rapporterna och Del II utvärderingsmetoderna.

Utvärderingen genomfördes av internationella kollegiala utvärderingspaneler. Enheterna som utvärderades var fakulteter, institutioner, avdelningar, enskilda discipliner eller grupper av discipliner, som hade eller skulle kunna ha gemensamma mål och utvecklingsplaner. Panelerna företrädde områdena humaniora (Humanities), livsvetens-

skap (Life Sciences), naturvetenskap (Natural Sciences) och samhällsvetenskap (Social Sciences). Universitetets rektor tillsatte en styrgrupp för att leda processen, och utvärderingen administrerades av utvärderingsbyrån vid sektorn för forskningsservice.

Utvärderingens tre teman var forskningens vetenskapliga kvalitet, samhällspåverkan samt forskningsmiljö och enheternas funktionsförmåga. Varje tema bedömdes individuellt enligt skalan svag–god–mycket god–utmärkt. Utvärderingsunderlaget bestod av självvärderingsrapporter som enheterna själva hade utarbetat samt metrisk data inklusive bibliometriska analyser av publikationsverksamheten i de relevanta forskningsområdena.

I fråga om vetenskaplig kvalitet visar de övergripande resultaten att forskningen vid universitetet genomgående håll-

er hög internationell kvalitet. Alla paneler hade enheter vars forskning anses vara enastående eller ledande inom sitt område. Utvärderingen visade också att forskningen vid HU har en utomordentligt stor samhällspåverkan. Nästan alla enheter fick betygen ”mycket god” eller ”utmärkt”, och beroende på panelen fick 46–100 % av enheterna betyget ”utmärkt” i fråga om samhällspåverkan. I fråga om forskningsmiljö och enheternas funktionsförmåga visade sig läget överlag vara gott.

I panelernas rekommendationer återkom särskilt följande teman: omsorg om nyfikenhetsdriven och tvärvetenskaplig forskning som kännetecknar ett forskningsintensivt universitet; säkerställande av en attraktiv forskningsmiljö med välfungerande karriärvägar och tjänster; enighet om gemensamma verksamhetsmodeller på organisationens olika nivåer; frågor som gäller jämlikhet och delaktighet.

Nyckelord: universitet, forskningsutvärdering, kvalitetsutvärdering, utvecklande utvärdering, utvecklingsarbete, strategisk utveckling

PREFACE

According to the Finnish Universities Act, research activities are to be assessed regularly in Finnish universities to ensure the quality, accountability and transparency of higher education. Finnish universities should hold international standards, be accountable to the society and taxpayers from whom they receive most of their funding, and show transparency by using independent expertise for the assessment.

The University of Helsinki is an internationally respected, comprehensive research-intensive university striving towards higher and higher quality. We are the only Finnish university competing in the top class of the world's 100 best multidisciplinary universities, and therefore, as the Finnish flagship on the research front, we have a national responsibility to guarantee the high quality of our research activities, to show that we do our utmost to spend the public funding wisely, and to communicate the results widely.

Universities have the autonomy to decide on how and how often to make assessments. The previous International Evaluation of Research at the University of Helsinki was carried out in 2010–2012. Research Communities formed for the evaluation were evaluated in four different categories, and the best were rewarded by additional funding.

Preparatory discussions on this assessment started already in late 2016, and the approach was agreed upon by the end of 2017. The task that was given was to make an assessment that would - by assessing the quality and impact of our research activities and their future potential - produce information for planning and development activities at the

University at the unit, faculty and university levels.

The decision was to choose an enhancement-led approach, where units would be assessed against their own goals. We would not make rankings of the assessed units, nor define any rewards or follow-on actions in advance. Questions concerning the research environment and unit viability would play a relatively important role in this kind of assessment, as those are factors underpinning the long-term success of research activities. The themes, process, data and criteria would be the same for all fields of research, but the discipline-based panels would follow practices that fit their fields, thus allowing for variations across the research community.

In the end, we designed a relatively conservative assessment, both for reasons of resources and schedule, but also to avoid complications in the interpretation of the results. Our implementation owes much international practices, especially the Standard Evaluation Protocol of the Netherlands, but also elements from the UK REF were adopted. The assessment was a combination of bibliometric analysis of publications for fields where applicable, self-assessment with supporting metric data, and panel interviews. In this way we combined an evaluation of the past performance, which is a good indication of the short-term success, and an assessment about the future potential.

Even a clean and simple process becomes a lot of work in a comprehensive research university: 11 faculties and 4 independent institutions, 39 units of assessment in four panels, approximately 1,150 pages of self-assessment, 46 experts in the panels and an outcome of 39 unit reports and

4 panel reports. This will serve as a useful knowledge base on where University of Helsinki research stands today and what are the keys for future success.

The assessment shows that there are areas of research that are either excellent or of world-leading quality in all campuses. The level of societal interactions was evaluated as very good or excellent in most units. Among the development areas, common themes were: fostering curiosity-driven and interdisciplinary research; securing an attractive research environment and infrastructure with well-functioning career paths and services; common ways of operating on different levels of organization; and paying attention to equality and inclusivity.

The enhancement-led approach was used for the first time at our University-level research assessment. Already the self-assessment phase as well as discussions during the process were very useful for the units. Discussions have continued and at the time of publication of this report, discussions between the vice-rector and the faculties and the independent institutes on their development have been initiated. We hope the assessment process has also initiated new thinking – or at least stirred lively discussions at different levels – on the role of goal-setting and the planning of research.

Planning for the next assessment will commence soon. Lessons learned from this assessment will obviously feed into the discussions on how to assess research in the future, but also into the numerous assessment exercises in faculties and independent institutes.

I would like to thank everyone who contributed to this assessment. From the University leadership's point of view, the process and the outcome have been a success. The assessment has met its goals, and it is now up to us, the academic community at our University, to take it from here, and be even stronger in the future.

Paula Eerola

Vice-Rector, Chair of the Assessment Steering Group

1 INTRODUCTION

The aim of the Research Assessment 2018–2019 University of Helsinki (RAUH) was to produce information that can be used for enhancing quality and supporting strategic decision-making at the University of Helsinki. The assessment covered all research carried out at the University, assessed in 39 Units in four assessment Panels. The complete report of the assessment consists of two parts, Vol I: Assessment results and reports and Vol II: Assessment method. In Vol I, we summarize the results for the Units: the distribution of grades, the highest graded Units by Panels, excellence by assessment theme and the suggested development areas. This part concludes with general remarks on grading, its limitations and

interpretation. Vol II includes the process description for the assessment, as well as the main documents defining the assessment: the assessment plan, self-assessment template and report template.

The assessment was carried out by international peer-review panels. The Units of Assessment (Unit) were defined to be Faculties, Institutes, Departments, disciplines or combinations of disciplines, where common goals and development plans are, or could be, established. The final composition of Units was discussed with each Faculty and Independent Institute, who then made the decision on their Units. The four Panels representing the areas of assessment were Humanities, Life Sciences, Natural Sciences and

Social Sciences. The assessment was led by the assessment Steering Group, nominated by the University Rector, and process was managed by the Research Assessment Office.

The three themes for the assessment were scientific quality, societal impact and research environment and viability. Each theme was assessed individually on a scale weak – good – very good – excellent. The assessment material consisted of self-assessment reports prepared at the Units and metric data, including bibliometric analyses of publication activity for relevant fields of research. For each theme, the Panels were asked to identify strengths and development areas and make recommendations both at Unit and Panel level.

2 ASSESSMENT RESULTS

DISTRIBUTION OF GRADES

The overall results of this research assessment show that research is of high international quality throughout the University of Helsinki. In every Panel, there are Units that are considered outstanding or cutting-edge in their field. None of the Units were graded weak in any of the three assessment themes.

The vast majority of the Units received either the grade excellent or very good in scientific quality. Of the total 39 Units assessed, 14 Units were graded excellent. The proportion of Units graded excellent in scientific quality varied from 23-67%, depending on the Panel. A total of 20

Units out of the 39 Units received the grade very good in scientific quality. The proportion of Units falling into these two highest categories was 78-100% of Units, depending on the Panel.

The societal impact of research conducted at the University of Helsinki was graded even higher than the scientific quality. The grade of excellent was awarded to 22 Units and very good to 14 Units. Altogether, 87-100% of Units received the highest grades in societal impact, depending on the Panel.

The research environment and Unit viability was

mostly graded excellent or very good. The grade excellent for research environment and Unit viability was awarded to seven Units and very good to 18 Units out of 39, which is 56%-83% of the Units depending on the Panel.

The **Department of Mathematics and Statistics**, the **Department of Physics and the Helsinki Institute of Physics (HIP)** and the **Institute for Atmospheric and Earth System Research (INAR)** at the Faculty of Sciences were graded excellent in all three assessment themes. All these Units were assessed by the Natural Sciences Panel.

Humanities Panel	Scientific quality	Societal impact	Research environment and Unit viability
Aleksanteri Institute, Faculty of Arts	Excellent	Excellent	Very good
Department of Cultures, Faculty of Arts	Excellent	Very good	Good to very good
Department of Digital Humanities, Faculty of Arts	Very good	Very good	Good
Department of Finnish, Finno-Ugrian and Scandinavian Studies, Faculty of Arts	Very good	Excellent	Good
Department of Languages, Faculty of Arts	Very good to excellent	Very good	Very good to excellent
Department of Philosophy, History and Art Studies, Faculty of Arts	Excellent	Excellent	Good
Philosophy, Faculty of Social Sciences and Faculty of Arts	Excellent	Excellent	Very good
Faculty of Theology, Faculty of Theology	Excellent	Excellent	Very good
Helsinki Collegium for Advanced Studies, Helsinki Collegium for Advanced Studies	Excellent	Very good	Excellent

Life Sciences Panel	Scientific quality	Societal impact	Research environment and Unit viability
Department of Agricultural Sciences, Faculty of Agriculture and Forestry	Good	Very good	Good
Department of Food and Nutrition, Faculty of Agriculture and Forestry	Very good	Excellent	Very good
Department of Forest Sciences, Faculty of Agriculture and Forestry	Very good	Very good	Good
Department of Microbiology, Faculty of Agriculture and Forestry	Very good	Excellent	Good
Ecosystems and Environment Research Programme, Faculty of Biological and Environmental Sciences	Very good	Very good	Excellent
Molecular and Integrative Biosciences Research Programme, Faculty of Biological and Environmental Sciences	Very good	Very good	Good
Organismal and Evolutionary Biology Research Programme, Faculty of Biological and Environmental Sciences	Excellent	Very good	Very good
Faculty of Medicine, Faculty of Medicine	Very good	Good	Good
Faculty of Pharmacy, Faculty of Pharmacy	Very good	Excellent	Very good
Faculty of Veterinary Medicine, Faculty of Veterinary Medicine	Very good	Excellent	Excellent
Finnish Museum of Natural History LUOMUS, Finnish Museum of Natural History LUOMUS	Very good	Excellent	Very good
HiLIFE Joint Activities and Infrastructure, HiLIFE Helsinki Institute of Life Science	N/A	N/A	N/A
Institute for Molecular Medicine Finland (FIMM), HiLIFE Helsinki Institute of Life Science	Excellent	Excellent	Very good
Institute of Biotechnology (BI), HiLIFE Helsinki Institute of Life Science	Excellent	Very good	Excellent
Neuroscience Center (NC), HiLIFE Helsinki Institute of Life Science	Very good	Very good	Good

N/A The Panel decided not to give grades

Natural Sciences Panel	Scientific quality	Societal impact	Research environment and Unit viability
Department of Chemistry, Faculty of Science	Very good to excellent	Excellent	Very good
Department of Computer Science, Faculty of Science	Very good	Excellent	Very good
Department of Geosciences and Geography, Faculty of Science	Very good	Excellent	Good
Department of Mathematics and Statistics, Faculty of Science	Excellent	Excellent	Excellent
Department of Physics and Helsinki Institute of Physics (HIP), Faculty of Science	Excellent	Excellent	Excellent
Institute for Atmospheric and Earth System Research (INAR), Faculty of Science	Excellent	Excellent	Excellent

Social Sciences Panel	Scientific quality	Societal impact	Research environment and Unit viability
Department of Economics and Management, Faculty of Agriculture and Forestry	Good	Good	Good
Ruralia Institute, Faculty of Agriculture and Forestry	Good	Excellent	Very good
Faculty of Educational Sciences, Faculty of Educational Sciences	Excellent	Excellent	Very good to excellent
Faculty of Law, Faculty of Law	Very good	Excellent	Very good to good
Economics, Faculty of Social Sciences	Very good	Excellent	Very good
Politics, Media and Communication, Faculty of Social Sciences	Very good	Very good	Very good
Social Research, Faculty of Social Sciences	Very good to excellent	Excellent	Very good to excellent
Society and Change, Faculty of Social Sciences	Excellent	Very good	Excellent to very good
Swedish School of Social Science, Swedish School of Social Science	Very good to good	Excellent to very good	Excellent to very good

HIGHEST GRADED UNITS BY PANELS

Humanities Panel

The quality of research produced in the Units was found impressive by the Humanities Panel. Elements of excellent research were found in every Unit, with significant concentrations of world leading outputs in highly ranked international journals and presses. The track record of external grant capture, especially from the ERC was considered remarkable. The level of societal impact generated in the Units was found to be extremely strong

as well. This included e.g. contributions to school teaching, monographs that supported wider public understanding of history and politics, and collaborations with policymaking and law enforcement. The Units have been operating under difficult conditions caused by budget cuts and organisational restructuring. The remarkably positive attitude in times of challenging circumstances was commended by the Panel.

The Humanities Panel assessed nine Units and graded

four of them excellent in two themes and very good in one theme. This was the highest combination of grades at this Panel. The **Aleksanteri Institute** at the Faculty of Arts, **Philosophy** at the Faculties of Arts and Social Sciences and the **Faculty of Theology** were graded excellent in their scientific quality and societal impact and very good in its research environment and Unit viability. The **Helsinki Collegium of Advanced Studies** was assessed to be excellent in its scientific quality and research environment

and Unit viability, and very good in its societal impact.

The Panel described the **Aleksanteri Institute** as an outstanding example of a social science-based area studies research institute with an international reputation and distinctive profile. According to the assessment, the volume and quality of publications are very impressive and demonstrate that the Institute's research areas are timely and internationally highly regarded. It has targeted the areas and audiences where its work can have a substantial impact and the evidence of societal impact is impressive. Researcher education was assessed to be excellent and the record for gaining external funding very good.

The Humanities Panel marked that the Unit **Philosophy** at the Faculties of Arts and Social Sciences has a strong international impact and visibility and outstanding scientific qualities. The quantity of publications was described as significant and the results as important and advancing the field of philosophy. The Panel described the list of actions for societal impact as impressive and was convinced that the Unit enjoys the status of being highly respected by Finnish society. The Unit's prospects for obtaining future research grants and top research results were assessed to be excellent.

The Panel stated that the research conducted at the **Faculty of Theology** is thematically innovative, highly interdisciplinary and internationally visible, and that the research output is at the forefront of international theological research. Research output in the most prestigious international publishing houses and in high-ranking journals was graded excellent. A broad range of research dissemination and impact activities nationally and internationally as well as the international visibility of individual research priorities and individual research personalities were considered to be strengths. The high

proportion of third-party funding was also positively noted by the Panel.

In its assessment, the Humanities Panel agreed that the **Helsinki Collegium for Advanced Studies** is fulfilling its mission to cultivate and achieve a "top-class international research environment" by nurturing innovative and multidisciplinary research, and noted that it enables Finnish and international scholars to spend dedicated research time within a supportive and interdisciplinary community. The high quality scientific outputs when measured against international benchmarks was noted with satisfaction. The interdisciplinary scope was considered a strength.

The Humanities Panel awarded the grade excellent in scientific quality and in societal impact also to the **Department of Cultures**, as well as the Unit of **History and Art Studies** at the Faculty of Arts. Scientific quality was graded excellent at the **Department of Cultures** at the Faculty of Arts, and societal impact at the **Department of Finnish, Finno-Ugrian and Scandinavian Studies** at the Faculty of Arts.

Life Sciences Panel

Overall, the quality of research publications and external research funding was considered impressive. It was clear that the research has impact on diverse audiences from government (policy / advocacy) to patients and populations and commercial - industry partnerships delivering economic gain. On Research environment and viability, the picture was more varied. The Life Science Units are generally very well equipped with state-of-the-art equipment and large infrastructures but the Panel recommended paying attention to agreeing on a shared Life Sciences strategy, Unit leadership and structural issues, and academic ownership of societal impact in the Units.

Of the 15 Units assessed by the Life Sciences Panel, the **Institute for Molecular Medicine Finland (FIMM)**, the **Institute of Biotechnology (BI)** and the **Faculty of Veterinary Medicine** received the highest grading within the Life Sciences Panel: excellent in two themes and very good in one.

The scientific quality and societal impact of research at the **Institute for Molecular Medicine Finland (FIMM)** were graded excellent. The research of the FIMM was described as outstanding and internationally competitive with major societal impact, implications and benefit. The FIMM was assessed to perform outstandingly by all indicators. Research is highly collaborative nationally and internationally and the quality and quantity of research outputs are excellent. Outreach and dissemination was assessed to be very strong. The research environment and Unit viability was graded very good with excellent facilities and infrastructure, international collaborations and connections, training opportunities and leadership.

The Life Sciences Panel assessed the scientific quality and the research environment and Unit viability as excellent at the **Institute of Biotechnology (BI)** and stated that it was "a flagship Unit of scientific excellence at the University of Helsinki". Scientific productivity was described as world-class, with clear evidence of originality and publication output exceeding the world average. The panel was impressed by the number of prestigious national and international research grants awarded to the BI. The research environment was described as outstanding with a superb infrastructure, well-defined leadership, networks of national and international collaborations and a strong training programme. The societal impact of research was graded very good, with a high level of activity and significant efforts made to reach out to appropriate target audiences.

The **Faculty of Veterinary Medicine** was graded excellent for its societal impact and research environment and Unit viability. Stakeholders were assessed to be explicitly identified and the track record in providing scientific support to legislators and authorities and successful cooperation with the industrial sectors excellent. The strategic development of the Faculty was described as extraordinarily visionary and successful. The scientific quality was graded very good and assessed to be of very high quality and in some areas world class.

The scientific quality of the **Organismal and Evolutionary Biology Research Programme** at the Faculty of Biological and Environmental Sciences was graded excellent. The **Department of Food and Nutrition** and **Department of Microbiology** at the Faculty of Agriculture and Forestry, the **Faculty of Pharmacy** and the **Finnish Museum of Natural History LUOMUS** were graded excellent for their societal impact, and the **Ecosystems and Environment Research Programme**, the Faculty of Biological and Environmental Sciences were graded excellent for their research environment and Unit viability.

Natural Sciences Panel

All Natural Sciences Panel Units are strongly embedded in the international science community. Several National Tasks are linked through research collaborations with the Faculty, which is mutually beneficial for staying at the front of knowledge and to share infrastructure. The Societal Impact was found excellent across all Units. This included teacher training, special events for children to motivate them for science, outreach in TV and press and lobbying in politics. The Panel presented their feeling that the collaboration between the Dean and the Departments functions well and the Faculty is well organized.

The Natural Sciences Panel assessed six Units of the Faculty of Science. Three Units were graded excellent in all three assessment themes: the **Department of Mathematics and Statistics**, the **Department of Physics and the Helsinki Institute of Physics (HIP)** and the **Institute for Atmospheric and Earth System Research (INAR)**.

According to the Panel, the **Department of Mathematics and Statistics** is well known worldwide for its expertise. The scientific strategy was assessed as excellent and the research outputs remarkable for variety, novelty and originality. The Panel highlighted the excellent research record in all the fields the Unit works on and was impressed at the number and level of the interactions with other scientific fields. The selection of targets and activities concerning societal impact was assessed as perfectly adapted to their expertise and societal impact was considered remarkable. The policy and methodology for the recruitment of academic staff, students, and the network of national and international collaborators were also assessed to be excellent.

The **Department of Physics and the Helsinki Institute of Physics (HIP)** Unit was acknowledged for its successful participation in world leading, large international projects and having several widely internationally known professors. The bibliometric indicators showed excellence: a very high number of publications, predominantly in top international journals with a citation rate above average and more than 90% involving international collaboration. A strong outreach programme along with successful research commercialization and industrial collaboration contributed to excellent societal impact. The infrastructure was assessed to be remarkably strong and the training of early-career researchers and graduate students excellent.

The Natural Sciences Panel assessed that the disciplinary contribution of the **Institute for Atmospheric**

and Earth System Research (INAR) is world leading. The INAR was also noted to have a significant role in global atmospheric chemistry observational infrastructure and in process-level understanding of its discipline. The Panel praised the number of highly-cited papers and papers among the world top 1% and called the publication record unique. The Panel called the national and international networks the INAR is committed to very impressive. The INAR was also noted for its science diplomacy strategy and its ambition to develop a “science for service” value chain. INAR was assessed to attract public and private funders and eventually investors through its convincing mission and execution of that mission.

In the Natural Sciences Panel, excellent societal impact was also acknowledged in the **Departments of Chemistry, Computer Science** and **Geosciences and Geography**.

Social Sciences Panel

The social and behavioural sciences at the University constitute, taken as a whole, an impressive domain of research where a sense of the need to uphold high quality permeates the entire organisation. The social sciences at the University stand out, in almost any international comparison, by their degree of societal impact. The reforms of the University were still visible but most of the Units have themselves deliberated about how to maximise their potential and have drawn up plans accordingly. The Panel also concluded that there was a genuine commitment among leadership, Faculty and students alike to further strengthen the Units.

The Social Sciences Panel assessed nine Units of which the **Faculty of Educational Sciences** received the highest combination of grades: excellent in scientific quality and societal impact, and very good to excellent in Unit

viability. The **Social Research** and **Society and Change** Units of the Faculty of Social Sciences were assessed to be excellent in one theme and at least very good in two themes.

The societal impact of the **Faculty of Educational Sciences** was praised as excellent, even outstanding. At the international level, the Unit has received notable recognition, while two Faculty members have had appointments as UNESCO Chairs. At the national level, significant societal impacts have been achieved via active roles developing educational practices and policies. The scientific quality of research was graded excellent. According to the Panel assessment, the Faculty of Educational Sciences has outstandingly strong research, with a track record of a substantial number of publications in highly-ranked refereed journals and books as well as multiple discoveries and creative findings. The research environment and Unit viability was graded very good to excellent with a note that the

Teacher Training Schools provided an excellent infrastructure, a living lab and a basis for a learning community.

The societal impact of the Unit **Social Research**, Faculty of Social Sciences was graded excellent. The Panel stated that the societal impact activities and outcomes were outstanding and world-leading for public policy, and make the world better. The scientific quality was graded very good to excellent. Scientific originality and methodological innovation in several research projects was assessed to be strong and qualified as cutting-edge. The Panel recognized original and excellent scientific productions which compared favourably with the best worldwide regarding originality. The research environment and Unit viability was graded very good to excellent. Excellent collaboration with other Units and stakeholders and the internal collegiality were considered strengths.

The Unit **Society and Change**, Faculty of Social

Sciences was graded excellent for its scientific quality. The subject matter of the key research was assessed to be of major intellectual and societal concern both nationally and internationally. Outputs published in the disciplines' top-ranked journals were assessed as reflecting outstanding scientific quality. The Panel graded the research environment and Unit viability excellent to very good and noted the extremely impressive number of substantial and prestigious research grants awarded to the Unit and the new high-quality appointments. The numerous expert hearings in the Finnish Parliament on the preparation of legislation was pointed out by the Panel as justification for the grade very good for the societal impact.

In the Social Sciences Panel, the societal impact was assessed to be excellent in the **Ruralia Institute** of the Faculty of Agriculture and Forestry, the **Faculty of Law**, and **Economics** at the Faculty of Social Sciences.

EXCELLENCE BY ASSESSMENT THEMES

Scientific quality

According to the Panels' feedback, excellent scientific quality means quality on an international scale. Units that are considered respected and advancing in their field, have internationally high visibility, unique expertise and a distinctive profile, stand out. Success in University rankings is also noted by the Panels. Internationalization and international collaborations are an essential part of excellent scientific quality.

In the excellent Units, the volume and quality of scientific outputs, measured by bibliometric indicators such as citations, is high or increasing. Furthermore, the publication activity matches the research goals of the Unit. Descriptions given for excellent output are, for example, remarkable variety, novelty and originality or exceptional in quality and quantity. The excellence of outputs is usually associated with working in international collaborations and research outputs in highly-ranked journals, books and publishers.

The excellent Units have been successful in obtaining external funding from prestigious and competitive national and international bodies such as the Academy of Finland, the Finnish Strategic Research Council and the European Research Council. In addition, industrial funding is appreciated by the Natural Sciences Panel.

Research topics and goals in excellent Units are well formulated. The goals are set based on the strengths of the Unit, by scanning for new opportunities in a broad global

context. Originality and plurality in methodology with a strong inter- and multidisciplinary aspect are also common. The research strategies are effective and clearly guide the work towards ambitious and unique goals and areas.

Other features of excellence in scientific quality include leading editing roles in quality journals, expanded expertise in research infrastructure, promotion of young researchers, balance of researcher at different career levels in the Unit, high national visibility, openness to collaboration in research, education and training, as well as experimental facilities and a high number of doctoral degrees.

Societal impact

The Units with the 'Excellent' grade in societal impact have wide interaction with the general public. Contributing to and taking part in policy-making, as well as interaction with the governmental bodies is well covered by all excellent Units. Non-profit organizations are important audiences for the many top-category Units and collaboration with enterprises especially for Units in Natural and Life Sciences.

The Units excellent in societal impact have a clear specification of their most important stakeholders and they make sensible choices in targeting their areas and audiences of societal impact. They take part in relevant decision-making and policy briefing processes outside academia.

They are active in media discussions and committed to increasing the awareness of the research results and their relevance in society. They often enjoy the high respect of society, especially as educators. Their outreach activities are frequent and successful in making an impact, for example in the form of scientific support for legislators, professional literature, committee participation, or entrepreneurial outcomes such as patents and spin-offs.

Research environment and Unit viability

In all the Panels, the Units excellent in research environment and Unit viability are appraised for their management and leadership procedures and practices. In the Panel feedback, the Units that have clear and lean structures and well-functioning planning processes that align with Faculty and University levels are appreciated. Transparent management, a cooperative environment and collegial leadership seem to create an excellent working culture which supports the Unit viability.

Human resource development is part of an excellent Unit's research environment. Examples of well-functioning practices are research leaves offered for those at advanced stages of their careers, travelling grants for earlier career staff, offering postdocs and PhD students opportunities for project management duties, clear career development

schemes especially at the level of PIs, post-doctoral association networking, and well-defined measures for managing the well-being of staff and students.

Excellent Units support and enable cooperation in many forms. They are hubs of interdisciplinary research with an "ethos of collaboration", they take part in nationally and internationally active networks and include strong links with other UH Units as well as stakeholders.

The Panels value strategic thinking. In the excellent Units, there is a clear awareness of the strategic choices facing the Unit, long-term vision and strategic development work to support the research environment as well as a clear mission and an ability to prioritize. In the Panel feedback, successful strategic work is linked with excellence in research, high international visibility and high educational and societal impact. The excellent Units often also have clear funding strategies, and have proven successful in the competition for funding and grant awards, from a variety of sources.

The Panels also mention doctoral education in their feedback on excellence in viability. Strong PhD and post-doctoral training programmes that are well-organized and productive receive positive remarks from the Panels. High-quality infrastructures are naturally an asset, especially in the Life Sciences and Natural Sciences.

DEVELOPMENT AREAS

Within the development areas, three themes stand out, as more than one Panel noted them in their recommendations. Each of the Panels have their own emphasis and way of describing the development area but common features can be summarized as below.

Curiosity-driven and interdisciplinary research

The Panel feedback stated that curiosity-driven research needs to be ensured and enabled. This means, for example, that scholars need to be fully involved in the process of the creation of new research themes. The long-term consequences of the scholarly work carried out in a research University, are often unforeseen and even unforeseeable.

There is also a need in academic settings at large to further enhance interdisciplinary and collaborative research, especially in the social sciences and the humanities.

In addition, concrete recommendations are made to reconsider the groupings of subjects within Departments (in large Faculties) and to support the resources for more long-term strategic initiatives at the lower organizational levels.

Attractive research environments and competitive infrastructure

According to the Panel feedback, there was a lot of variation between the Units in strategic leadership. Strengthening the strategic thinking and leadership capability as well as opportunity at Unit and sub-Unit levels is a common development area for all Panels. There were also signs of a need for further articulation of relationships between

strategy, responsibility and resource allocation at the sub-Unit level (within Faculties and independent institutes). The Life Sciences Panel recommends developing an overarching vision for the Life Sciences at the UH and reconsidering the focus and configuration of HiLIFE.

Human resource management and guidance play an important role in creating, maintaining an attractive research environment. Improving the career development of PhD students and early career researchers e.g. in the form of mentorship is pointed out in the Panel feedback. Especially the Natural Sciences Panel is concerned about the long time taken by tenure processes at the UH.

The establishment of doctoral schools and programmes are seen as a major achievement. However, the differences in the positions of internally- and externally-funded PhD candidates is highlighted throughout the interviews and self-assessment reports, especially in the field of humanities.

Developing the infrastructure is recommended, for example, by strengthening the funding for medium-size infrastructures in the natural sciences field. Plans should be made for the provision of a sufficient digital infrastructure, perhaps in consultation with library services for humanities.

Common ways of operating

The availability of local administrative resources varies between individual Units and the Faculties. The relationship with the Units and the University Services may need further articulation and improvement. The implementation

stage of research projects is also in need of administrative support which is found to be efficient and generous in the preparation phase of the research proposals.

The Humanities Panel suggests reviewing hiring practices at the Faculty to improve the involvement of scholars in the process and to speed it up. There was a concern that the time between the identification of the need for a permanent appointment and the advertisement of the vacancy was long. Also worrying was the impression that subject experts were not always asked to be members of academic hiring panels, which is seen as against good international practice.

Systematic strategies for work on societal impact should be developed at the Units but, at the same time, an overview of ongoing actions and best practices, as well as administrative support for them should be maintained at the Faculty level. Overall, there is a call for clear academic ownership of societal impact.

Equality and inclusivity

Ensuring equality and inclusivity was recognized as a common development theme. There is an urgent need for putting in place at Unit level (and beyond) an easy-access and confidential system for reporting staff and student concerns relating to social welfare, harassment, bullying and discrimination. Further work is required on equality and inclusivity, embracing, but not restricted to, international metrics. It is also recommended to pay attention to equality and diversity especially in succession planning.

GENERAL REMARKS ON GRADING

The focus of the assessment was on the future competitiveness of the Unit within the three assessment themes: scientific quality, societal impact and research environment and Unit viability. Past performance was considered to be an important underpinning factor for future success in scientific quality. In the themes of societal impact and research environment and Unit viability, the past outcomes, practices and metric data provide supporting evidence to the written self-assessment when assessing the Unit's potential for future success.

The four Panels acted as independent review teams, following common guidelines and criteria agreed by the RAUH Steering Group (see Appendix IV). Each Panel was responsible for adjusting their interpretation of the grading criteria for their fields of research and research culture. The description of the use of criteria written by the Panel can be found in the beginning of each assessment report. It should be noted that the Life Sciences Panel chose to follow a stricter grading for scientific quality than other Panels. Within the Life Sciences Panel, grade 'Good' refers to internationally recognized research in terms of originality, significance and rigour. In the original RAUH criteria grade, 'Good' refers to national activity only, with evidence of potential for international work. It should also be noted that the Humanities Panel and the Social Sciences Panel decided to use half grades (e.g. Excellent to Very good, Good to Very Good) in their assessment.

As a result, the grading is not comparable across the Panels. This does not compromise the aim and purpose of the assessment, but should be kept in mind when discussing

the assessment results, especially in cases where Units from the same Faculty have been assessed by different Panels.

Scientific quality

The scientific quality of the Unit was assessed against the goals the Unit had set for its research questions, activities, results and outputs. Both the quantity and quality of results and outputs were considered. At the same time, they were compared to international standards within the fields of the research concerned.

The use of metric data in this assessment followed the principles described in the Leiden Manifesto. Bibliometric indicators (where applicable) reflect the scientific impact of the research in the Unit and are used as a proxy for the scientific impact of earlier work. However, the metric data and bibliometric indicators were provided to support qualitative expert assessment.

Societal impact

Societal impact emphasized the capacity and potential within the Unit to be a source of societal impact in the future. In this assessment, the key issue was to assess contributions in areas that the Unit has itself designated as target areas and focus on factors that the Unit's academic community has full control over.

The aim thus was to assess how the Unit has identified its target areas of the societal impact, identified potential audiences and research questions or results which are or would be relevant to them, and what outreach and valorization activities the Unit has produced.

The grading for societal impact was based primarily on the key factors for success, the description of the goals, target audiences and activities provided by the Unit in the self-assessment report (SAR). The examples of outcomes supported the conclusions. To reach either of the two highest grades, successful outcomes should always be presented.

Research environment and Unit viability

In this theme, the key issue was the Unit's position for the future. The Units had assessed their own goal-setting procedures, leadership and management practices and resources. Metric data (e.g. staff and funding) was provided at the Unit and/or Faculty/Independent institute level. The qualitative self-reflection provided by the Unit and the quantitative, metric data together form a picture of the Unit's research environment and viability.

The assessment focused on the alignment of the plans, goals and the Unit's capability of following and developing its own activities in a meaningful way. Attention was also paid to the Unit's capability of recognizing its own strengths and development areas.

The grading gives an overall idea of the 'development stage' of the Unit but the qualitative feedback from the Panel is the most valuable outcome of the assessment. For example, the Unit can be in the 'excellent' category even if the ways of operating are not yet fully established but there is evidence of successful development activities existing in the Unit.

3 ASSESSMENT REPORTS

Humanities Panel

PANEL SUMMARY REPORT

1 OVERALL ASSESSMENT

Researchers in the Units of Assessment for arts and humanities (hereafter the UoA) produce excellent research across all sub-units, with some elements of good and very good work. The societal impact of this research is excellent or very good. However, the research environment is rated as good with some elements that are very good. The research environment has suffered due to financial constraints, lack of local administrative support, and structural reorganisation, and the Panel is concerned that unless our concerns are addressed the quality of future research will be affected negatively.

Scientific quality

Excellent: we found work of excellent quality in every Unit but are especially impressed by the research in History and Art Studies, Philosophy, Theology, the Aleksanteri Institute and much of the work in languages. We were also impressed by the way in which the Helsinki Collegium for Advanced Studies (HCAS) supports excellent interdisciplinary research in collaboration with visiting scholars.

Societal impact

Excellent: we particularly wish to commend the societal impact generated by History and Art Studies, Philosophy,

Theology, the Aleksanteri Institute, and Finnish and Scandinavian Studies.

Research environment and viability

Good to very good: we are aware that Units have recently been operating under very difficult conditions caused by budget cuts and organisational restructuring. The Panel is, however, concerned that this may have deleterious effects on research outputs and impact in future, unless positive change is initiated by the university as a whole.

2 STRENGTHS AND DEVELOPMENT AREAS

Research outputs and societal impact are impressive; we rated both as either excellent, or very good. This is despite researchers having to work in a challenging environment of budget cuts, lack of administrative support and organisation reorganisation.

2.1 Key strengths and highlights

Scientific quality

We rated scientific quality as excellent.

The Panel was very impressed by the quality of research produced across the UoAs as a whole. We found elements of excellent research in every Unit, with significant concentrations of world leading outputs in highly ranked international journals and presses. The quality of outputs is overwhelmingly excellent with a minority of very good or good quality publications.

We were especially impressed with the consistently excellent research produced by History and Art Studies, Philosophy, Theology, the Aleksanteri Institute and much of the work in languages. These Units have a distinguished history of achievement in research and show a determination to continue to achieve equally highly in future. The Helsinki Collegium for Advanced studies also supports excellent interdisciplinary research in collaboration with visiting scholars, some of whom then go on to become academics at UH.

Researchers across the UoAs were also aware of the need to publish in Finnish, Swedish and other Nordic and European languages to ensure the widest possible impact of their work, and we felt that they maintained this balance deftly. We found many examples of fruitful collaboration between researchers in different disciplines whether inside or beyond the Faculty of Theology and Faculty of Arts and willingness to adopt interdisciplinary research methods, including those from digital humanities.

The Panel was very impressed with the track record of external grant capture, especially from the ERC. The latter is

an outstanding achievement, remarkable across all Nordic countries. It is evidence of the high quality of research being produced across the UoAs but was especially notable in Philosophy.

Societal impact

We rated societal impact as excellent (to very good).

Once again, the level of societal impact generated in the UoAs is extremely strong. This included contributions to school teaching, monographs that supported wider public understanding of history and politics, and collaborations with policy making and law enforcement, to give just a few examples. The majority of impact generated is excellent and the rest very good. We were especially impressed by the work of the Aleksanteri Institute, History and Art Studies, Philosophy, Theology and Finnish and Scandinavian Studies.

Research environment and viability

We rated the research environment as good to very good, overall.

We are aware that Units have recently been operating under very difficult conditions caused by budget cuts and organisational restructuring. Nevertheless, we have assessed the research environment as it was presented to us, while always bearing in mind that Units are taking all possible actions to mitigate damage. The Panel is, however concerned that this may result in deleterious effects on research outputs and impact in future, unless positive change is initiated by the university as a whole. We provide

further detail under development areas, below.

We were impressed by the high quality of library resources available to researchers, including both the National library, with its remarkable collections, for example the Slavonic Library; and at the new Kaisa House library.

The HCAS makes a very important positive contribution to the research environment in the humanities by making it possible for UH scholars to work with visiting scholars who are based there. The Collegium also supports a wide range of interdisciplinary research projects and hosts early career scholars, some of whom have gone on to become academics at UH.

We also commend the majority of those we met for a remarkably positive attitude in the face of challenging circumstances, and for their willingness to try to overcome the problems caused by budgetary and organisational pressures. We found positive, collegial research cultures in several Units, which had the unity of purpose and intellectual outlook conducive to the production of excellent research. This was to be found in Theology, Languages, the Aleksanteri Institute, Finnish and Scandinavian Studies, and Philosophy. The latter is especially remarkable because it is split over two faculties, and does not constitute an independent department, as would be usual in most universities, internationally. Indeed we found that, where positive and intellectually coherent Units existed, these often mapped onto areas that are recognised as broad subject fields in many universities, globally and are thus supportive of positive research cultures.

2.2 Development areas

Scientific quality

The use of JUFO rankings is problematic for many Units in the humanities. These do not appear to take sufficient account of monograph publication, which is crucial for many humanities scholars, if their work is to be considered outstanding in an international context. We also noted that in some areas, for example philosophy and digital humanities, journals which subject experts on the Panel regard as the most prestigious in their area, internationally, are not listed as JUFO level 3. We therefore urge caution in the use of such rankings in the humanities for any future financial negotiations

Further development is needed bringing together work that involves digital methods in humanities research. A promising start has been made by the Department of Digital Humanities and UH has a long and distinguished history of the use of digital methods in corpus, and historical, linguistics. This pioneering work underpins much modern research with digital text, including that in data science, and UH's strength in the area could be more widely celebrated within the university. It is therefore crucial for the future credibility of Digital Humanities at UH for researchers from Department of Digital Humanities (DDH) to collaborate fully with researchers across the UoAs, especially in the Departments of Languages and Finnish and Scandinavian Studies, where world-leading research in digital humanities has long existed. Such collaboration should result in a more coherent vision and strategy for the future of digital humanities with a distinctive University of Helsinki style.

Societal impact

Despite the excellent societal impact generated in many Units we felt that not all Units were clear about the nature of impact in the humanities, and methods by which this might be achieved. Although, in many cases, the impact generated was excellent, it often resulted from the efforts of individuals or projects, rather than clearly expressed plan for the Unit. The development of such a plan could help Units to prioritise which opportunities, among the many possible avenues for impact, they might pursue, and which academics should undertake relevant tasks. We are aware that there are many conflicting demands on academic time, and thus more careful prioritisation will help safeguard a good balance of staff member's overall academic work. The development of more systematic strategies at Unit level, therefore, could result in even more impressive achievements in the area of societal impact.

We would also recommend that the Faculties of Arts and Theology and HCAS management teams keep a central overview of existing actions for societal impact and of best practices so that Units can learn from and support each other in their engagements with other societal partners. The Faculties could also help the researchers by dedicating some of its administrative resource to support this activity.

Research environment and viability

Researchers across the UoAs are very aware of the need successfully to navigate a path between the generation of bottom up, curiosity-based research, and the top-down pressures of strategic themes which respond to the Finnish government's requirements that universities generate

agrees of focus. However, at present they do not appear to feel that such research themes are relevant to their areas of expertise, and are, quite rightly, aware that in the humanities the best research often results from individual creativity. There will always be a need for outstanding single scholar research, resulting in monographs, as well as team-based, collaborative projects. However, we found that many researchers would also welcome the ability to contribute more fully to the processes that create future themes and areas of focus. We therefore recommend that, in future, humanities scholars are more fully involved in the process of the creation of new research themes.

Units have been operating in a challenging financial environment, over which they had no control, and they have dealt with the difficulties that this has caused with determination and significant good will. They have striven to overcome problems and maintain their excellent track record despite this, with considerable success. It is not clear, however, how long they will be able to do so, if the financial environment continues to be as adverse, since most of the outputs we evaluated were produced before the budget cuts and administrative reorganisation, and thus are products of a more positive climate.

Humanities disciplines have been especially negatively affected by the reduction in local administrative resource as a consequence of such budgetary pressures. This has resulted in academics having to perform generic administrative tasks, reducing, sometimes very considerably, the amount of time available for research. In a culture where research is still overwhelmingly performed by single scholars, and where PhD students and postdocs

tend to work on their own projects, rather than that of a supervisor or research group, such a reduction in time has a disproportionately negative effect. In large scientific research groups, tasks can be delegated, but a world leading monograph must be written by the scholar who did the primary research. There is a serious risk, therefore, that if the situation does not improve, research quality and volume will decline. We therefore recommend that the balance of local administrative resource between individuals Units and the Faculties of Arts and Theology be reconsidered.

We understand that, in the past, there were too many small, isolated units in the Faculty of Arts, and that, as a result some element of consolidation was necessary. However, we would suggest that the process may have been taken too far, and that now there may be too few units, some of which lack intellectual coherence and identity. In some cases this made it very difficult for Units to identify international benchmarks; they could do so at the level of individual disciplines but could not find international comparators at a larger scale- for example in the Department of Cultures. PhD students also told us that they would welcome a stronger disciplinary identification as a preparation for the job market, internationally, which is still generally organised on disciplinary lines.

In some cases the Panel felt that the intellectual rationale behind the combination of disciplines was not clearly articulated, and, as a result, observed that cultures in very diverse Units could be less conducive to the production of excellent research. Indeed, as the Helsinki University Change Review Group's report *Beyond the Changes: The effects of, and lessons from, the downsizing and restructuring process of 2015-2017* argues, it appears that the humanities may not have been treated with equity in this respect, as compared to the sciences. We agreed with Scott

that the rationale for the continued existence of discrete departments of Physics and Chemistry but not History or Philosophy is not evident, and that such a situation is not conducive to the visibility of the humanities, either within the university or on the international stage. We do not believe that a lack of cohesive research culture is simply a function of relatively recent reorganisation, since the newly-created department of languages already demonstrates an impressive sense of intellectual coherence. The Panel therefore suggests that groupings be reconsidered, and a slightly larger number of discrete Units created, which correspond more closely to internationally recognised research disciplines.

We welcomed the positive and enthusiastic attitude displayed by the PhD students and postdocs that we met. Nevertheless, we felt that more could be done to support their career development and to provide mentoring and training in preparation for permanent employment whether in academia or outside it.

While we recognise that funds to employ staff from external funding are disbursed reasonably promptly, we were also concerned to learn about the very long lead-time between the identification of the need for a permanent appointment and the advertisement of the vacancy (18 months was mentioned several times). This is contrary to assurances in the university strategy that: 'The filling of academic posts will be expedited' and may result in the most talented researchers being employed by competitors before UH has been able to act. We were further concerned to learn that subject experts are not always asked to be members of academic hiring Panels. We feel strongly that this is contrary to good practice, internationally: the involvement of at least one subject expert on a hiring Panel is considered essential in all universities where Panel

members have worked. We therefore recommend that hiring practices are reconsidered at a Faculty level.

We recognise that the new structures require financial and HR decisions to be taken at Faculty level. However, a, perhaps unintended, consequence of this appears to be that departments may feel disenfranchised, which inhibits effective leadership and the generation of local strategies and future plans. It is essential that Units feel responsible for their own research direction, but this did not always appear to be the case. One example was given of a local research committee having been abolished following the restructure; a very regrettable development.

We also noted, with regret, a significant gender imbalance in leadership positions. Only two of the Units we met were led by women; this is unusual in humanities where female professors and senior leaders are relatively well represented, internationally. We recommend that urgent action is taken to determine the reasons for this imbalance, and to support the career development of potential female leaders of the future, so that it may be remedied. We therefore recommend that consideration be given to developing more strategic capacity and giving opportunity for leadership at a Unit level, including attention to equality and diversity considerations in succession planning.

As we have discussed above, UH possesses an excellent track record, and significant potential for future development in digital humanities. However, such research may necessitate investment in digital infrastructure. While we commend UH's involvement in FINCLARIN, in a constrained funding environment, the provision of appropriate digital infrastructure may prove a challenge. We recommend that plans are made for the provision of sufficient digital infrastructure, perhaps in consultation with library services.

3 GOOD PRACTICES AND RECOMMENDATIONS

3.1 Good practices

The Panel wishes to mention the following good practices:

- Effective mentoring of more junior colleagues by more experienced investigators when preparing grant applications: especially in Finnish and Scandinavian studies, but found in several Units
- Cohesive, positive and collegial research cultures: especially in Philosophy, Finnish and Scandinavian Studies, Theology, Languages and the Aleksanteri Institute.
- Very impressive external grant capture, especially from the ERC: especially in Philosophy
- The organisation of a national DH Summit: department of Digital Humanities
- The publication of research, in a wide variety of languages (22), including in monograph form that has impressive societal impact: this was found very widely across the UoAs.

3.2 Recommendations

The Panel recommends that:

1. Humanities scholars should be more fully involved in the process of the creation of new research themes;
2. JUFO rankings should be used with caution in the humanities for any future financial negotiations
3. The balance of local administrative resource between individual Units and the Faculty of Arts be reconsidered;
4. Groupings of subjects within departments be reconsidered, and a slightly larger number of discrete Units which correspond more closely to internationally recognised research disciplines be created;
5. More could be done to support the career development of PhD students and early career researchers;
6. Hiring practices should be reviewed at Faculty level;
7. Consideration should be given to developing more strategic capacity and giving opportunity for leadership at a Unit level, including paying attention to equality and diversity in succession planning;
8. More systematic strategies for work on societal impact should be developed at Unit level;
9. The Faculties keep a central overview of existing actions for societal impact and of best practices and provides the necessary administrative support for this;
10. DDH should collaborate fully with researchers across the whole UoAs, especially those in the department of languages;
11. Plans are made for the provision of sufficient digital infrastructure, perhaps in consultation with library services.

Humanities Panel

ALEKSANTERI INSTITUTE (HUM UNIT 01)

Faculty of Arts

1 SUMMARY

1.1 Description of the use of criteria

The assessment of Unit HUM_Unit_01, (Aleksanteri Institute) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

The Aleksanteri Institute occupies a distinctive place in the Faculty of Arts as a multi-disciplinary area studies institute with a very strong and cohesive identity. It is the Finnish national centre for research in Russian studies.

Strengths

- Excellent research goals and outputs
- Excellent societal impact
- Cohesive, innovative and impressive research framework
- Outstanding example of social science-based area studies research institute with an international reputation

Development areas and recommendations

- Enhance employment pattern for Institute staff
- Consider extending research area to take full advantage of Slavonic Library resources
- Establish a research committee that has oversight of the Institute's research policy

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit has a distinctive profile internationally. Its selection of goals allows the Institute to build on its strengths. The research goals and the policy are cohesive and the Unit has created high-quality outputs in its field. However, the concentration of research goals could pose a risk in rapidly-changing external and internal environments.

GRADING: EXCELLENT

Research goals

The Aleksanteri Institute identifies its research objective as 'to bring together cutting-edge expertise of scholars working in the Institute and outside to create groundbreaking frameworks of analysis, integrating advanced studies in specialized research fields into area studies'. The Institute believes that the uniqueness of its approach lies in placing research on global challenges into the context of Russian, East European and Eurasian area studies, identifying six central research areas as its main areas of interest:

- Environment and climate change
- Security challenges
- Changes in culture and identities
- Democratisation
- Innovation and digitalisation
- Inequality and human capital

The Institute sees its research as contributing to the UH strategic priorities for the period 2017–2020 of Globalisation and Sustainability, and also having relevance to the University's thematic focus on World Order and Global Interaction. These research areas will help to explain critical contemporary phenomena through the prism of Russian, Eurasian and East European studies and will allow the Institute to extend its research into novel areas.

The Institute's focus on contemporary issues allows it to concentrate the strength of its researchers and to engage with a coherent set of research topics. The selection of research goals allows the Institute to build on its areas of strength and experience, especially through the Centre of Excellence in Russian Studies, which operated between 2012 and 2017, and which concentrated on analysing choices for Russian modernisation. The goals the Institute has set itself reflect the expertise of its researchers and also contribute to the overall aims of the University of Helsinki (UH). They give the Institute a distinctive profile internationally.

Research results

The Institute has identified five areas where it believes its research has produced significant outcomes. Between 2012 and 2017 the Institute hosted the Centre for Excellence in Russian Studies, funded by the Academy of Finland, and it suggests that the centre of excellence has been crucial in developing multi- and interdisciplinary work in Russian

studies. The centre added a new perspective to the study of contemporary Russia by stressing the significance of agency in Russian development, with other focuses on structures, path dependencies and the consequences of actions, both intended and unintended. The Institute believes that this theoretical and methodological approach is novel and that it has been important in attracting international attention to its work.

Six subject areas have been identified as producing especially important research results.

- Welfare policy and its implementation has been examined in both its theoretical and practical aspects. An interdisciplinary theoretical approach has been applied to analysing Russian social policy, particularly in the fields of poverty, health and education. Alongside this work, the Institute has fostered the formation of a centre for Russian welfare data, designed to gather relevant data sources and to acquire relevant IT tools to analyse this data.
- The politics and governance of Russia has been studied using an agency-based theoretical approach.
- Connections between energy policy and political power have been analysed to show how energy is used in the Russian domestic political context.
- The traditional view of the Cold War has been challenged by research showing how multilevel interaction operated and this approach has launched a new branch of Cold War studies.

- The research group on migration has worked on a theoretically-based assessment of migration and informality.
- New work on Russian culture and religion has critically assessed the impact of religious institutions.

Common to each of these research areas is a focus on the theoretical and conceptual frameworks underpinning the empirical work of the Institute. This approach gives the work of the Institute a clear distinctiveness and cohesiveness, unusual in the humanities, and indicates that the Institute has identified an original and significant set of research themes. The six discrete subject areas that form the bulk of the Institute's work provide a focus on society, politics and culture in contemporary Russia and can offer insights into each other. This approach was at the core of the Centre for Excellence in Russian Studies and has borne fruit in stimulating intensive work, with the Institute gaining international recognition for its concentrated approach to research on Russia. The Institute's focus on contemporary Russia is a very considerable strength, but the concomitant lessening of research on Russia's past and the roots of its contemporary problems could result in an uneven approach in the Institute's research. By positioning itself in this way, the Institute could run the risk of reducing its ability to gain major research grants and to attract the widest range of high-quality researchers to Helsinki. Given the National Library of Finland's world-class Slavonic Library, with its concentration on pre-1917 materials, the Institute could enhance its international position by encouraging research that draws on the exceptional resources of the Slavonic Library in the National Library of Finland.

Analysis on research outputs

The Institute's publications show an uneven pattern in terms of the year-by-year volume of outputs. The steadily increasing number of publications from 2012 (95) to 2016 (148) was reversed in 2017 with a sharp decrease to 101. The Institute explains the fluctuations in research outputs as affected by the review processes of different journals and by the production of the Centre of Excellence in Russian Studies' final monograph, and it explained that the number of research outputs increased again in 2018

The University utilises the JUFO system to classify the level of quality of research publications: this appears to classify research output quality on the basis of an overall judgement of the journal or book publisher, rather than on an individual assessment of research output. As the Aleksanteri Institute notes in its self-assessment report, this approach is problematic since even the most highly-regarded area studies journals do not reach the highest JUFO level. There is no question that such journals in the field of Russian, Eastern European and Eurasian studies internationally publish work of the highest quality, and the JUFO data is thus of limited utility in assessing the overall quality of the Aleksanteri Institute's research outputs.

The TOP10 publications selected by the Institute are made up of 6 books and 4 journal articles. The outputs represent work carried out across the full range of the Institute's activities, and they include an article published in the leading journal *Europe-Asia Studies* that discusses the overall paradigm for the Institute's work on Russian modernisation. The books overwhelmingly have the imprint of publishers who are regarded as producing work of very high quality in Russian, Eastern European and Eurasian studies, while the journal articles include pieces published in top-quality area studies journals that enjoy the highest

international regard. This set of publications is a much better guide to the high quality of the Institute's research outputs than the JUFO ratings, and the latter should be treated with some caution in making an assessment of the quality of the Institute's work.

The data provided by the Institute shows the significant number of publications that are aimed at the general public, with some 18 per cent of the Institute's output falling into this category. The Institute notes that as part of its goal to create societal impact, its research is published in a variety of media in both Finnish and Russian that have no JUFO ranking (and indeed that JUFO does not recognise journals of any type published in Russian).

The Institute has played a crucial role in training new generations of scholars in Russian studies. Since 1998 its graduates include over 400 specialised Master's students, together with more than 60 doctoral students. Until 2015, the Institute coordinated a national programme for doctoral education in Russian and East European studies, but the abolition of nationwide doctoral programmes in 2015 meant that the Aleksanteri Institute's doctoral education was subsumed into the University of Helsinki Faculty of Social Sciences' multidisciplinary PhD programme, while there are PhD researchers working on topics on Russian and East European studies more widely across the university. In 2017, a Finnish-Russian Network in Russian and Eurasian Studies was established, drawing together the Aleksanteri Institute and the European University at St Petersburg to continue nationwide research training. The changes in doctoral provision with the ending of collaborative national PhD programmes may reduce the quality of doctoral education in Russian and East European studies, especially since there does not appear to be any overall coordination of PhD research in the field across the University of Helsinki. The

Institute noted that, since the 2015 changes to the structure of doctoral education and the Institute's loss of autonomy in decision-making on student admissions to its PhD programme, the number of PhD students had declined.

Overall, the Institute's research outputs match its research goals well. The volume and quality of publications are very impressive and demonstrate that the Institute's research areas are timely and internationally highly regarded. The Faculty and University should review the decision-making process for PhD admissions to ensure that the Institute is able to sustain its numbers of PhD graduates.

International benchmark

The selection of the Davis Center, Harvard University as an international benchmark is interesting: however, as the Aleksanteri Institute's self-assessment report indicates, the Davis Center has a very different structure and lacks the overall cohesiveness in research direction of the Aleksanteri Institute. While both institutions are highly regarded internationally, the significant differences between the Davis Center and the Aleksanteri Institute make it difficult to see this an entirely appropriate comparator.

The Free University of Berlin and the Universities

of Uppsala and Vienna are also identified as potential benchmarks, with each institution having some similarities to the work of the Institute. The Aleksanteri Institute should also benchmark itself against the University College London, School of Slavonic and East European Studies which, although it does not have a common research policy, is an integrated multi-disciplinary Unit covering Russia and Eastern Europe.

2.2 Societal impact

The Unit has a very good understanding of the role and positioning of the Institute's research in society. The audiences for the Institute's research are varied and extend well beyond academia. The evidence provided by the activities and outcomes is impressive. The Unit's societal impact is high-level and considered excellent by the Panel.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The Aleksanteri Institute sees its research work as having relevance for decision-making at all levels in Finland and in a wider international context. It identifies three generic areas in which its research has societal impact:

- conceptual impact that affects how people understand the world. The Institute sees this as the most obvious area of its societal impact, with the opportunity to communicate new knowledge to improve understanding of the current tensions in Europe.
- instrumental impact that influences policy and behaviour. This area has relevance to some areas of the Institute's work, in particular by influencing the development of policy on Russia, Eastern Europe and Eurasia.
- capacity-building to develop new skills. This is the least relevant area of impact for the Institute since less of its research has an 'action-orientation'.

The audiences for the Institute's research are varied and extend well beyond academia to include political and

diplomatic decision makers, NGOs, the Finnish business community and Russian discussion fora. Through extensive media work, the Institute's researchers engage in societal discussion both in Finland and internationally and the Institute regards itself as one of the University of Helsinki's most active Units in this area.

The nature of the Institute's research, with its strong focus on contemporary Russia, Eastern Europe and Eurasia, lends itself naturally to producing extensive societal impact. It has made sensible choices in targeting the areas and audiences where its work can have a substantial impact.

Activities and outcomes

The Institute engages in a very wide variety of activities to disseminate and communicate its research to wide

audiences. It holds more than 60 open seminars annually, attracting some 2,000 participants, provides briefings to political figures at all levels in Finland and consults with political and other visitors to Finland. The annual Aleksanteri conference attracts some 400 participants, drawn from both academia and the wider community interested in Russian, Eastern European and Eurasian affairs.

The Finnish government commissions research from the Institute on areas connected with its research, and the

Institute also publishes *Aleksanteri Insight*, providing expert opinion to inform policy-making. Members of the Institute's staff have published best-selling works on Russia and Eastern Europe aimed at the general reader, and Institute researchers have made very many appearances in the media.

The Institute's self-assessment report gives a comprehensive view of the audiences and activities that are the focus of its work designed to achieve societal impact

and, during the meeting with the Panel, it set out a range of impressive outcomes from its work. These included briefing the President of Finland before his meeting with President Putin in July 2018, and the production of a major report on Russian strength and capabilities, commissioned by the Ministries of Foreign Affairs and the Interior. The Institute is able to engage with the highest levels of the Finnish state so that its work shapes policy towards Russia, Eastern Europe and Eurasia.

2.3 Research environment and Unit viability

The Unit has an excellent record of researcher education, and a very good record of gaining external funding, but its reliance on fixed-term funding and consequent uncertain employment patterns pose significant risks to the viability of the Unit. The Panel suggests paying attention to clarification of the membership of the executive team as well as to responsibility for the management of the Institute's research. Creating oversight of the Institute's research policy and development is important.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The Institute has a defined internal management structure, although the self-assessment report does not give details of the executive team's composition, beyond noting that it is made up of members of the Institute's staff who have

permanent positions. There should be more clarity about the membership of the executive team to ensure that it is properly representative of the Institute's staff. The respective functions of the Institute's Executive Board and Advisory Board are not clarified in the self-assessment report but they are defined in the Institute's working order. Responsibility for the management of the Institute's research is not clear and, while the Institute has a number of boards that deal with aspects of its teaching, there does not appear to be any comparable body that has oversight of the Institute's research policy and its development.

The overall reform of the University of Helsinki appears to have introduced uncertainties and inconsistencies into the management of the Institute so that, while the Institute is responsible for formulating its own research policy, it has only limited influence over the allocation of the resources needed to deliver the policy successfully. The relationship

between the Institute, the Faculty of Arts and the University as a whole appears to be in need of clarification, given the Institute's position as the national centre for work in Russian, Eastern European and Eurasian studies.

Human resources, careers and recruitment

The majority of the Institute's staff are employed on fixed-term contracts and the Institute sees little chance of this pattern of employment changing. This poses significant risks to the sustainability of the Institute, and fails to provide any stability for the Institute's staff, some of whom are still in precarious employment after 10 – 20 years of service. The establishment of PROF1 positions in the Institute has been of significant benefit, but there is a need for a more strategic approach to staffing policy to ensure the well-being of the Institute's staff and the long-term viability of the Institute as a whole.

The nature of the Institute as a cohesive Unit located in a single building contributes towards a collegial and supportive environment which encourages, for example, the development of research funding applications and thus informally assists in career support. But, the uncertain employment status of many of the Institute's staff and their dependence on external funding – with its rapidly changing priorities – presents challenges in providing career support.

As most of the Institute's positions are the result of external fixed-term funding, recruitment is thus done project by project. The Institute suggests that there is a need to take a more wide-ranging view of its staffing needs and for recruitment processes headed by the Faculty of Arts to be better aligned with the Institute's research policy.

Researcher education

This element is also discussed under 'research outputs'. The Institute has made a major contribution to the development of new generations of researchers in Russian and East European studies both through its own doctoral programmes and by providing advice nationally to PhD students and their supervisors. The new collaborative research training programme with the European University at St Petersburg is innovative and promotes the internationalisation of doctoral training. Closer coordination of doctoral work in Russian, Eastern European and Eurasian studies inside the University of Helsinki would help to strengthen the University's profile in Russian, Eastern European and Eurasian studies and reinforce the international profile of the Institute as a leading centre for doctoral training in its area.

Research infrastructure

The Institute's premises on the University's Central Campus are highly suitable for its work, enabling the organisation of seminars and meetings, and providing an appropriate venue for hosting visits by high-level individuals.

Funding

The Institute has been successful in gaining funding from a good variety of external sources to support its research. Both domestic and international funding bodies have awarded major grants to the Institute, and the Academy of Finland-funded Centre of Excellence between 2012 and 2017 provided an important element of stability to the Institute's work. With the ending of the Centre of Excellence, the Institute's funding situation is unpredictable, despite its excellent reputation and the high quality of its work. The 2018 funding situation shows that more than 75 per cent of the Institute's external funding continues to come from the Academy of Finland and the Institute is now seeking to broaden its funding base by making regular applications for ERC grants. Given the unstable funding situation, efforts to diversify the Institute's funding base should be intensified.

Collaboration

The Aleksanteri Institute is well-connected nationally and internationally. It has led Nordic research networks and is now engaged in significant joint programmes with Russian institutions. The Institute's Visiting Fellowships programme is especially beneficial in developing international collaborations with scholars from a variety of backgrounds. The expansion of the Institute's annual conference into one of the leading European fora for discussion in its area is likely to bring further benefits in establishing formal and informal collaborations.

Given the uncertainties of dealing with Russian institutions, the Institute could look more widely for international collaborative partners. It is planning to reinvigorate the former Nordic networks and to seek international funding to support collaboration, and this approach could be extended more widely across Europe and beyond.

Connections with 'other constellations'

The Institute has had a loose connection with the Helsinki Collegium for Advanced Studies, and is now seeking to intensify its links with scholars visiting the Collegium. The self-assessment does not discuss the nature of the Institute's ties to other parts of the University of Helsinki and there may be opportunities for better collaboration across the University in Russian, Eastern European and Eurasian studies.

Societal and contextual factors

Carrying out research on Russia is inherently challenging, given the international environment and the uncertain attitudes of the Russian authorities to foreign scholars carrying out empirical research inside Russia itself. The Institute also faces internal challenges, with government policy and budget reductions having the potential to adversely affect its ability to sustain its research policy.

The Institute is confident about its future, given its history and very high levels of achievement. The University of Helsinki and the Faculty of Arts should, however, consider how they can mitigate the challenges to the Institute's future, and thus best support a research Unit that has an international reputation.

Humanities Panel

DEPARTMENT OF CULTURES (HUM UNIT 02)

Faculty of Arts

1 SUMMARY

1.1 Description of the use of criteria

The assessment of unit HUM_Unit_02, (Department of Cultures) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

The Unit demonstrates a level of international research excellence well above the state of the art. The research goals are well formulated. The Unit has succeeded especially in the field of making their research available to a larger audience. More precise strategies, though, are needed for developing societal impact. The panel also recommends developing the coherence of the strategic leadership in the Unit.

Strengths

- high quality research outputs, together with strong international collaboration and appropriate publication outlets
- a productive bottom-up approach to leadership and interdepartmental collaboration, spanning teaching and research

- strong and varied societal impact both locally and internationally

Development areas

- the Unit needs to define a clearer strategy for how to balance multi-disciplinary versus interdisciplinary identities
- develop a strategy for expanding critical cultural heritage studies, including national identities, as a future growth area
- develop a strategy for how to link up with the science turn, especially in archaeology, but also in digital humanities and big data

Recommendations

- develop a departmental strategy for international collaboration
- define and develop a strategy for how to better integrate doctoral students in the Department and provide disciplinary identity
- create a stronger research strategy that will define the common cause of the nine distinct areas within the Department, including a monthly research seminar for all
- establish a monthly research seminar for all, articulated in terms of meta-themes or methodologies to ensure it has intellectual coherence in the Unit
- consider combining heritage and museum studies into one unit in the future

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Department has achieved some high-level research projects, especially the Centre of Excellence, an impressive number of research grants from the Academy of Finland, as well as two ERC grants. The listed publication output is of the highest international standard, including several books published by Routledge and Palgrave, and they have published in most leading international journals in their fields, just as they have leading editing roles in several such journals. Theoretically, they have successfully pursued the local in the global and vice versa. They have critically examined difficult heritage and traditions of identity in a post-colonial setting, making significant contributions to the expanding global field of critical heritage studies. The focus of research is both Nordic and global, with a number of international project collaborations of high standard. In all of this the Department has demonstrated a level of international research excellence well above the state of the art.

GRADING: EXCELLENT

The research goals are well formulated as they cover shared themes among several disciplines. These include critical approaches to dominant discourses of traditions, memories, and identities in local and global contexts, such as critical heritage. They should also form part of the University of Helsinki (UH) strategic research goals, and it raises the question how productive it is with such overriding research priorities pressed down over all Departments? However, this was not seen as a major problem by the Department.

The monthly research seminar for all should help to create integration and synergies between researchers in this relatively newly formed Department, but we would like to see this articulated in terms of meta-themes or methodologies to ensure it has intellectual coherence.

Qualitatively, the themes of the top 10 publications are cutting-edge within their disciplines, with high profile international publishers, and if they represent the broader publications trends of the Department, this looks excellent.

Here the statistics are helpful and clear: there is a strong and increasing number of papers in JUFO category 3, compared to the larger numbers in 2 and 3

over the measured timespan. Popular presentations are also well represented. Monographs are strong in terms of their intellectual and international scope and publication platforms, not least internationally edited books. Compared to the Faculty trends, the Department maintains a strong position in terms of long-form scholarship. Much is also based on success in grant applications and a relatively large number of post doc researchers, which raises another question about their future.

The number of international collaborations in journal publishing is good, and the diversity of journals impressive. 111 publications with international publishers is really quite remarkable.

Rationales for benchmark are well argued: the formation of successful concrete international collaborations is the major benchmark, as well as theoretical plurality. They have chosen a few departments for inspiration, like Leicester (Museum Studies) and Utrecht (Gender Studies), again concrete choices linked to personal experience and exchange. This strategy holds the potential to let research evolve organically from below.

2.2 Societal impact

The strength of the Department is especially in the field of making their research known to a larger audience through various channels and cultural institutions, including social media, newspapers, radio, etc., and they have also a policy of raising debate about identity formation and cultural traditions. In these fields the various disciplines have a strong and successful tradition. Their strategy on policy making and political impact is less developed, even if they list two examples. Here there is room for expansion, and that also includes a more overall strategy.

The research themes of the Department linked to local and global challenges relating to cultural diversity

and inequality places them in a strong position in relation to societal impact, depending at what level and what stakeholders they address. They primarily address social media and groups of practitioners, such as museums, and other cultural institutions. Policy matters have also been successfully targeted in an effort to ensure that scholarship can have a political influence, but this aspect is less developed.

More precise strategies, though, are missing. For example, will they employ a professional media/communicator, or will other strategies be followed? The Unit proposes to target new stakeholders linked to the

gathering of data, including citizen science. This represents a more concrete strategy. This, however, needs to be further developed.

Various groups/units in the Department have been active in media, radio, TV, etc. and when it comes to political impact there are some well described cases. This is also true of collaboration with cultural institutions. Thus, the Department seems to have succeeded very well in its objectives with respect to societal impact, even if there is a lack of a more general strategy.

GRADING: VERY GOOD

2.3 Research environment and Unit viability

The Unit has a strong intellectual basis on which to develop stronger pan-departmental research themes in the coming years. The Panel sees it is important that the Department develops a coherent research strategy within the Unit. The leadership strikes a good balance between formal and informal management. The Panel recommends that the Unit defines the parameters of its own research culture to enable heterogeneity to thrive within an organized, nuanced and purposeful research infrastructure.

GRADING: GOOD, WITH POTENTIAL FOR VERY GOOD

Leadership and goal-setting, follow up

Based on the self-assessment there are some 'productive' strategies: such as a bottom-up approach to the formulation for research themes, stressing the heterogeneous nature of research and projects. Leadership and management lend practical and other support to such groups. This seems to stand in some opposition to the more strategic top-down strategies of the Faculty and UH research priorities.

However, for a newly formed and diverse Department it is a viable way forward in these initial stages. One key question is what keeps the Department together? Asked about the role of physical co-location of the new Department, and how to integrate so many former Departments, the representatives answered that many of the disciplines already had lengthy traditions of collaboration, and that they were located closely together. In the interview, the Department representatives emphasised the central role of the disciplines. At this level, they maintained, identities are

preserved and innovative research emerges. In this sense, the new Department has a strong intellectual basis on which to develop stronger pan-departmental research themes and directions in the coming years.

The leadership strikes a good balance between formal and informal management, from personal annual development discussions to meetings with all staff for information on larger strategic decisions. We note that future tensions might arise between Faculty directives and the very open bottom-up approach in the Unit. However, the Departmental representatives stressed that Finnish academic culture was bottom-up. They saw no serious tension between the two strategies as they have been practised this far, but it is important that the Department develops a coherent research strategy to ensure that its own research goals are clear and its trajectories are strengthened.

Career and recruitment strategies

The success of the Department in grant applications has led to a rather large group of post doc researchers, which obviously stimulates the research environment, but also raises problems of academic careers and futures. Here the Faculty plays a formal role while the Department plays an informal one. There are questions to be formulated here about how this works, which is not well described in the self-assessment document.

In this section the report describes very well the problems of academic identity in a multi/inter-disciplinary Department. There is clearly a need for a strategy for the future: should the Department be multi-disciplinary with due respect to the identity of each discipline, but creating channels for collaboration between disciplines, or should it aim at interdisciplinarity, where perhaps a new cultural

discipline is created but without losing academic prestige and identity in the process? The answer to this question from the representatives was both/and: they stressed that disciplinary identities were maintained at the same time as new cross-disciplinary teaching courses and research project were developed.

Researcher education

Doctoral programmes are thematically fixed and what that implies for the 'free' choice of research for PhD students and eventual tensions needs to be addressed. The strength of such programmes is that one can organise more efficiently masterclasses, thematic seminars, etc. However, the downside might be a certain narrowing of future research and creating a doctoral programme that is not always relevant to the present or future research topics of the Department. However, the Department representatives answered that they did have an influence on the selection of PhD candidates, and so far did not see problems. This was reassuring, but the panelists thought a more clearly delineated system with a handbook for doctoral students about what support they can expect would be helpful. Other tensions are linked to the different funding mechanisms for PhD students as those who are funded and those who are unfunded (or receive little funding) are not on an equal footing. Doctoral students had expressed that they would benefit from a stronger disciplinary identity. Here perhaps a new or more refined strategy is needed.

On the positive side, it was mentioned in the interview that both PhD students and postdocs had the opportunity to propose new teaching courses linked to their research. The senior staff mentioned that most teaching was taken up by basic courses, and there was less scope for introducing their own research in special research-related courses.

Funding, collaboration, networks

The Department has been extremely successful lately in being awarded prestigious ERC grants, as well as Finnish Academy funding at various levels, including a Centre of Excellence. Given that this is far above the normal for similar departments in Scandinavia, this offers new strategic opportunities for the future. International and other collaborations are at the heart of this success, and therefore a strategy to support international collaboration should be formulated at the departmental and the disciplinary level. Critical concerns are raised against the new UH strategy to create centralised, large-scale research collaborations, which may undermine smaller and more diverse humanistic disciplines as in this Department. However, the representatives mentioned as a positive factor that the Faculty supported invited researchers. On the other hand, it would seem appropriate for the Department to have a strategy for supporting international collaboration in their budget.

This new Department has Units of very different size, some like heritage and museum studies are extremely small. The panel was concerned if this was viable for the future. Are there plans, for example, about combining heritage and museum studies into one unit in the future? Strategically, the heritage and museum sectors are interlinked and critical heritage studies is an internationally expanding subject and an expanding job sector as well.

More generally: there is a clear tension throughout the self-assessment between an UH top-down strategic research planning and a more bottom-up research environment in the Department. This was toned down in the interview, but the Panel felt it was important that the Department defines the parameters of its own research culture to enable heterogeneity to thrive within an organised, nuanced and purposeful research infrastructure.

Humanities Panel

DEPARTMENT OF DIGITAL HUMANITIES (HUM UNIT 03)

Faculty of Arts

1 SUMMARY

1.1 Description of the use of criteria

The assessment of Unit HUM_Unit_03, (Department of Digital Humanities, DDH) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

The output of the Department of Digital Humanities shows a very good quality of scientific research; a very good level of societal impact and a good level of viability and environment (making allowances for weaknesses inevitable in a recently established and comparatively small Unit).

The international vocation of this Unit is clear, strong and inspiring. The scholarly and scientific contributions were found to be internationally relevant. The scientific output is good or very good in various separate areas, with the potential of becoming internationally transformative. The expressed aspiration to claim and maintain a position among the "top five" in the world is not substantiated because the other four potential competitors or benchmarks are not defined in the SAR and were not made sufficiently explicit in the discussion with the panel. A clear definition would help

the current process of defining the group's identity.

The societal impact of DDH has been very good. However, we found that when DDH identifies stakeholders and audiences, it seems very focused on users and direct beneficiaries (e.g. of technology), and perhaps this relates to how DDH perceives its role in society. DDH does interact with the wider scientific community and the general public on some occasions, which shows that there is a degree of awareness of its broader potential role in society. The activities undertaken to reach potential users and direct beneficiaries are appropriate, if perhaps restrictive, often focusing on academic, industrial (e.g. NLP) or similar users rather than stakeholders in the wider community, which could involve anyone potentially affected by these studies. Again, this might reflect the still evolving identity narrative

of the Unit (the "Helsinki DHH story"), which should be spelled out in more concrete detail by the steering group. In contrast to a typical humanities research environment, industry and its specific demands as a partner (e.g. short-term deliverables) play an important role.

In terms of Unit viability and management, DDH is clearly shaped by its history, of being a combination of different groups, as well as by its funding situation, being greatly dependent on individual grants. A unified narrative of the group's identity and goals is still emerging. A stronger overarching scientific vision would greatly benefit the future viability of the group, and this should be developed in consultation with the steering group. This should help to integrate the various components. This integration is currently hampered by the fact that the

different components are still located in different parts of the campus. We recommend a concerted effort to identify common goals and common models of success. The potential tension looming between the scientific and the infrastructure missions would also be mitigated by a more joint sense of mission. In addition, measures should be taken to alleviate gender bias, particularly at the higher levels of the Departmental hierarchies (compare the list of steering group members). This is particularly important if the Unit wishes to be competitive in Digital Humanities (DH) internationally, where senior female scholars are unusually well represented. Current governance and culture demonstrate the intention to secure future external funding.

Strengths

- Scientific quality. The individual papers published in the Unit (as listed in the report) appear to be of good (and some of very good) quality. The ERC project, the various infrastructure (CLARIN) and scientific projects are very good.
- Societal impact. A specific set of targets for impact has clearly been identified and plans have been made to reach them.
- Research environment and Unit viability. Plans are in place to attract new researchers, including researchers from abroad. There is great emphasis on international standing and recruitment, coupled with a keen awareness

that DH is a dynamically developing and highly competitive field.

Development areas

- Scientific quality. While making a promising start, there could be a stronger core vision and 'story', with a stronger drive to inhabit the space of digital humanities, prioritising genuine joint projects that are of recognised value to the humanities and that require innovation in the quantitative domains, as well. Connecting and integrating these various threads is important for defining the scientific direction of the Department.
- At the moment, the report shows a strong bias towards language technology and textual data. Other important areas of attention for DH could include archaeology, arts history, or contemporary exhibition practice. A Department aiming for a position among the top five in the world might want to define clear benchmarks with regard to these diverse activities.
- Societal impact. There could be a wider set of stakeholders and audiences, not just users and direct beneficiaries. For example, in an emerging field defining its position in the leading national university, the general public, students and policy makers are arguably at least as critical as direct users as addressees of outreach activities as direct users, because they will be affected by digital transformation, too. DH has a lot to say about

how, as a society, we are going to live and cope with this transformation.

- Research environment and Unit viability. There could be a stronger central steering in science and the setting of common goals, so as to embark on a coherent quest, and one that can easily be communicated both internally and externally. At present, the Unit presents itself as an amalgam of individual contributors with very good scientific records. To realise its full potential, it needs to increase its degree of integration – not only in terms of organisation but also in terms of a coordinated research agenda.

Recommendations

We suggest that future work focuses on an ever more coherent scientific story and vision. This will be day-to-day steering, more than a single decision, aimed at constantly (re)identifying common goals and missions. The leadership might want to reiterate to all members of the DDH what they have in common and why they work together. We also think the DDH could benefit from a more diverse portfolio of revenue streams, for longer-term viability. Active efforts are needed to address the issue of gender bias. The provision of shared premises is necessary to achieve the above-mentioned aims.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The quality of the scientific output is very good overall, covering separate areas, and has the potential of becoming internationally transformative. There is still a lack of a unifying story and mission. The report is unclear about who the international benchmarks are that will be used to measure success of the Department as a whole.

We regard the scientific quality of the DDH's research output as very good, due to its ambition, diversity and international standing. While this output compares fairly well with global production, as yet it only rarely reaches a quality of being truly transformative and trend-setting internationally. Achieving this excellent level, however, is a realistic aspiration for the coming years.

The scientific production seems to have been influenced more by what the current capabilities in DDH are than any coherent new research agenda or strategy to engage with challenges in the (digital) world. It has focused on work about prosody, digitally aided content analysis of book titles in catalogues, machine translation, etc. All this does not yet come across as part of a coherent strategy to reach a well-defined set of overarching priorities, but rather as the result of existing capabilities and current opportunities. While many of the individual projects operate at an internationally competitive level, there is not yet a distinct "Helsinki Style" of doing DH. A potential risk is that humanities scholars in Helsinki might see DDH as a mere service provider, rather than a genuine partner in

defining research goals. The complementary risk is that the technical teams choose their own goals based on available tools, rather than as the result of consultations with the humanities. Achieving an appropriate balance between the infrastructure/service missions and the research mission of DH remains an important goal for the years to come, as well as to achieve truly leading international standing. These considerations are not independent of the funding landscape, of course, with many members of staff being supported by short-term contracts, and PhD students being supported by industrial projects. These problems are obviously not limited to this specific Unit and are faced by many other international teams. The ideal would be for the Department of Digital Humanities to be judged on their own values and vision, and not only on their fund-raising potential, which – as expected – is above the Faculty average.

GRADING: VERY GOOD

Research goals

Present. Some of the stated research goals (data-driven language processing; understanding the human; facilitating infrastructure) are a very specific subset of what could be covered under the header of Digital Humanities. But one more goal is also stated, which is formulated at a very different level of abstraction and remains somewhat under-specified, namely computational approaches to

research questions in the humanities and social sciences. This formulation covers all potentially relevant issues, but is not very informative in itself. Which research questions in the humanities and social sciences will be prioritised? What should the field of DH focus on at this point in time?

Future. The future goals are listed as understanding human language and cognition; developing computational social sciences and humanities (both research and facilitation); and human-centric computation and understandable AI. Again, some are very specific subsets of the domain, but then again "developing computational social sciences and humanities" does not tell us much about actual priorities. Where is it thought are the big prizes and the destiny of this domain of investigation to be found over the next few years? Without specific goals and a strong story, it will not be known if success has been achieved, and appropriate choices will not be able to be made when faced with currently unforeseen technological or conceptual innovations in the field.

The current mission is "to foster the use of computational methods in humanities and social sciences, study digitization as a phenomenon, promote open data, open source code and open science, as well as the deployment of research results for societal benefit". But then it is said: "we combine machine learning, linguistic theory, history, and also an additional mission in infrastructure to let researchers in arts and humanities and

social sciences (...) spend less time on manual processing of the data". It is also said that the digital world, ageing, health and globalisation will be dealt with. What are the key questions that the field of DH should address in this connection? More specific answers to these questions would, not least, provide valuable orientation to younger scholars in the Department of Digital Humanities.

DDH aims to be among the top five most recognised Departments of its kind over the next five years. We encourage this Department to identify these five benchmarks, at a unified level, and – should this be found useful – possibly also by sub-area. After the first phase of institutionalisation, DDH should choose and plan its research topics in line with a long-term vision.

The mission of fostering computational social sciences and digital humanities for the good of humanity is clearly stated. The idea of studying digitalisation as a phenomenon is very central, too. The infrastructural mission, embodied particularly in the CLARIN section of the Department of Digital Humanities, seems to be added, and it is unclear if it is part of the main mission, or a way to generate revenue. It is difficult to see how progress in this area will be rewarded or even be considered part of the humanities, given that DDH are operating in the Faculty of Arts. It may, however be helpful in supporting productive combinations of humanities research problems with scientific methods, with their focus on rigorous, measurable, repeatable, quantifiable studies. Note that while a lot of the work presented focuses on the contributions that IT can make to the humanities, the opposite direction is also of great value to the digital humanities: the application of humanities methodologies to issues related to information technologies. Future work might want to focus on this too.

Specific research goals in current projects: useful

efforts in mass digitisation, the generation of new AI methods, machine translation, gaze and gesture analysis, prosody, etc. These directions are very interesting, but it is still unclear what hiring policy will be adopted in the future, particularly when hiring long term. Which areas will be expanded or added?

What is very commendable and inspiring is the strong emphasis on international comparisons and exchanges and on some clear metrics (e.g. the proportion of peer-reviewed publications).

Research results

Digital Humanities, computational history and computational social science: The Computational History group focuses on public discourse in Europe 1470–1920. It has organised many events and is well staffed by separately funded projects. It has published very well (as is witnessed by the “Quantitative study of history in the English short-title catalogue”, the “Publishing and using cultural heritage linked data on the semantic web” and “Smartmuseum” studies). These projects also show a clear direction in which DH could be moving: the study of large scale trends over time; the analysis of relations among cultural-heritage data, and the use of those for recommendations in applied contexts, such as visitor guidance in museums. These studies are all of either very good or good quality.

Corpus Processing: The study on “massively-heterogeneous cultural-heritage data” may well link with the above direction, and is a good study, among other interesting studies in this mould.

Cross-lingual NLP: Output from this project is focused on a different area from those mentioned above and is of very good quality (cross-lingual dependency parsers; word alignment with MCMC).

Cogsci and Phonetics: This group works in a research domain somewhat separate from those mentioned above, with studies of prosody and music. It has also developed its own task-specific tools. The quality of the individual publications is good, with some attesting very good quality.

Other: The studies on identifying Arabic dialects, on self-organising maps, and on Mandeville vs. Hume are valuable in their own right, but less well connected in terms of conceptual and methodological foundations.

Analysis on research outputs

As discussed above, individually these studies are of good or very good quality, and of international standing; going forward, it would be very good to see DDH and these studies generate a strong narrative of where the field of DH can go, ideally establishing a uniquely “Helsinki” narrative. This would set in motion a development, at the end of which DDH will have a good chance of realising its ambition to become a world-leading Unit.

International benchmark

As already noted above, the Department’s stated goal is to be among the top five institutions of its kind globally, but these are not named. We have been given examples of benchmarks in an area-by-area fashion, which suggests that no existing benchmark matches all different components of the Unit. Kings College London is mentioned as the main comparison, but its structure is actually rather different from DDH. In principle, we value the Department of Digital Humanities’ global aspirations, which are realistic in the mid-term, and we would encourage them to pay closer attention to identifying appropriate benchmarks.

2.2 Societal impact

The activities of a) identification of audiences and stakeholders, b) valorisation and dissemination of results and c) outcomes of successful engagement, are very good. Some targets have been identified and engaged with. The evidence of outcomes is good for some of the activities, but for others (e.g. communicating the need for digital history) this has not yet been done. The report identifies audiences and stakeholders with beneficiaries and users – mostly academic-industry research. Other potential stakeholders, such as the general public, politicians, educators and policy makers, receive less attention. Impact seems to be interpreted in the sense of direct economic and practical benefits. This is not a problem, so long as it fits within a broader strategy of identity for DDH and there is an awareness of the ethical issues and possible unwanted side-effects of technologies.

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

Some research directions seem to have been listed in the section on societal impact, for example “tools to identify precursors for aggravation in public discourse”. The report on “Target Areas” has a very academic perspective.

However, societal impact should show the capability to create an impact outside of academia. This part also contains a list of the Department’s service roles (e.g. OCR services); which suggests that stakeholders are identified with users and customers, therefore implying a role for DDH that is defined in terms of economic benefits rather than cultural leadership. All this can be valid, within a coherent story. The following are named as stakeholders: libraries, archives, museums, broadcasters, ministries, the Finnish software industry (as a user of language data), and AI developers. The discussion could say more about the intellectual and cultural role to be played by DDH – and the Digital Humanities in general – in these activities. Questions such as whether a vector-interlingua can be developed or how semantic representations can be learned represent important practical and scientific and scholarly challenges. The goals listed for the short term are accurate translation services and, for the long term, the creation of complex and interactive intelligent machines, with a deeper world knowledge and human-like language interfaces. For this long-term goal, intensive and systematic cooperation between information technology and the humanities and social sciences will be needed.

It is surprising to see a brand new scientific direction introduced in the section on societal impact that is missing

from the previous section: developing technology for improving human-machine interaction. This will require deeper engagement with the humanities in research on language comprehension, because interactive AI machines will share space and interact with humans. The working hypothesis to guide these efforts is that effective interaction arises from the interplay between grounding aspects operating in parallel on multiple interconnected levels. This section on societal impact helps more than the previous section towards understanding what the overarching mission for DDH might be.

To conclude, there seem to be different visions of the mission of DDH driving the writing of different sections. This reiterates the need for the Department and steering group to speak with one voice about the identity and mission of this Unit.

Activities and outcomes

The activities for social impact included various courses and hackathons, as well as seminars and symposia covering the application of computer science technologies to the humanities and the social sciences. The outcome of these activities included 150 tools and datasets, made openly available via CLARIN. This amounted to a very good impact on the scientific community and society in general.

2.3 Research environment and Unit viability

The research environment and viability are good. Inevitable initial weaknesses in organisation are recognised and addressed. Prospects for the long term are good. The long-term viability of the Unit is based on its research, on its role in the national digital research infrastructure for the humanities (e.g. CLARIN), and its societal impact. A largely revenue- and project-based funding model has its risks, which DDH has coped with well so far. Currently the Unit is shaped by its “federal” history and by funding opportunities. Long-term viability also depends on the research environment: creating a culture of transparency, of gender equity, and on having a single location to foster a sense of identity. It might be important to define the Department through its long-term scientific goals rather than through the methods it uses. There is still an unresolved tension between the scientific and the infrastructure missions; and the role of the steering group in shaping the scientific vision is unclear. The main long-term threat to the viability of this Unit is centrifugal forces arising as a result of different subgroups pursuing their own goals. The role of the steering group in mediating between members and defining an integrative research agenda is essential at this stage and will remain so in the future.

The position of DDH in this respect is good: it shows good quality control procedures; transparency on tenure can be slightly improved; and it is unclear how the steering committee sets the common goals and decides on the grand directions. Are these scientific or managerial tasks? Ultimately, holders of long-term revenue streams will have the opportunity to shape the identity of the Department, so

if a clear destination has been selected, this needs to shape the kind of funding that should be pursued.

GRADING: GOOD

Leadership, goal setting and follow-up

This Unit appears to be formed as a federation of various research groups, which reflects its genesis and recent history, and this shapes both risks and opportunities. It is also shaped by the funding environment and the need to respond to opportunities, while remaining lean. One concern is that it might not be able to survive a funding challenge, such as the end of a couple of large projects. One other concern is that scientific control seems to sit at the level of the research groups, with the steering group apparently not leading the development of a common story and vision – this is compounded by the division between infrastructure goals and scientific goals. This could lead to centrifugal forces: infrastructure possibly receiving funding; and PIs of ERC possibly receiving funding that cannot be (by its nature) influenced by the hosting institution.

Key questions that will need to be answered include:

- Who is going to set the overarching scientific questions for the Department?
- How can one set long-term goals while depending on short-term funding opportunities and temporary staff, and scientific goals seem to be set and monitored by PIs?
- How does one manage the centrifugal temptations of more successful groups who attract more funding?
- Can CLARIN, with its clear infrastructure mission, be

developed into a backbone of institutional continuity for the Department.

- Can the Department benefit from the European dimension of CLARIN activities (CLARIN-ERIC) and CLARIN activities in other European countries?

In this situation we find that it is important to:

- have a strong story and identity, which allows choices to be made about alternative opportunities;
- resist the temptation to become a support Unit that can be all things to all people, just providing the technology to others;
- have, if possible, a sufficient long-term revenue stream to secure continuity, while still being open to change in the funding landscape, capturing and incorporating whichever funding opportunities emerge.
- have a constant and evolving message – both internal and external – about the contribution of the non-IT components to the overall mission. These humanities missions make all the difference between DH and plain engineering.

In other words: goals must derive from a long-term vision and story of what digital humanities should be, and why they should be funded and pursued; leadership should ensure that the story is told at the highest levels in research policy circles, domestic and international; and also that it is repeated internally, in this way evolving due to feedback from both sides.

There is a description of monthly steering meetings,

monitoring of research quality is devolved to PIs, external validation is encouraged, but monitored by PIs, in a sort of federal system. But who monitors the PIs? Does the centre only have a coordinating role? This might not be enough to ensure quality control and avoid centrifugal forces.

Coaching for funding applications is offered; and common goals are discussed at the steering group meeting (monthly meetings of all DDH professors). From the report, it seems that PIs have all the scientific control, and the steering group is at most a coordination venue. Who sets the vision then? The steering group is said to “track” common goals, but it was unclear what these goals might be.

The steering group: Its projects seem to include infrastructure building, the development of common data tool resources for the arts, humanities and social sciences, among others. This makes sense in a federation, but a single

Unit additionally needs to collectively buy into a shared narrative.

In addition to the provision of shared premises, the Faculty and the University can support the steering committee in its task of striking an appropriate balance between the infrastructure and research missions.

On the basis of their impressions gained during the site visits, the review panel has gained the impression that the Department of Digital Humanities has scope for productive cooperation for research with most other Departments. Currently, these opportunities seem to be exploited to varying degrees. While there is active, smooth and productive cooperation with some Departments, we have noted less activity and even some friction in other areas.

Human resources, careers and recruitment, researcher education

The Departmental culture is characterised by a very laudable emphasis on internationalisation and external funding and motivates individual researchers to attract funding.

The Department has good professional networks, both national and internationally, producing the expected synergies. PhD and MSc projects will be influenced by industry to an extent unusual in a humanities context, creating both opportunities and challenges.

DH, internationally, has an unusually large number of female senior professors and takes the need to increase equality and diversity more widely very seriously. Therefore, if DDH wishes to be considered a top international player in the field, it is advisable for it to take such matters equally seriously.

Humanities Panel

DEPARTMENT OF FINNISH, FINNO-UGRIAN AND SCANDINAVIAN STUDIES (HUM UNIT 04)

Faculty of Arts

1 SUMMARY

1.1 Description of the use of criteria

The assessment of Unit HUM_Unit_04, (Department of Finnish, Finno-Ugrian and Scandinavian Studies) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

The Department of Finnish, Finno-Ugrian and Scandinavian Studies (Unit 04) has been successful in its research during the assessment period. The societal impact of the Department is impressive. During the assessment period, the Department hosted the Academy of Finland funded *Centre of Excellence for Intersubjectivity and Interaction* (2012–2017), which has been very successful. The Centre of Excellence (CoE) has produced publications that have received considerable international attention, and it has accounted for a crucial part of the external funding for the Department. It turned out in the discussions that even though the special funding for the CoE has ended, it lives on in several smaller subprojects that are still going on.

Strengths

- Societal impact: The researchers of the Department are very active in the media and the Department does research on topics that have a strong societal impact.
- Digitalisation: The Department is active in building and developing a digital infrastructure that is most useful for researchers worldwide.
- Researcher education: The Department has been active in the doctoral programmes for languages, and the results in doctoral level education have been very good.

Development areas

- Even though the number of publications is on a good level in the Department, it is still significantly lower than in the Faculty of Arts in general. The numbers have improved

during the assessment period, particularly for quality scientific publications (JUFO levels 1-3, see Tables 1-4).

- The external funding per researcher (i.e. teaching and research staff member) in the Department is significantly lower than in the Faculty of Arts in general (see Table 5). The external funding also forms a smaller part of the total funding of the Department than it does in the Faculty of Arts in general. The external funding is not low in the Department, but it would be good to have a plan of how it can be increased in the future.

Recommendations

The CoE for Intersubjectivity and Interaction has been productive and good for the Department in many ways. The Department should make a concrete plan how the success

of the CoE can be turned into success in the future now that the external funding for the Department has ended. This could be done in two ways. The Department could develop an application for a new CoE. This application could build on past achievements and the experience gained, but also

requires a genuinely new research agenda. Alternatively, several smaller follow-up projects could explore new areas and together preserve the international and dynamic research culture brought to the Department by the CoE.

In the self-assessment, the organisational reform of

the University of Helsinki is mentioned briefly, mostly as a burden. The Department could look for ways in which it could profit from the new organisational structures now that they are a reality.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The research in the Department has been active and diverse. The programmes for Finnish language, other Finno-Ugrian languages and Nordic languages are clearly the biggest in Finland, and therefore it is expected that they play a leading role in their fields of study in Finland. The main research areas concern language use and conversation, but good quality research is also produced in other fields, for instance literature studies, language history, semantics, and grammar.

The sizes of disciplines can roughly be illustrated by the number of professors representing each discipline:

- Finnish Language 6
- Other Finno-Ugrian Languages 3
- Swedish and Other Scandinavian Languages 3
- Literature Studies 3 (2 Finnish Literature, 1 Swedish Literature)
- Other 2 (1 Non-fiction, 1 Indigenous Studies)

Given the sizes of the disciplines, it is natural that the

research is dominated by linguistics rather than literature. It is also natural that the Finnish language and Finno-Ugrian languages produce more research and are studied more intensively than Swedish and other Scandinavian languages.

We have noted with satisfaction that the Department also provides a conducive environment for the study of an under-researched Indo-European minority language, namely the Romani language.

The research concentrates on discourse, construction grammar and cognitive linguistics, historical linguistics, language variation, and literature studies. These fields of research have strong traditions in the Department. For some reason, the number of publications per researcher is lower than in the Faculty of Arts in general. During 2012–2017, the Department succeeded in increasing its number of publications per annum. This increase is particularly apparent in JUFO levels 1–3. The number of other publications has remained about the same during the assessment period.

The strength of the Department is that its research activity has improved significantly over a six-year period, 2012–2017. There was an increase in the number of quality research publications in 2015 and the number has stayed at this respectable level during 2016–2017. Further effort is needed to bring the numbers up to the Faculty level.

The Department carries out very good, including internationally recognized, research.

GRADING: VERY GOOD

Research goals

The research goals in the SAR (self-assessment report) of the Department are formulated in very general terms.

- Research on national languages is clearly the core mission of this Department.
- Research co-operation between disciplines and integration of the research and doctoral programmes

within the Department are good goals, but need to be complemented by concrete plans.

- The Department aims at improving the possibilities for doing research and the research infrastructure as well as increasing external research funding. These goals are also good and, in a sense, self-evident. Again, the argument would be more convincing if it were accompanied by concrete plans.
- In the self-assessment, the research carried out in the Department is said to relate to the University of Helsinki's strategic research area "the human mind in a changing world". It is not explained in the self-assessment in what way the research of the Department serves this strategic research area.

The Department has not taken any risks in its selection of research goals. Some of the goals follow from the languages studied in the Department (Finnish and other Finno-Ugrian languages, Swedish and other Scandinavian languages, and Romani), and some are self-evident (e.g. increase in external funding).

The SAR does make it explicit what the Department is aiming at in the future. Thus, it may be safe to assume that the Department is planning to continue with the kind of research that has been done so far. It would, however, be helpful for the strategic planning of the Department, the Faculty of Arts, and the University of Helsinki if the Department were more specific about its research goals. For instance:

- What will the focus areas be in the future?
- What is the role of the researchers and the research done within the Department in view of the strategic goals of the University of Helsinki, e.g. "the human mind in a changing world"?

Research results

According to the Guidelines, "[e]ach Unit was instructed to choose a maximum of 10 publications to showcase the scientific output of the Unit." The selection of the Department shows that the Centre of Excellence for Research on Intersubjectivity in Interaction (2012–2017) has played a very central role in research during the assessment period: of the ten publications, six can be found in the list of the publications of the CoE's website (<https://blogs.helsinki.fi/intersubjectivity/?lang=en>). Two of the publications represent Finno-Ugrian Language Studies and two publications are article collections in Literature Research.

Finno-Ugrian Language Studies: The collection of articles edited by Riho Grünthal and Petri Kallio, *A Linguistic Map of Prehistoric Northern Europe* (2012) updates the current understanding of the prehistory of languages in Northern Europe. Most of the authors are linguists, but there are also two articles by archeologists, which widens the point of view from linguistics to culture and makes it interdisciplinary. The topics discussed in the volume have been studied by Finno-Ugrian and Finnish Language Departments at the University of Helsinki in the 21st century, and the volume strengthens the leading position of the Department in this research area. The article collection *Mordvin Languages in the Field* (2016), edited by Ksenia Shagal and Heini Arjava, consists of articles that discuss the Erzya language from different points of view: grammar, use, history, and language contacts. The articles are based on a field trip and a seminar in which the results of the field trip were discussed. This project and this book are important for the scientific knowledge of the Erzya language. The volume is an example of a successful cooperation between language departments at the University of Helsinki and internationally.

Literature Studies: The article collection Rethinking

Mimesis: Concepts and Practices of Literary Representation (2012) edited by Saija Isomaa, Sari Kivistö, Pirjo Lyytikäinen, Sanna Nyqvist, Merja Polvinen, and Riikka Rossi consists of articles that discuss the Aristotelian aesthetic concept mimesis ('imitation') from many different points of view. Mimesis is a central concept in the theory of art and literature, and it is very important for the general theory of literature to look at the traditional concepts from new perspectives. The article collection *Novel Districts: Critical Readings of Monika Fagerholm* (2016) edited by Kristina Malmio and Mia Österlund is devoted to the Finland-Swedish author Monica Fagerholm. The volume discusses Fagerholm's literary works from different points of view. One of the editors (Malmio) and one author (Lahdenperä) are from the Department. The authors of the articles represent different universities from Finland and Sweden.

Publications related to the CoE for Intersubjectivity and Interaction: Most of the ten selected publications are in one way or another linked to the CoE of Intersubjectivity and Interaction hosted by the Department 2012–2017. The main method used in the CoE is Conversational Analysis, which has been one of the mainstream research fields in the Department since the 1980s. A new feature in this kind of research is that it aims at a pragmatic typology of some kind by comparing similar expressions cross-linguistically. The topics related to the CoE have even been approached from a sociolinguistic and clinical linguistic point of view and the interactional approach has been related to grammatical research.

The special issue *Grammar and Negative Epistemics in Talk-in-Interaction* in the *Journal of Pragmatics* was edited by Jan Lindström, Yael Maschler, and Simona Pekarek Doehler (2016). The introduction and two articles (by Ritva Laury & Marja-Liisa Helasvuo and by Jan Lindström

& Susanna Karlsson) were written by members of the Department. Laury and Helasvuo concentrate on the use of the Finnish expressions meaning 'X do(es)n't know/remember' in everyday conversations. They study the frequencies of different word orders and reduced forms as well as analyse a handful of examples in which the phrases are used in everyday conversations. Lindström and Karlsson study the Swedish expression *jag vet inte* 'I don't know' in doctor-patient conversations.

Another example of language comparison is the article collection *Imperative Turns at Talk: The Design of Directives in Action* (2017) edited by Marja-Leena Sorjonen, Liisa Raevaara, and Elizabeth Couper-Kuhlen (Amsterdam: John Benjamins). This article collection concentrates on the use of the imperative mood in institutional and "everyday" conversations. The articles of the volume discuss the use of the imperative in different languages.

The volume *Helsingissä puhuttavat suomet. Kielen indeksisyys ja sosiaaliset identiteetit* edited by Marja-Leena Sorjonen, Anu Rouhikoski, and Heini Lehtonen (2015) is an example of a more sociolinguistic approach. The article collection is based on a project on the Finnish spoken in Helsinki and the social and sociolinguistic features of Helsinki Finnish and the identity of people living in Helsinki. The book is a useful addition to the literature on spoken Helsinki Finnish.

The collection of articles *Contexts of Subordination: Cognitive, Typological and Discourse Perspectives* (2014) edited by Laura Visapää, Jyrki Kalliokoski, and Helena Sorva concentrates on subordination from the point of view of grammar, semantics and interaction. It is a good idea to look at one central grammatical phenomenon, subordination, from different points of view in the same volume. In a sense,

one can see even Sandra Thompson's, Barbara Fox's, and Elizabeth Couper-Kuhlen's 2015 book *Grammar in Everyday Talk: Building Responsive Actions* as a piece of grammatical research. The book concentrates on responses in interaction in English conversations. (Couper-Kuhlen was a senior researcher in the CoE.)

An example of clinical linguistics is the article collection *Multilingual Interaction and Dementia* (2017) edited by Charlotta Plejert, Camilla Lindholm, and Robert W. Schrauf. The volume focuses on the social interaction of multilingual people with dementia. (Lindholm is from the Department.)

General remarks of the TOP10 publications

The Department's selection of publications emphasises the big impact of the Centre of Excellence for the research in the Department. Having said that, there has also been excellent research outside the CoE. The selected publications show that the research done in Finno-Ugrian studies is of excellent quality. The research in literature studies includes both new thinking on traditional theoretical concepts as well as research into individual authors (in this case a Finland-Swedish author Monica Fagerholm). The research linked to the CoE on the one hand follows the tradition of Conversational Analysis that has been carried out in the

Department for several decades, but on the other hand the scope of the research has widened to, for instance, language comparisons, clinical linguistics, and grammar. Nine of the top ten publications are collections of articles. The authors of the articles represent several universities in Finland and abroad. This shows that the Department has wide and active research networks both nationally and internationally.

Analysis on research outputs

The scientific quality of publications is estimated on the basis of the *JUFO classification*. Even if one may disagree with the classification of individual publications, it is safe to say that the publications on JUFO levels 1-3 can in general be classified as quality publications.

According to the statistics in the Department's SAR, in 2017, the Department produced altogether 308 publications, which is 2.9 publications per researcher (member of research and teaching staff; note that the number of personnel is from 2018.) Of these publications, there were 171 publications on JUFO levels 1-3. That means 1.6 publications per researcher. These are good numbers as such. However, the numbers of publications per person are considerably lower than those in the Faculty of Arts in general. Table 1 shows the number of publications per researcher in 2017:

Publications per teaching and research staff member 2017 (Unit 04 vs. Faculty of Arts)	Unit 4 (staff 108)	Faculty of Art (staff 520)	Difference between the unit and the faculty in general
All publications 2017	2.9	3.7	-22 %-units
JUFO levels 1-3	1.6	1.9	-16 %-units

The difference is smaller for JUFO levels 1–3 than for all publications, which indicates that the researchers in the Department tend to publish more in quality research forums than the researchers in the Faculty in general. However, the number of the publications on JUFO levels 1–3 per researcher is also below the Faculty of Arts average.

During the six years under consideration the development in the Department has been positive. Table 2 shows that the percentage of JUFO 1–3 publications of all publications has increased for the Department while it has remained on the same level at the Faculty of Arts:

Percentage of JUFO 1–3 publications of all publications	2012	2013	2014	2015	2016	2017
Unit 4	51%	44%	41%	56%	58%	55%
Faculty	51%	53%	48%	54%	53%	53%

The development of the number of JUFO 1–3 publications is shown in Table 3. The number of publications is compared to the first year of the statistics, i.e. 2012.

Number of publications on JUFO levels 1–3 in 2012–2017 (year 2012 = 100%)	2012	2013	2014	2015	2016	2017
Unit 4	146 (100%)	141 (96%)	121 (82%)	175 (120%)	182 (125%)	171 (117%)
Faculty	1,054 (100%)	1,000 (95%)	959 (91%)	1,018 (97%)	1,118 (106%)	1,010 (96%)

The increase of the publications on JUFO levels 1–3 has not decreased the number of the publications that are classified on JUFO level 0 or have no JUFO classification.

These numbers have stayed approximately on the same level since 2015, as shown in Table 4:

Number of publications on JUFO level 0 or no JUFO classification 2012–2017 (year 2012 = 100%)	2012	2013	2014	2015	2016	2017
Unit 4	140 (100%)	178 (127%)	170 (121%)	135 (94%)	130 (93%)	137 (98%)
Faculty	1,012 (100%)	863 (85%)	1,033 (102%)	862 (85%)	994 (98%)	911 (90%)

The publications on JUFO level 0 or having no JUFO classification are most probably newspaper articles and other popular publications that are meant for a larger audience outside academia or at least outside the scientific community of linguistics and language studies. They are important, too, particularly concerning the societal impact of the research done within the Department.

Table 3 shows that Department has clearly increased its JUFO 1–3 publications starting from 2015, when there is a significant jump to a higher level. The research work for these publications was naturally done in the couple of years before the year of publication, so the positive development had already started before 2015. The Department has hosted the Academy of Finland funded *Centre of Excellence in Research on Intersubjectivity*. The CoE has undoubtedly played a central role in the positive development.

The most important publication forums for the Department have been the journals *Virittäjä* (JUFO 2; 26

publications) and the *Journal of Pragmatics* (JUFO 3; 19 publications). *Virittäjä* is a Finnish journal for research into the Finnish and Finno-Ugrian languages and the *Journal of Pragmatics* is an international journal (published by John Benjamins) that concentrates on articles within pragmatics and language use. The *Journal of Pragmatics* is one of the leading journals in its field. The fact that the publications of the Department are mostly published in these journals underlines the dominant role of the Finnish language as a discipline and the research into language use as the main field of research in the Department.

International benchmark

The Department has pointed out in its SAR that it is not easy to find corresponding academic departments or units at other universities in the world. This is true: the constellation of disciplines in the Department is based on historical reasons and the fact that Finland is officially a

bilingual country. The Department mentions the Department of Swedish Language and Multilingualism at Stockholm University as a somewhat similar unit. But even the Department at Stockholm University is only partly similar: their disciplines are Swedish, Scandinavian languages, Swedish as a second language, Swedish as a Foreign Language, Interpreting and Translation Studies, Bilingualism and Second Language Acquisition. This may, however, be as close as one can get.

Another partly similar unit is for instance the Department of Linguistics and Scandinavian Studies at the University of Oslo. Their areas of research “include Linguistics and Language (Scandinavian and a range of other languages), Norse Religion, Literature (Scandinavian in particular), Literature Didactics, Textual Science and Philology, Lexicography, Onomastics, Language Technology and computing in the Humanities” (see <https://www.hf.uio.no/iln/english/research/>).

2.2 Societal impact

The societal impact of the Department is very strong. The Finnish language programme is the largest and oldest in Finland and it therefore has a long tradition in language planning and maintenance as well as producing school books and other teaching materials. This tradition can be seen in the Department even today, and it has been developed and extended to meet today’s challenges. The members of the Department have also been active and

visible in both traditional and new media. Naturally, it is not always easy to say which part of the societal impact is based on scientific research and which is based on the members’ general expertise in their fields.

There is a clear understanding in the Department of the role and positioning of its research in society. The Department has identified audiences and stakeholders as well as the activities required to reach them.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The Department identifies the Finnish school system and Finnish society in general as its main target areas. This is natural, because the Finnish and Swedish languages are the national languages of Finland, and therefore they

are important school subjects. The national languages and the minority languages of Finland are studied in the Department, which is important for Finnish society as a whole.

Activities and outcomes

The Department (particularly the Finnish and Swedish language programmes) has been active and successful in language education in Finnish schools. The Faculty members have participated in the Finnish matriculation exams, written schoolbooks, and organised further education for teachers. It is difficult to say how much of this activity is research

based. Nevertheless, it is important, and it is excellent that the Department is so active in these areas.

Research into the Sami languages and people belong to the Department's traditional repertoire. It is interesting and very exciting that the Department now has a new professorship for Indigenous Studies. The project for maintaining and revitalising Indigenous languages can be seen as a continuum to the traditional research and societal impact of the Department. The connection to the research on Amazonian languages and cultures opens a new perspective to this important activity.

Together with the Institute for the Languages of

Finland, the Department forms an important research and public service centre of onomastics in the country.

The Faculty members of the Department are active in literary debates and criticism in the Finnish media. Since literature is an important part of the Finnish culture and society, participating in such discussions represents an important societal impact.

The new professorship in non-fiction and education in non-fiction writing is an interesting new area of research and societal impact for the University of Helsinki.

2.3 Research environment and Unit viability

According to the SAR, the Department has organised its recruitment, appraisal interviews, meetings and other formal activities following the regulations of the University of Helsinki. These issues are described on a rather general level in the SAR. As the University of Helsinki has recently carried out a thorough organisational reform, the Department could plan how it can benefit from the new organisation.

The external funding of the Department is lower than in the Faculty of Arts in general. The Department hosted a successful Centre of Excellence in 2012–2017, but that funding has now ended. The Department has received funding from Business Finland, which is a very positive sign of a new kind of collaboration and funding.

The infrastructure of the Department is very good,

and the Department's activities in building a digital infrastructure have been excellent.

The Department has traditionally had good contacts with scientific societies and other relevant actors in Finland, and the recent collaboration with the Helsinki Institute of Sustainability Science may well open up new opportunities.

The Department is adequately positioned for the future. Operations and procedures are of good quality.

GRADING: GOOD

Leadership, goal setting and follow-up

Appraisal interviews, project meetings, and regular meetings between doctoral students and their supervisors

as described in the SAR belong to the normal activity in any academic unit.

It is good that the Department aims at making more time for research for professors and university lecturers. It is natural that this is easier to do in disciplines with more than one professor and that have several other teachers. Naturally, this is a problem that the Department alone cannot solve: the Faculty of Arts and the University of Helsinki must come up with a sustainable policy of guaranteeing enough research time for professors and university lecturers.

Researcher education

The Department has been active and visible in the doctoral

programme of Language Studies in the sense that both the present and the previous leader of the programme have been professors of the (present) Department. The results in doctoral level education have been good and the international connections in doctoral education are on a very good level.

Research infrastructure

The Department has been active and successful in building a digital research infrastructure. This infrastructure is very useful even for researchers outside the Department. For instance, the Department has a leading role when it comes to linguistics in the Finnish Term Bank. Another good example is the Digital Archive of the Grammar of Finnish Dialects. The Morphology Archives of Finnish Dialects (Muoto-opin arkisto) was founded in the 1960s. The digitalisation of this Archive shows that the Department is following technical developments in research infrastructure at the same time as it is building new research infrastructure based on its traditional one.

The Department is located in the Helsinki city centre, which makes it easy for Department to access the resources of other institutions, e.g. the Finnish Literature Society and the Society of Swedish Literature in Finland.

Funding

According to the statistics in the Department's SAR (page 3), external funding compared to core funding is lower in the Department than in the Faculty of Arts in general. We must, however, take into account the fact that the sum of external funding does not include much of the funding from foundations, particularly if the funding is paid as a personal grant to the recipient. Table 5 shows that external funding per researcher in 2018 (staff member numbers from 2017) is also lower in the Department than in the Faculty of Arts in general.

External funding per teaching and research staff member in 2018 (staff member numbers from 2017)

	Total external funding	teaching and research staff	external funding per researcher
Unit 4	1,709,000 €	108	15,824 €
Faculty	13,673,000 €	520	26,294 €

The funding for the CoE ended in 2017 (which is clearly shown in the 2018 figures), and this makes finding new sources for external funding increasingly urgent. We assume that the researchers involved in the CoE have good possibilities of attracting more external funding to new research projects.

The funding from Business Finland is a very positive sign. Even though the sum is not very large, this project may lead to more of this kind of funding in the future as the researchers and the organisation learn from it.

According to the SAR, the Department has a policy that senior researchers give advice to their younger colleagues concerning applications. This is a very good system assuming that it is applied systematically.

Collaboration

The Department has active collaboration and contacts with other relevant institutions and societies in Finland and internationally. Since the biggest disciplines of the Department, i.e. Finnish Language, Swedish Language and Finno-Ugrian Languages are the largest of their kind in Finland and the University of Helsinki is the biggest and the best-known university in the country, such contacts are also expected. As pointed out earlier in this report, the Department has a wide and active research collaboration network with researchers in other universities in Finland and abroad.

Connections with 'other constellations'

The Department's connections to the Helsinki Institute of Sustainability Science (HELSUS) and Indigenous Studies are very good signs of the renewal of the Department's research profile.

Societal and contextual factors

It is certainly true what is stated in the Department's SAR (p. 21): *"The Big Wheel, as well as cuts and the reorganization of the administration have burdened academic staff considerably and generated insecurity. Furthermore, the introduction of matrix organization severely affected the sense of community at the university."* However, reforms and budget cuts always cause uncertainty. The role of the leadership is to minimise the uncertainty caused by the reforms and budget cuts and discover the best possible routines in order to use the new organisation for the benefit of the Department.

Humanities Panel

DEPARTMENT OF LANGUAGES (HUM UNIT 05)

Faculty of Arts

1 SUMMARY

1.1 Description of the use of criteria

The assessment of Unit HUM_Unit_05, (Department of Languages) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

Scientific quality

The self-assessment report describes the Department as a "hub of linguistic, literary and cultural research at the highest international level" (p. 2) and claims a "long-standing position as a nationally and internationally acclaimed department" (p. 6). The reviewers are happy to confirm this positive assessment on the whole. The Department's recognition as an internationally leading research centre is borne out by standard quantitative measures as well as by qualitative assessment. Helsinki has been an international centre of philological research for at least a century (with eminent figures such as Tauno F. Mustanoja [1912-1996] and Matti Rissanen [1937-2018]). This is a legacy which the Department has taken up with a

due sense of respect, which – however – has not prevented it from energetically modernising and actively seeking constant dialogue with international peers. In line with the Faculty's and the University's general planning, the Department's expertise in corpus linguistics, which has been built up over four decades, has been expanded to include the construction of a research infrastructure for the Digital Humanities. The overall scientific quality of the Department's research is very good to excellent.

Societal impact

The discussion of societal impact in the self-assessment falls into two parts. In the core areas of social engagement for a languages department – i.e. teacher education, language

policy and planning, linguistic minorities, multilingualism – the track record is excellent, and the planned activities for the future are plausible and relevant. There are several examples of excellent and successful individual activities. Beyond this core, however, priorities are presented in the form of an unstructured list of ideas, formulated as very general questions rather than concrete plans for specific activities. An overarching strategy and clearer priorities are needed here. Hence the overall assessment here is very good.

Research environment and Department viability

This section of the self-assessment and the corresponding responses received during the site interview show a

clear awareness of the strategic choices facing the Department. Planning for the Department dovetails well with planning for the Faculty and the University as a whole. The self-assessment is based on a systematic and transparent discussion process which has involved all status groups in the Department. As for governance, there is a laudable desire to keep structures lean and to encourage participation through flat hierarchies. The discussion shows concern for the needs of young scholars (e.g. professionalisation through mentoring and support with application writing). The consequences of the recently instituted division of labour between the Faculty (responsible for financial and human-resources planning) and the Departments (responsible for setting the research agendas) are unclear at the time of this writing and should be monitored closely. Very good to excellent.

Strengths

- Helsinki boasts a long tradition of excellence in philological/linguistic research, which the Department is further developing as a major international player.
- The work of the Department is based on a wide range of languages, ancient and modern, European and non-European.
- Partly in response to external advice (e.g. 2010–2012 RA), but latterly also as a result of its own intrinsic motivation,

the Department has made great efforts to encourage interdisciplinary research. The Department preserves the traditional links, increasingly tenuous in many other places, between linguistics and literary/cultural studies. In addition, it promotes new types of interdisciplinary humanities research under the umbrella of Digital Humanities.

- The Department presents an impressive track record and convincing plans for future societal impact in the core areas of “schools, education policy [and] language policy”.

Development areas

- While the “language-history-culture” nexus and the Digital Humanities figure prominently, self-assessment remains relatively silent on another “New Frontier”, namely research at the interface between linguistics and cognitive science/psychology/neurology. The site visit clarified that the Department is well aware of this potential gap and sees it as a point of concern, though not as a pressing priority at the present moment. The basic laboratory equipment necessary for this type of experimental linguistic research is available in principle.
- The plans for impact and public engagement in the domains of “culture, society, and language communities” remain vague and provisional.

Recommendations

- The plans for societal impact in “culture, society, and language communities” should be reconsidered, with a view to setting a manageable number of clear priorities which make sense locally. More concrete detail and planning should be provided, ideally accompanied with measures for defining a successful outcome.
- During the site visit it was pointed out that some research on language processing (e.g. on “chunking”) was being carried out in the LFP (“Lingua Francas and Plurilingualism”) group. We would encourage the corpus linguists in the Department to explore more actively the potential of integrating corpus linguistic and experimental/psycholinguistic approaches, as this is currently a worldwide trend in research.
- In view of the many shared research interests, we suggest developing an active and productive working relationship with the Department of Digital Humanities.
- While the Department outperforms the Faculty average on many measures, this is not so with regard to raising external funding. We encourage activities to remedy this.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

At the time of writing this self-assessment, QS World Universities Ranking listed Helsinki 34th and 51-100 in the global subject rankings for linguistics and modern languages, respectively. The latest version of this ranking shows an undramatic decline, which is in the nature of such a relatively crude tool and should not be a cause for worry. Publication output overall and per researcher is impressive. Quantitatively, output is broadly in line with the Faculty average, but the proportion of publications in high-quality outlets (JUFO 2 and 3) has increased markedly in recent years. As in the self-assessment report, we do not see this increase as the end of the line in this development, but encourage further efforts in this direction. Where reviewers have been familiar with individual research strands in the Department's work, they unanimously confirm the positive self-assessment on the basis of their own reading and experience. At present, members of the Department are at the forefront of international research in the following fields, to which they contribute conceptual innovations as well as rich empirical findings:

- modern historical linguistics (e.g. historical sociolinguistics, socio-historical linguistics, linguistically and language-historically grounded approaches to cultural studies)
- corpus linguistics, where Helsinki-based research has produced conceptual, methodological and technological innovations clarifying the future role of the field in the

wider context of the Digital Humanities

- research in English as a Lingua Franca (ELF) and lingua-franca communication in general
- language typology and research on endangered languages.

Evidence of the dynamic research culture fostered by the Department is provided by success in competitions for external funding, with most of the funded projects being driven either by conceptual innovation or a strongly interdisciplinary orientation (or both). Two of these ventures are ERC-funded: Digital Grammar of Greek Documentary Papyri (starting grant, 2017, M. Vierros), and Linguistic Adaptation (2018, K. Sinnemäki). The latter project goes beyond what is suggested in its title, namely the individual adaptation of speakers to new environments and new communicative contexts, in that it researches the structural adaptation of entire linguistic systems to new social and communicative demands, thus bringing together linguistic typology and sociolinguistics. A similarly comprehensive approach is taken in EVIDEGO (Academy of Finland, S. Kittilä), a project which scrutinises the categories of evidentiality and egophoricity from descriptive, sociolinguistic, areal and typological perspectives. On the basis of decades of Helsinki-based experience researching diachronic change in the English language, STRATAS (Academy of Finland,

T. Nevalainen) addresses a fundamental methodological challenge in sociohistorical linguistics, namely how to integrate structured and unstructured data. Through their own research and a number of high-profile international conferences on "Changing English" the eponymous project and the LFP group have established Helsinki as a centre of research in the study of World Englishes. In all these areas, a fair amount of the research output is excellent, with some world-leading contributions. As has been mentioned, the Department as a whole covers an admirably broad range of languages, sometimes with very limited financial and human resources. This diversity is an asset which the Faculty and the University should recognise and protect – even if in such a constellation it is in the nature of things that not all specialisations can produce equally excellent output at the same time. Having said that, we add that the self-assessment and the site visit have shown us that there is an active and competitive research culture across the whole range of specialisations covered in the Department.

GRADING: VERY GOOD TO EXCELLENT

The panel was impressed by the productivity of the Department's research groups. Some of them are of long standing, rooted and organically developing in decade-long research traditions, whereas others are more recent and sometimes kick-started by top-down initiatives. As the site

visit has suggested, however, by now all of them seem to have become genuine focal points of research which help integrate a diverse research community.

CoCoLac (Comparing and Contrasting Languages and Cultures): The core of this group comprises researchers in the Romance languages and German who carry out contrastive and crosslinguistic research (covering both lexico-grammatical ‘micro’ phenomena such as collocations as well as ‘macro’ categories such as text types and politeness). Co-edited and co-authored publications by members of the group provide proof of sustainable cooperation.

HALS (Helsinki Area & Language Studies): This group is a lively and active research community working at the interface of linguistics, cultural studies, anthropology and area studies. Its achievements span the entire range from integrated research and teaching in the form of field trips for students to internationally visible scholarly publications. Its research on Helsinki and on minority languages (old and new) give it excellent potential for social impact.

LFP (Lingua Francas and Plurilingualism): The Helsinki group is one of three internationally leading research centres in its field (the other two being Vienna and London). After having put ELF (and lingua francas in general) on the map, the team will have to decide whether they want to consolidate (E)LF studies as a distinct subfield or whether they prefer to establish lingua-franca communication as an integral part of a unified theory of language variation and change. The former strategy would be likely to attract short-term attention; the latter, on the other hand, seems to promise longer-term scholarly impact and wider dissemination.

VARIENG (Variation, Contacts and Change in English): The group goes back to a former Finnish Academy

Centre of Excellence with a focus on historical English linguistics and corpus linguistics. Through successive stages of development this group has remained an international leader, branching out into sociohistorical linguistics/cultural studies and the Digital Humanities. As in the case of LFP, the challenge facing this successful group is to decide on its future identity – as a centre of modern historical-linguistic research or as a more comprehensive vehicle for variation studies in Englishes past and present (this latter option leading to possible overlap with LFP). The review panel encourages the responsible team to clarify whether the “Language Change Database” (LCD) is a digital infrastructure measure or an implicit research programme in English historical linguistics. We appreciate the design of the project, but are worried about the difficulty of motivating the wider corpus-linguistic community to contribute to and use this new digital resource. Does the team have plans for an effective ‘roll-out’ after the current pilot phase?

Research assessment materials and the site visits have shown that the Department co-operates with the Department of Finnish, Finno-Ugrian and Scandinavian Studies concerning research on Finno-Ugrian languages. We find intensive and systematically organised cooperation across Departments to be most useful.

Research goals

The review panel has no principled objections to this theme, but notes a somewhat technocratic approach, which may overemphasise procedures at the expense of substance. Three of the four goals (nos. 1 - 3) are related to the issue of making the Department fit for global academic competition. Only one (no. 4) is substantial and relates to nurturing and supporting diversity of research within the Department. Emphasis on competition is certainly not wrong in itself, but

more goals referring to the substantial core and intrinsic cultural and academic merits of basic research in the humanities – as exemplified, for example, in the study of ‘small languages’ and their speech communities – would have been welcome.

Research results

During the site visit we were particularly impressed by the Department’s awareness of the language politics of academic publishing. There was a clear understanding of the fact that the question was not to publish in English or Finnish (or other languages), but that scholars needed to develop audience- and context-sensitive multilingual strategies, using English and Finnish (or other appropriate languages) to reconcile the need for global visibility in the academic community, social impact at home and responsibility to the speech communities providing the data for research. This discussion helped the panel to understand certain choices in the list of ‘top ten’ publications which had initially appeared puzzling.

Otherwise, we take it that this list covering a wide range of topics and including texts in six languages represents a compromise between choosing showcases of high impact and covering the whole range of activities in a diverse Department.

From the methodological point of view, this selection of publications shows that the research carried out in the Department is often multi- or interdisciplinary, as for instance in the three publications from Slavic studies (*Understanding Russianness* by Alapuro, Mustajoki & Pesonen; *Venäläisen avantgarden manifestit* by Huttunen; and “Aphasia in Linguistics, Linguistics in Aphasiology” by Lehečková).

Analysis on research outputs

The quantitative survey of publication output is transparent. We find the self-analysis, and the measures derived on its basis, convincing. The review period saw 56 doctoral dissertations (ca. 3 per professor). One of them was awarded a prestigious research award. This is suggestive of an active research culture fostering young scholars.

International benchmark

The self-assessment identifies the University of Leiden (Netherlands) as an international benchmark. This is an appropriate choice, as – like Helsinki – Leiden is a member of the League of European Research Universities (LERU) and both universities offer a similarly broad range of language-related subjects and occupy comparable positions in the

respective countries' academic landscapes (though Helsinki probably dominates Finland even more than Leiden does the Netherlands). The review panel endorses this choice and would have regarded LERU partners Zurich or Leuven as additional useful choices.

2.2 Societal impact

The very good grading reflects a compromise between the reviewers' near complete satisfaction with societal impact and engagement activities in the core areas identified in the self-assessment and their dissatisfaction with a much less well focused list of further ideas, where we felt that a clearer sense of priorities and more concrete planning was needed. The interview during the site visit left us with the impression that the Department is capable of developing a strategy and appropriate priorities. Examples of activities which we found impressive and convincing were the smooth cooperation between the Department's researchers and government authorities, the foreign-language teaching community, and the Skolt Sami and Nivkh communities in the context of language-maintenance activities carried out with them. Another example of research with immediate impact is the work on 'plain language' communication benefiting various disadvantaged groups in society. Throughout, the self-assessment shows awareness that the increasing ethnic,

cultural and linguistic diversity of present-day Finland will increasingly require the Department's experts to intervene in public debates. Needless to add, for such intervention to be productive, a sense of tact and diplomacy will be needed and the traditional stance of the experts 'talking down' to the general public is not productive. Since this is an issue which is not only pressing in Finland, but in the whole of Europe, we see a great opportunity here for a major research centre such as Helsinki. We encourage cooperation with partners across Europe – not only in research itself, but also in public-outreach activities of this kind.

GRADING: VERY GOOD

Strengths

- The Department has a proven track record as a competent expert partner for stakeholders in government and the educational and cultural sectors,

who rely on its expertise and advice. As reviewers we appreciate the equal emphasis on the 'old' and the 'new' multilingualism as socially relevant topics in Finland, and we applaud the intelligent multilingual dissemination strategies planned for the outreach activities.

Development areas

- Beyond the core activities in education and teacher training, there are few signs of clear priorities. Much of the discussion of societal impact is taken up by a long and loosely structured catalogue of questions which are formulated at high- to mid-levels of abstraction. It is difficult to see which specific activities for social impact these questions might inspire in the local Helsinki context. The department needs a shorter list of key questions with a clearer ranking of priorities.

2.3 Research environment and Unit viability

The discussion in the self-assessment is substantial and convincing because it is based on a systematic and transparent discussion process which was organised within the Department and provided opportunities for all groups to articulate their views. We find the self-analysis of the strengths and weaknesses in governance very honest and agree with the measures proposed by the Department to remedy the latter. The procedures for goal-setting, action and follow-up are clear and practical. Some goals are ambitious within the present funding constraints, without becoming unrealistic. As has been noted, efforts to raise additional external funding should be encouraged. The review panel is not worried about the renewal potential. There is renewal within the long-established research traditions (for example historical English corpus linguistics), and new ideas are introduced regularly, most recently for example through an ERC grant funding digitally aided research on Ancient Greek. In this self-assessment we see the Department leadership coping well with a tension between a traditionally individualistic and heterogeneous humanities research culture and current thinking in university management, which emphasises top-down coordination and team-based research.

Strengths

- Responsible and competent leadership
- Elaborate consultation within the Department with all status groups
- Concern for young scholars

Development areas

- Career bottlenecks in the transition from the doctoral to the post-doctoral level and in various stages of the post-doctoral phase itself

GRADING: VERY GOOD TO EXCELLENT

The procedures described are satisfactory in principle. The self-assessment report and the site-visit show a willingness to evaluate current practice self-critically. Where weaknesses are identified in this process, workable solutions are suggested. The discussion raises some issues which are not specific to the Department, but arise in the humanities in general, for example the difficulty of providing teaching relief for research in areas covered by two or three people only. This issue is mentioned in other self-assessment reports of the Humanities panel and should be discussed at Faculty and University level. Costs for a faculty-wide or university-wide competitive programme under which individual researchers could apply for full or partial teaching relief for important research projects would not be exorbitant and would have an immediate impact in the relevant areas.

Human resources, careers and recruitment

All procedures described are satisfactory in principle, with the self-assessment suggesting sensible measures of improvement in some areas. The self-assessment report hints at various 'career bottlenecks' for younger scholars, for example in the transition from the doctoral to the

post-doctoral stage or from fixed-term employment to a professorship or otherwise tenured position. These concerns need to be addressed – on the individual level as well as in terms of defining the Department's research agenda. It is well placed to correct the misperception that research in philology and linguistics takes place in an ivory tower and is irrelevant to modern society. Historically, much cutting-edge language-technological innovation has come from unexpected subject areas, such as theology (e.g. Roberto Busa SJ, Corpus Thomisticum) and the Classics (e.g. Gregory Crane, the Perseus Project). Today, the increasing ethnic and cultural diversity of contemporary Europe and the digital-media revolution represent two major social challenges which require precisely the kind of sociolinguistic and discourse-analytical expertise which is developed in state-of-the-art linguistics departments.

Researcher education

Recruitment procedures are transparent, fair and designed to promote quality. Doctoral students are part of the research community and receive institutional support in structured programmes.

Research infrastructure

The Department has a forty-year record of developing language corpora and other digital tools for language study. This success causes extra costs for curating and disseminating resources and long-term archiving which are likely to rise in the future. The Department will have to develop a long-term vision of how it will deal with these

challenges, including making provisions for financing dedicated staff, ideally with help from the University. In this process, it will be crucial to define the complementary roles, the division of labour, and the scope for cooperation between this Department and the newly established Department of Digital Humanities.

Funding

Seen in itself, the Department's record in raising external funding is good and no cause for worry. We have noted that it is below the Helsinki Faculty average.

Collaboration

The situation is excellent. The Department is well connected within the University of Helsinki itself as well as nationally and internationally. We expect it to be fully capable of expanding and adapting its networks as necessary.

Societal and contextual factors

This section of the self-assessment mentions recent educational reforms in Finland and recent restructuring within the University of Helsinki. It seems that the Department has been able to adapt to and cope with both, if not always without temporary difficulty. Growing demographic and linguistic diversity in Finland is a challenge in the wider society which the Department is eager to take up.

Humanities Panel

DEPARTMENT OF (PHILOSOPHY), HISTORY AND ART STUDIES (HUM UNIT 06)

Faculty of Arts

1 SUMMARY

1.1 Description of the use of criteria

The assessment of unit HUM_Unit_06, (Department of (Philosophy), History and Art Studies) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

The Department of Philosophy, History and Art Studies within the Faculty of Arts consists of multiple disciplines of different dimensions. In this Unit assessment, the following disciplines are included: History, Aesthetics, Comparative Literature. Film and Television Studies, Musicology, and Theatre Research. Thus, Philosophy is left for others to assess.

The scientific quality and societal impact of the Unit are both graded as "excellent" while the Unit's viability is graded as "good". Excellent scientific results and societal impact are closely integrated in the output of the Unit. The present Unit's future is hard to determine, but continuity is strongly anchored within the disciplines and their networks.

Strengths

- a determined will to use the multiple cores of the Department so as to be able to uphold and renew synergy and cross-over research
- a strong societal impact, based on the notion that research follows a changing world
- a leading national position for commissioned research

Recommendations and development areas

- protect "core assets", i.e., the generators of research themselves, the disciplines, within a Department stable over time

- protect smaller research communities (also the individual projects) within the Department,
- re-establish a research committee responsible for all disciplines
- keep all administration and human resource management as close as possible to the core research and tuition assets of the Unit
- offer all PhD students, internally or externally funded, the same benefits

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The four outstanding examples of research results subsume some overall tendencies within the Unit: broadly themed projects with many participants with themes like democracy and capitalism are encouraged parallel with individual endeavours. The effort encompasses premodern, modern and contemporary themes. The track records of history and the arts leave no doubt of past scientific results.

A multi-core (as in multidisciplinary) Department may potentially carry inherent structural problems. When assessing the scientific output, the dominant disciplines are history (and philosophy). However, the Unit self-assessment takes care to underline the explicit and honest wish to use the top-down fusion of disciplines to the subjects' own advantage in promoting research (SAR p.18). In spite of the past restructuring of the Departments, excellent research is being produced in larger collaborations as well as on the individual level. For the time being, the Unit has found a convincing common departmental narrative.

GRADING: EXCELLENT

Research goals

The Unit has formulated a four-point programme for its research goals in the near future: promotion of internationalisation; integration between disciplines; enhancement of scientific impact through broad research projects; boosting the Digital Leap.

As a conclusion to the self-assessment, the Unit makes the important statement that when global insecurity grows in for example the form of forced migration and threats of terrorism, art research must follow suit: a shift from focusing on traditional nationalism to transnationalism, multiculturalism, and multilingualism is due. The four-point programme can be seen as a direct result of these serious concerns.

Research results

The Department of Philosophy, History and Art Studies (and its forerunner the Department of Philosophy, History, Culture and Art Studies) has chosen four outstanding examples as a *pars pro toto* of research results during the assessment period 2012–2018. Firstly, the evolution of democracy in the Nordic countries; secondly, the evolution of Nordic and European capitalism; thirdly, mapping the history of early modern rhetorics as a kind of early form of participatory politics; and lastly, Finnish cinema from a transnational perspective.

The results have not only been chosen on the grounds of scientific novelty, but also for their strong societal relevance (cf. societal impact further on). It is very positive that the historians evince a leading national position for commissioned research on a micro-level, e.g. in the form of private company histories. The tenor of the self-assessment is, however, on the macro-level, namely the overall tendency

of the Unit scholars to address questions of global change and the possible corrective remedy of introducing historical perspectives so as to alleviate present-day fears for the future.

Analysis on research outputs

The metric data and the self-assessment show that the Unit produces many publications in highly regarded academic journals (level 3) and in the form of monographies (more than the Faculty average). The Top 10 list of monographs in SAR Appendix 3 illustrates the broad international approach of the Unit. The publishers are well-known internationally, and the themes range from pre-modern times until today. The list also emphasises the right and need of humanities' researchers to produce monographs both collaboratively and individually. Many of the researchers at the Department are well known to the general public in Scandinavia, with popular and scholarly publications, for example, on the role of Finland within Swedish and Nordic pre-modern political history.

Fulfilling the two goals of integration between Units as well as launching new broad projects seems well on its way, and members of the Unit have recently applied for a "Potential Audience" research project. The intention is to carry out a broad and statistically representative survey of the potential audiences of art events in the fields of music, visual and performing arts in the entire Finnish population.

Researchers from Aesthetics, Musicology, Consumer Economics and Theatre Studies will participate in this project.

The Unit presents a large range of collaborations and projects on the national and international arena, both *intra* and *extra muros*. Somewhat surprising is the self-criticism at the end of the long overview in the self-assessment: the tendency of the collaborations to be personal rather than institutional is seen as a main weakness. On the contrary, we feel that the synergetic force of personal networks, also those with few nodes, should not be underestimated. Formal contracts can lose meaning as soon as the instigators of the contracts withdraw. To us, there actually seems to exist

a durable balance between institutionalised and personal collaborations in the Unit. This impression was reinforced during our meeting, where the interviewees emphasised both individual and departmental strategies as generators of research on multiple levels in the present Unit.

International benchmark

The Unit's choices of two international benchmarks as role models for a multi-core Department seem well considered: firstly, the Institute for History at the University of Leiden. The University of Leiden has received high international ranking over the last few years, and the discipline of History at Leiden has been ranked 20th in the world in the QS

World University Rankings by subject 2019. Leiden boasts professorships covering most of the research topics studied at modern universities and a large output in research.

Secondly, the collaboration on the Ph.D. level with the International Graduate Centre for the Study of Culture (GCSC) at the University in Gießen seems fruitful. Students and scholars from HU have in recent years been working at the Centre. The GCSC explicitly encourages the development of new approaches and methods in the study of culture, and attempts to enable a transfer of concepts between different disciplines and scholarly cultures. This transfer is one of the long-term goals of the Unit.

2.2 Societal impact

Scientific results and societal impact are closely integrated in the output of the Unit.

For an academic at Helsinki University with its close-knit historical contacts to the state and to the government, the societal impact may seem natural. The Panel noted that the concrete and instrumental results of this impact on the whole remain unformulated. In spite of this, there is no way of disregarding the activities of the Unit scholars in media, policymaking processes, and participating in private and public sectors.

GRADING: EXCELLENT

There is certainly no lack of societal outreach in the Unit (already touched upon above). Research questions like for example the evolution of democracy in the Nordic countries catch public interest because of democratic processes being openly called into question today. The fact that the Nordic welfare model, the combination of equality and economic prosperity, may be under threat, is also a concern of the general audience. Such interest results in interviews and expert comments in national and international media.

Not only are the historians active *extra muros*. Collaborations and connections exist with many national agencies and foundations, like the International Institute of

Applied Aesthetics (IIAA), the Finnish National Theatre, the National Audiovisual Institute (NAVI), the Natural Resources Institute (Luke), as well as with the National Archives and the Finnish Literature Society. The smaller disciplines (for example Aesthetics) deem international collaboration to be essential for the actualisation of disciplinary identity. Other areas of interest are, for example, teacher training and the development of school books, as well as participation in international exhibitions (like the Documenta in Kassel) and events.

2.3 Research environment and Unit viability

An important source for our view of the research environment and viability of the Unit was the interview with the Unit itself as a complement to the written assessment. The high morale and will to cooperate within the Unit is evident and can be rated as excellent. The administrative situation, on the other hand, is miserable, and so the grade can be no better than “good”.

The strength of the Unit lies in its expressed intention to use time and resources to work as a whole in spite of a turbulent recent history of departmental restructuring, which *per se* is a weakness.

GRADING: GOOD

The fairly new Department operating environment is undeniably obstructed by the lack of control of staff recruitment, strategy and budgeting. Physically, the Unit is concerned about the University central administration's wish to cut down on office space. The interviewees expressed frustration at only having advisory functions at higher levels and little direct access to decision-making. There also seems to be a communication problem and lack of transparency between different levels in the organisation. The divide between teaching, research, administration and personnel management after the university reforms hinders long-term strategic and economic planning.

The panel was astounded to learn from the interviewees that a University-financed recruitment may take up to 18 months just to open a position, which of course is in no way acceptable. The Faculty-level selection

committees at times seem to have no representative relating to the discipline of the recruits-to-be. Having some kind of control over the recruitment is essential especially to the smaller research communities. If a recruitment goes awry, it can bring down a whole discipline.

The Unit, as well as the doctoral schools, does well in integrating the doctoral students into the research community: A total of 78 PhD theses is mentioned for the assessment period. The Unit highlights the improvement of the quality of PhD studies as one of its keynote achievements. There seems to be some inequality between salaried position PhD students and externally funded students. Salaried students receive Faculty travel grants, whereas externally funded students do not, and have to apply every year for new funding.

The Unit has a strong track record of external research funding. According to the metric data a large amount of the funding (besides the core funding), comes from the Academy of Finland (larger than the Faculty average), and only a small part from for example EU research funding. The Unit is willing to do more about the ERC money in the future. The self-assessment points out that especially one-person projects with funding from the private sector are not visible in the official statistics.

It is a difficult task to assess the long-term viability of this Unit within the Department of Philosophy, History and Art Studies. Philosophy is assessed elsewhere. The other voluminous discipline at the Department, History, could indeed have been evaluated separately. This would, of course, have been unfair to the smaller disciplines, some

of which do not exist at any other Finnish university. We will not speculate further on the possible reasons for this high-level choice of the make-up of the assessment Units, but it is clear to the Panel that the humanistic discipline constellations have been in flux in recent years. We fear that the process may still be unstable. No one can guarantee that no new combinations of multicore Departments will appear in the next decade. In this way, the future viability of the Units and also the Departments is above all the responsibility of the Faculty of the Arts and the central administration of the University. Our suggestion to the management is to give the new Department time, space and resources so as to make the disciplines able to grow together in peace and quiet.

Nevertheless, the Unit is well aware of the situation. The management structure may change, but the research Unit is confident in its identity. Old connections from former Departments are maintained, even though the interviewees especially mentioned a strong new generation moulded into cross-border research. The Unit also clearly sees the benefit of multiple cores: “[...] diversity within a single Unit can be an asset”. This shows the Unit is taking things into its own hands, switching from top-down to bottom-up solutions. The Unit seems well on its way to modelling a future of its own, even if an organic development to an ideal multidisciplinary Department may take years to accomplish and may be hampered by renewed top-down attempts at restructuring.

Humanities Panel

PHILOSOPHY (HUM UNIT 07)

Faculty of Arts / Faculty of Social Sciences

1 SUMMARY

1.1 Description of the use of criteria

The assessment of Unit HUM_Unit_07, (Philosophy) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

Both the scientific quality and actions concerning societal impact of the Unit are graded as truly excellent while we grade the Unit's viability as very good.

Strengths

- Scientific quality: the research output is of very high quality and of high international standing. The Unit's success in attracting a Centre of Excellence and in securing external research funding (including 4 ERC grants) is a very clear indicator that the Unit's research has a strong international scientific impact and visibility. The Unit was able to attract researchers with strong international profiles, which indicates that the unit is well respected in the international research environment.
- Societal Impact: the research Unit has described a

clear and feasible way in which it can target different types of audiences and in which way it can have an impact in society. The list of actions for societal impact is impressive. As far as philosophy is concerned, these methods are feasible.

- Research environment and Unit viability: the research Unit has a well-organised research environment within two Faculties to host its research staff, and the Unit has a well-organised doctoral programme for PhD students. Despite the organisational complication of belonging to different Faculties, the Unit acts very coherently.

Development areas and recommendations

- Scientific quality: The Unit is aware of new funding possibilities and opportunities for applying for new

Centre of Excellence projects as well as EU research projects. Taking part in these local and international opportunities will help the Unit to continue its high performance.

- Societal Impact: The responsibility and specific outreach tasks could be strategically prioritised within the research Unit.
- Research environment and Unit viability: While the Unit acts as one coherent entity it is administratively split between two Faculties and needs constant awareness of being well represented at higher administrative levels. We applaud the Unit's actions with regard to making issues of gender diversity visible within the Faculty and we recommend that these actions continue to receive the Unit's attention.

• The career prospects of younger researchers is something that requires the continued attention of the Unit. The Unit's growth rests for a large part on external

funding and this in itself generates a situation in which growth is only visible in non-permanent staff positions. So while the strength of the Unit is highly visible both

within the University and internationally, it requires equal attention from the Faculties in sustaining this visibility by investing in permanent staff.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit lists five top achievements in 2012–2018 which together give a clear indication of the scientific qualities of the Unit which are considered to be outstanding. In particular the Academy of Finland Centre of Excellence together with the funding success of the Unit are clear indicators of the Unit's level of scientific excellence. The funding success of the Unit includes 4 approved ERC grants in Philosophy, each of which has passed a very highly competitive international review evaluation, is a significant international achievement. In addition, the Unit secured not less than 12 Academy projects in different topics. The research output of the Unit is also excellent, but in saying this we note that certain groups that have received external funding had more opportunities than others to boost their research output and visibility. It is fair to say that this gives rise to a slight imbalance within the Unit, because the groups that have been less beneficial in receiving external funding are less visible.

The strengths of the scientific quality include a significant quantity of publications and the achievement

of important results that advance the field of philosophy further. Certain groups within the Unit, especially those that have attracted external funding (in logic and in philosophy of social science), have been very productive and were able to achieve a higher level of research output.

GRADING: EXCELLENT

Research goals

The Unit identifies clear research goals for each of its subgroups, and these are well entrenched within the traditional philosophical development of the Unit and support the strength of philosophy at the University. The subgroups of the Unit have a strong forward-looking strategy. The Unit hosted a large list of research projects during this evaluation period which have given a specific shape to the research goals of the Unit. We are happy to see that the research goals are directed bottom-up and are driven by the curiosity of the researchers themselves.

Research results

The obtained scientific results include within the area of logic several new achievements in proof theory, in the analysis of Gödel's work as well as in non-classical logics, counterfactuals and on notions of dependence and independence. In Epistemology the Unit highlights the development of a novel view of knowledge, based on dispositions to know. In History of Philosophy the Unit lists the work on active perception in the medieval period as well as the work on the concept of rationality and the impact of its interpretation. In Practical Philosophy the Unit highlights the TINT Centre of Excellence which led to results in the Philosophy of the Social Sciences including novel contributions to what can be called the Philosophy of Interdisciplinarity. In Social Ontology the analysis of social and collective actions, social practices/institutions, and collective versions of notions such as responsibility, trust, reasoning and emotions have been placed central. In Ethics, special attention is paid to expressivist views in metaethics, and in Political Philosophy the problems with received views on democracy are highlighted.

The main methods used within philosophy are based on critical reflection, and logical and philosophical analysis. In contrast to the empirical sciences, the methodology is very different and the use and applicability of data is less prominent in philosophy.

Analysis of research output

The Unit reports that a high number of articles have been published in leading venues, which include 237 peer-reviewed journal articles. Given the size of the Unit (measured as 49 staff (level 1,2,3,4) in 2018), this results in a good amount of research output per year per staff member

during the assessment period. The report rightly notices that citation impacts are not very representative for the area of philosophy. The publication culture in philosophy includes contributions to handbooks, edited collections, monographs and journal articles.

The Unit's output is of high international quality and is regularly published in top international venues within philosophy. It is surprising to see that many of these international top journals are not ranked as JUFO level 3, which according to the experts in the field they would definitely qualify as such.

International benchmark

The Unit selected Philosophy at Stockholm University as its benchmark because of the resemblance concerning the division into theoretical and practical sections, which also makes it possible to compare the size of the Units. The selection of the benchmark is further based on similar topic divisions including e.g. Logic within Theoretical Philosophy and Ethics within Practical Philosophy. It is, however, remarkable that the University of Stockholm has many more permanent members of staff whereas the Philosophy Unit at the UH is internationally ranked higher in the QS ranking.

2.2 Societal impact

We assessed the strengths and weaknesses of societal impact against what one internationally observes and can reasonably expect in the area of philosophy concerning impact in society. So while philosophy often plays an important but indirect role in industry, it is not a topic that leads to immediate monetary valorisation effects (such as those that one can expect in applications of artificial intelligence).

The self-assessment report identifies 5 different ways in which the Unit contributes to social impact, ranging from education, participation in public debate, engaging with media, etc. Most of these activities are out-reach or education-based activities. This is fully in line with what is to be expected in Philosophy and as such the Unit is doing

an excellent job. The Unit clearly enjoys the status of being highly respected by Finnish society (governmental bodies, media) and hence these stakeholders do reach out to the individual members of the Unit. At the same time a clear valorisation plan can help the Unit further, because some topics within Philosophy (e.g. in Ethics or the Philosophy of Social Science) lend themselves more readily to valorisation and outreach than others and because choices have to be made to safeguard a good balance with staff member's overall academic tasks.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The self-assessment report identifies 5 different ways in which the Unit contributes to societal impact. The first way is through contributing to secondary education as a method to help improve thinking and public debate. The second way is to promote reason-based decision-making, targeted to policy makers and funding institutions. The third way is to influence/engage with researchers in other fields about their methodological questions. The fourth way is via breakthroughs in the domain of logic and computation and its long-term effect within our information society. The fifth way aims at the general public via lectures, blogs and media.

Measuring the societal impact of research in

philosophy is very difficult as most of the impact is indirect and only visible in the long term and even then the impact is hard to measure, but with this in mind, we consider that the different paths and ways that are described in the self-assessment report to target the different audiences, are excellent.

Activities and outcomes

The main activities listed in the self-assessment report concern ways to improve the groundwork for critical reflection on different levels via education, public debate and argumentation. These methods will typically not yield immediate results but nonetheless will have an impact in society which can be substantial in the long run. The report lists different activities which include teaching/showing how

to think or reflect in a clear and systematic way, it includes seminars in which politicians and civil servants participated, giving advice on a ministry report, contributing to interdisciplinary fora, contributions to media and publishing popular books.

The outcomes listed as evidence for societal impact are very difficult to point out in detail but the research Unit has indicated that the teaching of philosophy in high schools has continued to improve as a result of educating teachers and creating better textbooks. The engagement with decision-makers and civil servants helped produce a better informed government report. And similarly one can hope that media outreach activities did have an effect on the general public opinion.

Overall, the research Unit has executed the activities

that made it possible to reach the goals that were identified. At the same time, the self-assessment report also indicates that more can be done in reaching out to the general public and in counteracting forces that push the debates in irrational directions. Indeed, as academics in philosophy we do carry the responsibility to remind our audiences about the necessity of critical reflection, giving them methods to fight inconsistent and irrational views at all times. Yet not everyone active in academia will be best positioned to also intervene in public debates and to channel the debates into a more rational direction. A recommendation for the research Unit is to keep paying attention to the topic of societal impact in a systematic way by carefully prioritising its actions.

2.3 Research environment and Unit viability

With respect to viability, the Unit itself is very well positioned for the future as far as its research and teaching activities are concerned, which are under the Unit's own control. The Unit builds further on a strong tradition of excellence in philosophy and its internal cross-programme links are working well to keep a healthy balance in this Unit's coherence. The Unit's outlook to obtain future research grants and top research results is excellent. But as far as the environment and organisation is concerned, which is constrained by the boundaries that the Faculties and the University impose and which is not directly under the Unit's control, there is

definitely much room for improvement to ensure the Unit's future viability. Given the organisation and management practices, we see a change in the fact that the Unit has much less administrative support now, which puts functioning at a high level both in teaching and research at risk. The fact that the earlier career researchers (postdocs) have voiced concerns about feeling excluded from decision-making processes indicates that there still is room for improvement. These matters are on the radar of the research Unit.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The Unit is in itself well organised and represented within the different structures in the two Faculties of which it is part. The individual members of the Unit are engaged with the well-being of the Unit and also invest time and energy in taking action whenever possible to advocate the interests of the Unit.

The self-assessment report indicates room for improvement on three fronts: the first is communication and cooperation between Theoretical and Practical Philosophy. The second concerns postdoctoral researchers, whose voice

has not been clearly heard, and the third concerns the way input is provided for setting the agenda for Academy of Finland's Strategic Funding. Each of the mentioned items require actions that are definitely worth the effort of the Unit.

The research infrastructure seems to be in place to give researchers in Philosophy what they need in order to develop their ideas and to pursue their scientific goals. The Unit itself is well positioned in international networks and has different ties with several other Departments within the University (also crossing Faculty boundaries).

Human resources, careers and recruitment

The metric data on personnel structure indicates that the Philosophy Unit has a higher number of level 2 staff members and a lower number of level 4 staff members when compared to the figures on the higher Faculty level. This indicates that while indeed the Unit has more postdoctoral researchers in temporary positions, it probably has fewer members of permanent staff in high-level positions of full professorships in comparison to other Units.

The Unit as well as the Faculties will need to keep paying attention to the career opportunities of their early career researchers, in particular PhDs and postdocs. With the high number of research grants and hence non-

permanent staff, career training and opportunities both inside and outside academia should be on the radar of the members of staff.

The Unit is involved in, and experts are consulted in the recruitment practices within their Unit.

Researcher education

The doctoral programme recruits students twice a year when students can apply for the programme. In addition the doctoral programme opens a call every year for salaried positions for four years. The doctoral programme seems to run well and doctoral students are well integrated (as several are linked to the specific research projects of the Unit). There is a slight concern that the number of salaried positions that can be handed out to doctoral students is rather low, given the total number of applicants.

Funding

The Unit is applauded for its funding success, which is much higher than the average external funding-income in both Faculties they belong to. The grants that the Unit has gained come from highly competitive sources of excellence, including from the Academy of Finland, the EU and the Centre of Excellence. The grants that the Unit has brought in

to the University are all on research topics that play a central role within the Unit, so they do belong to the Unit's core scientific programme.

Collaboration

The Unit is very engaged in active collaboration both within the University with other researchers in other Departments (including Mathematics and Physics) as well as internationally. The researchers are open for further collaborations and engage with research topics that cross their own domain.

Societal and contextual factors

The self-assessment report mentions an increasing level of insecurity in the past five to six years which is caused by funding-cuts at the University and the Academy of Finland. The Unit looks for more adequate background funding to ensure the available support personnel and doctoral positions. A Unit that is so successful in its research area in obtaining research funding should indeed be able to count on a more secure level of support to guarantee a sound balance between short-term employed staff and permanent staff for smooth operation (in both research and teaching) in the future.

Humanities Panel

FACULTY OF THEOLOGY (HUM UNIT 08)

1 SUMMARY

1.1 Description of the use of criteria

The assessment of Unit HUM_Unit_08, (Faculty of Theology) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and Unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

The Unit has a strategic approach to research planning which is both stable, dynamic and transparent, and which includes ability and courage to combine classical and traditional (disciplinary) approaches to theology (areas where the Faculty has been very successful) with research issues related to present and future societal changes, immigration, and religious radicalisation. At the same time, the Panel found that a number of fields and research issues are overlapping without being identified as overlapping. A mapping of overlapping fields might be useful as a point of departure for the next strategy period. The Panel recommends building a more systematic approach to societal impact, stemming from well-defined goals.

Strengths

- High-level research results and output as documented through the relatively high number of Academy of Finland (AF) positions and Centres of Excellence (CoEs), the high and growing number of publications, also at JUFO levels 3 and 2.
- Inter- and multidisciplinary in the design of research and methodological plurality in implementation.
- A broad range of research dissemination and impact activities nationally and internationally. International visibility of both individual research priorities and individual research personalities.
- Sensitivity to the importance of religion-related research for current societal challenges.

- A small Unit with a long history, which has managed to adapt to changing conditions in the Finnish higher education (HE) area, in international research and in society. It has a well-consolidated structure and governance system, and it has a pro-active approach to organisational matters.

Development areas and recommendations

- The Faculty's Departments each have clear and well-argued goals for the strategy period 2017-2020. A number of fields and research issues are overlapping without being identified as overlapping (e.g. digital humanities/digitisation of research, Islam/Qur'anic studies, religion and media, gender, etc.). One might

get the impression that the Departments are to some extent 'silos' working parallel to each other without fully using the potential of common interests and synergies. A mapping of overlapping fields might be useful as a point of departure for the next strategy period.

- The Panel recommends that the Faculty – within the

frames set up by the University of Helsinki new PhD programme – should aim at integrating the PhD students better in the daily life of the Faculty.

- The Faculty should develop a more systematic approach to societal impact. The goals of the Faculty are clear and well defined, but need more work to be implemented.

- Organisational changes in the University over the last few years have affected the working environment negatively. The Faculty expresses the need for more administrative service also at Department level after the reorganisation. The Panel advises that this be a development area for the University.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The research conducted at the Faculty of Theology is thematically innovative, highly interdisciplinary and internationally visible in its published results. It integrates effective promotion of young researchers. The high quality of the research output as documented, e.g. through the selected TOP10 publications, deserves the grading of excellent. The subjects and research questions of the publications in most if not all ten cases show that the research output of the Faculty is at the front of international theological research.

Researchers in the Faculty publish with the most prestigious international publishing houses and in high-ranking journals. The international scientific impact is well balanced with a national scientific impact documented through national publishing channels. The Faculty has a clear strategic approach to its research as documented through the areas of distinction for 2013–2016 and 2017–

2020, a strategic approach which is not only top-down, but also considers grassroots issues.

Strengths and development areas

The Departments all have relatively precise and realistic goals for their research and are able to base their future planning on a frank assessment of previous results.

The Departments are all doing well with some areas and individuals beyond doubt excellent (developing the knowledge body through new research, external funding, extensive publications track records, PhDs).

Concerning the identification of future *desiderata* and challenges, all Departments give detailed analyses which are clearly related to past and present performance – and that is of value. We recommend that in the future the Departments' strategic focus is on the *desiderata* and challenges they have identified:

Biblical Studies: the relation between Biblical Studies and fields outside theology, Quranic studies, digital humanities, and the cultural heritage movement. **Church History:** a stronger response to the popular interest in the role of religion, continued researcher training concerning archival research skills, publish more international monographs. **Systematic Theology:** ensure continuation of research of intellectual history and dogmatics. **Study of Religion:** focus more on the key research areas, develop Islamic theology, make collaboration more institutionalised. **Practical Theology:** strengthen joint research goals.

The Faculty has been able to establish a considerable number of CoEs and individual research projects. In addition, members of the Faculty participate in other CoEs. The Centres of Excellence have set very ambitious goals for themselves and are performing as hoped for. The most manifest challenge of the CoEs as well as for

the *CoCare/CoPassion* and *Embodied Religion* projects is to work consciously with questions concerning the future embedment of the results. The Faculty, moreover, should be very keen to train researchers of the next generation also in 'other' fields in order not to risk lopsided future research development. The proportion of third-party funding at the FoTh is above average. The research fields mapped in the areas of distinction and CoEs give the Faculty its specific profile and a unique characteristic compared to other European theological faculties.

In addition, successful participation in EU-funded projects such as the HERA project on "Protestant legacies in Nordic Law" and the EU project "Religious Toleration and Peace", the only humanities project approved under the Horizon 2020 programme, should also be highlighted.

The Faculty has a high number of PhD students (173, 29 employed). 15 degrees awarded each year is an impressive number; however, it seems to be rather low in relation to the number of PhD students.

GRADING: EXCELLENT

Research goals

In the past, the research objectives focused on the religious heritage of Latin christianitas on the one hand and its concretisation in Finland and Northern Europe on the other. This focus was successfully continued and expanded in the research strategy for 2017–2020, insofar as the Middle East is now also being considered. In addition, socially related topics, including the question of the "contribution of theology to modernity" / "religion, toleration, ecumenism", are being given more consideration. This reflects the topicality of the research conducted at the Faculty of Theology. It is good and important that the focus on

Finland in its relationship to Europe should be continued in a new form (religious change). The future focus on new challenges in the discussion of ethics and values as well as the theological view on global trends is highly relevant. The Faculty considers it "a feasible and realistic goal [...] to be among Europe's best multidisciplinary units within theology and religious studies within the next 5-10 years".

The Faculty of Theology has strong and relevant arguments for the selection of goals. All Departments have international ambitions, and they are all conscious about past and present achievements and are able to use them as a point of departure for future planning. This secures a fine balance between continuity and innovation. The research objectives of the Faculty of Theology are best reflected in the "areas of distinction". It is convincing that, on the one hand, they build on existing strengths and, on the other hand, take up current and innovative research trends. This deserves high praise as a successful research strategy.

Research results

The Faculty of Theology in its description of results, has covered the breadth of the Departments, mentioning quite a number of outstanding results (monographs/edited books with prestigious publishing houses, contributions to international journals, textbooks, etc.). The results reflected in the selected TOP10 publications are chosen so that each of the ten sub-units of the assessment (Departments, CoEs, projects) is represented with one publication. They are examples documenting that all sub-units, in at least one area, most in more, are producing research which is at the forefront of the area in question. The research at the Faculty of Theology has produced excellent results, most of which can be traced back to outstanding and internationally recognised individuals engaged in research. We also wish to

mention the organisation of large, internationally attended and recognised conferences, such as the 12th World Congress of Luther Research in Helsinki in August 2012, and the annual conference of the European Association for the Study of Religions in Helsinki in 2016.

The selected TOP10 publications document that the Faculty of Theology is doing research of a very high quality regarding scientific novelty, societal relevance and applicability of results. Scientific novelty is obvious as, e.g., *Biblical Studies* has taken up both a recent interest in ritual studies and a socio-cognitive approach, and *Church History* has used the Vatican Archives to break new ground investigating the Holy See's international affairs. Both *CoE CSTT* and *CoE RRR* combine novel research results with impacting future research in the fields through monograph presentations on ancient prophecy and recognition). *Study of Religion* and *CoCare/CoPassion* work with highly relevant societal issues (transnational Islam, the ethics of work). Other examples could be mentioned. All in all the Faculty is performing in a fully satisfying fashion as a theological university Unit which brings forward highly significant scientific results, takes up new research questions both in classical fields and in new areas, and develops new methods. Thus, the Faculty of Theology has proved to be innovative insofar as it currently pursues relevant questions (the importance of Islam, migration, gender, the discussion of values, social ethics, recognition, etc.) without abandoning the traditional topics of theology, which are still of high relevance for the European cultural heritage (Luther research, Reformation history of Northern Europe, etc.).

Analysis on research outputs

The balance between governmental funding and external funding is 56% / 44% (with a variation of 67-58%

governmental funding and 33–42% external over previous years). 37% (with a variation of 28–35 %) of the Faculty's funding is from the Academy of Finland. Thus, the Faculty is doing very well in attracting external funding. External funding, however, almost exclusively comes from domestic sources. EU and other international sources should be taken more strongly into account in the Faculty's strategic work.

The number of publications have increased remarkably since 2012 (except at JUFO Level 0). The size of the *academic* Faculty staff has been remarkably stable over the years. The growing number of publications thus indicates that the Faculty has focused on strengthening the publication output.

The Faculty of Theology has two/three CoEs. This

great success seems to be very well prepared by earlier research in the Faculty. The fields of the CoE projects – which must have developed out of areas of distinction pre-2013 – are clearly imbedded in the overall research of the Faculty as described in the strategy periods 2013–2016 and 2017–2020.

Apparently, the Faculty does not set strategic goals for publication output. But the Faculty, as part of its academic ethos, *de facto* aims at having a very strong publication output (international monographs, international books (contributions, edited), international journal contributions, Finnish publications). The Faculty could consider setting up an explicit publication policy also as a guidance for young scholars.

International benchmark

The Faculty has selected the Faculty of Divinity at the University of Cambridge and the Theological Faculty at the University of Heidelberg as their benchmarks.

Both the benchmark universities have profiles similar to the Faculty of Theology at Helsinki University with strong records in classical theological disciplines combined with opportunities for multidisciplinary international cooperation, and both are ranked better than the Faculty of Theology. Thus, the choices are ambitious yet relevant, as the Faculty of Theology enjoys a comparable reputation.

2.2 Societal impact

The level of societal impact and the ambitions for achieving such impact are less developed than the research goals of the Faculty of Theology. The Faculty is conscious of the need both for 'pure' societal reasons and for research funding reasons to become more mature in this regard. The Faculty has – as seems common for theological faculties – very intense activities concerning societal impact including research dissemination. But it is not yet a clear strategy in this field comprising all its Departments.

The Faculty has clearly defined the target areas and audiences for its impact work on the Faculty level. This is coherent with the research ambition of the Faculty – to

address research questions and provide teaching in areas that have become relevant to current societal changes *and* to further develop its performance within the classical theological disciplines.

On the Department level, there is less strategic consciousness and a less systematic approach to societal impact activities. The Departments all have intense activities and convincing examples of how to secure impact and disseminate research, but they have not set up plans for this, neither on an institutional nor on an individual level.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The Faculty of Theology very clearly defines target areas and groups for its research: the general public in all questions related to religion; government ministries; NGOs related to religion, social affairs, values and health; the Evangelical Lutheran Church of Finland and professionals trained in theology and religious studies.

At the Departments' level the target areas and groups are more diverse, and the division of labour in this regard between the Departments seems to reflect historical tradition rather than strategic decisions.

At the Faculty level, very obvious reasons are given for the choice of target areas and group, since the Faculty consider the enhancement of the historical and contemporary knowledge of religion and religious phenomena in all its varieties, and the advancement of interfaith cooperation and tolerance its overall goal, to which is added the more traditional and given audiences (churches, schools, NGOs, ministries). The selection also clearly reflects the research goals of the Faculty.

The Departments give less clear arguments for their choices – which also leads to a certain lack of consistency. Why for instance is only research-based teaching in the Study of Religion considered an impact factor in society? This should be the case for all disciplines.

Activities and outcomes

The activities and the choice of media to have an impact on society are manifold. They result in part from the nature of the research, but are also oriented towards the addressees. Translations into Finnish, exhibitions and textbooks address educated strata and social multipliers such as teachers, journalists, etc. Media presence via discussion platforms, e-journals, blogs and newsletters is aimed above all at the young, upcoming generation. The Faculty of Theology makes targeted use of these media on a project-specific basis. Through memberships in advisory boards and international contacts, the professors effectively contribute their expert knowledge and competence to decision-making and advisory bodies and thus also contribute to the dissemination and communication of theological research and its results.

The self-assessment report does not give examples of cases where the research of the Faculty has had a concrete influence on e.g. public decision making, legislation or suchlike. However, a research field like theology does not in many cases naturally lead to an immediate, concrete, measurable influence, but rather to long-time impact on culture, education and religious life.

The Faculty of Theology uses traditional media such as publications and lectures as well as digital and media forms of social presence. Expert knowledge can also be offered in advisory bodies. These are very suitable forms to give the outcomes of its research a broad social impact. To a high degree they correspond to the goals they have set themselves.

2.3 Research environment and Unit viability

The Faculty of Theology is a small Unit with a long history, and it has managed to adapt to changing conditions in the Finnish Higher Education area, in international research and in society. It has a well-consolidated structure and governance system, and has a pro-active approach to organisational matters.

The Faculty of Theology has a clear and transparent organisation and generally a clear and transparent governance model securing both collegial advising and effective decision making at Faculty level. Its strengths include cooperation with outstanding research centres such

as HCAS and HELSUS. In addition, there is a high proportion of third-party funding, which despite a slight decline compared to previous years is still considerable. There seem to be a clear annual procedures for strategic planning and follow up. In some instances, however, it is not quite clear how leadership roles function.

Weaknesses are caused by the brevity of employment contracts for young scholars and a lack of administrative support. The Faculty is well aware that organisational changes in the University over the last years have affected the working environment negatively and expresses the need for

more administrative service after the reorganisation. This will require negotiation with the University senior management.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The different roles of the Council and the Research Committee on the one hand and the Dean (incl. Vice-Deans) on the other seem clear, with the Council giving advice and the Dean (incl. Vice-Deans) being the responsible decision maker in academic affairs and economic questions.

There are clear annual procedures for planning and follow up on research activities and for monitoring of success and development.

The Faculty's annual development day for the whole staff is a fine tool for following up on strategies.

Some Departments are conscious that developing more team work could be relevant for them. However, the Faculty also seems to be aware that whereas a good collegial spirit is extremely important, team work as such is not the only possible way to achieve academic success nor is it necessarily a quick-fix to achieve fine results.

The Faculty has a fine system of providing research intensive periods of six months for all permanent staff members every five years. There is a price to pay for colleagues who have to take over with teaching and administration, but it seems to be worthwhile.

The Faculty finds itself to be in need for stronger administrative support for researchers applying for (esp. international) funding and, quite as important, for better administrative support for teaching at the Department level. The Faculty considers the current low level of administrative support a possible future hindrance for developing research performance.

Human resources, careers and recruitment

The academic (research and teaching) staff is small – but for a Faculty of Theology the size is quite remarkable. There is fine balance between the four levels (1: 26%, 2: 25%, 3: 34% and 4: 17%). The variation over time is explicable. One *caveat*, however, which the Faculty shares with many other institutions today, and which is due to the funding situation, is that level 2 (postdocs, instructors, both in non-tenured positions) is increasing. The number of “other staff” has been reduced due to the University's reorganisation of its

administration. As mentioned above, actions should be taken to avoid administrative tasks eating up researchers' time. However, the limitation of employment contracts for researchers level 2 and 3 to 2–3 years is too short. This is because it is difficult to obtain further scientific qualifications in such a short period of time.

The number of international staff groups is fine, except at level 4 (0%). It would have been interesting to receive information about the gender ratio and about the Faculty's plans with regard to gender diversity.

The Faculty enables good doctoral training within the Faculty structures. By involving young researchers also in the CoEs, they receive early training that qualifies them for a scientific career. Courses are also offered to support application writing.

Researcher education

Doctoral students are selected on the basis of a research plan submitted by them. This is a suitable way to ensure the quality of the research work at its outset.

The topic of the project is the students' own – which reflects the classical doctoral tradition in Humanities with free, “curiosity-driven” doctoral projects – and it is often defined in detail in cooperation with one of the two supervisors.

It is not clear how it is decided how many doctoral students the Faculty can accept, or how the number of employed positions is decided.

Doctoral students are well integrated in the research community (they join regular seminars in their disciplines/ CoEs) with the remark that the doctoral students in the Vuorikatu 3/Fabianinkatu 24 need to be better integrated into the daily life of the Departments.

Funding

The Faculty is strong in achieving external funding (e.g. AF, CoEs, TEKES) and has also some success with international funding (EU). The Faculty aims to raise the amount of international funding. At present, state funding dominates, which is normal for research projects in the Humanities.

The Faculty of Theology plans to develop more EU funding in the future and also to approach other international third-party funding providers.

Collaboration

The Faculty of Theology itself is already an interdisciplinary Unit. It also cooperates with its related disciplines in other Faculties. With the subject area Study of Religion, there is also a sub-unit that structurally bridges the gap between the two Faculties. Although this is a challenge concerning management roles, it does also show a lively interdisciplinarity which is highly appreciated. In addition there are relationships with the other theological faculties in Finland, and the cultivation of these relationships is important. The cooperative relationships established with Faculties abroad are quite considerable. The Faculty of Theology has already achieved a high degree of internationality in its cooperative relations.

The plans for further expansion of international cooperation in the north-south axis fit well with the research projects.

Connections with ‘other constellations’

The cooperation with the Helsinki Collegium for Advanced Studies (HCAS) and the participation in the Helsinki Institute for Sustainability Science (HELSUS) is outstanding.

In their respective cooperation, the Institutions guarantee interdisciplinarity at an excellent level.

Societal and contextual factors

The changes in the cultural and religious landscape will – like everywhere in Europe – influence theological research and teaching also in the Faculty of Theology. The Faculty of Theology is aware of this and is able to adapt flexibly to these changes.

The Faculty is well aware that organisational changes in the University over the last few years have affected the working environment negatively and expresses the need for

more administrative support after the reorganisation.

The Faculty of Theology works consciously and strategically with trends and developments as it defines itself as a Faculty which respects the value and tradition of a classical faculty of theology. The fields named by the Faculty of Theology (religious conflicts, dialogue and interaction between the global North and South, West and East, environmental issues, sustainability and wellbeing) show that there is in the Faculty of Theology a carefully

considered perception of current social and political challenges. Theological science with its value-oriented view of historical and contemporary cultural differences and religious diversity can decisively contribute with its traditional virtues, e.g. education qualifying for work in congregations and schools, and classical disciplines including the classical languages Hebrew, Greek and Latin.

Humanities Panel

HELSINKI COLLEGIUM FOR ADVANCED STUDIES (HUM UNIT 09)

1 SUMMARY

1.1 Description of the use of criteria

The assessment of unit HUM_Unit_09, (Helsinki Collegium for Advanced Studies) is carried out according to the three assessment themes: scientific quality, societal impact and research environment and unit viability.

The quality of the Unit with respect to each of these themes is assessed against the goals that are set forward by the Unit itself and against the specified terms of reference in the guidelines given to the Panel. Both the Unit's written

report and the interview with several members of the Unit have been taken into account.

1.2 Assessment summary

The Collegium for Advanced Studies at the University of Helsinki is Finland's premier institute for advanced studies. It has been running for nearly 20 years. The Collegium is financially stable and well supported by the University, but it should be ensured that the funding model is sustainable long-term. The Panel recommends the Unit continue to pursue external funding to supplement the University's investment. Also deepening of interdisciplinary research is recommended.

Strengths

- The Panel agrees that the Collegium is fulfilling its mission to cultivate and achieve a "top-class international research environment" by nurturing innovative and multidisciplinary research.

- By bringing together a diverse community of fellows, the Collegium ensures that a fruitful scientific exchange can take place between researchers at all career stages.
- Fellowships offered by the Collegium enable both Finnish and international scholars to spend dedicated research time within a supportive and interdisciplinary community.
- Collegium fellows are regularly producing high-quality academic outputs in both English and Finnish, especially monographs by world leading publishers.

Development areas

- It would be beneficial if the priorities of the Collegium could be aligned to those of the Faculty of Arts and Faculty of Social Sciences. This will ensure the Collegium is embedded within University structures whilst

maintaining its independence.

- The Collegium has a robust governance structure, but it should build in succession planning to mitigate against disruptions caused by changes of personnel.
- The Panel believed that the well-developed communication channels to promote the Collegium and the research it fosters could be usefully refined and expanded.
- We would encourage the Collegium to encourage diversity of applications by nation, gender and economic background.
- The Panel would encourage the University to ensure that it offers enabling structures and appropriate administrative resources to enable the Collegium to fulfil its ambitions.

Recommendations

The Panel would recommend that the Director and Deputy Director ensure that the Collegium remains financially viable over the next five years, underpinned by an explicit commitment from the University of Helsinki to continue funding at the current level. We would encourage the Collegium to continue to pursue external funding to supplement the University's investment, whilst recognising

whilst recognising that it already houses some externally funded projects. We would like to see the deepening of interdisciplinary research within and between the Faculty of Humanities and the Faculty of Social Sciences, as well as the development of stronger dialogues with the physical sciences and life sciences. The Panel agreed that the Collegium would benefit from developing a programme of public engagement in and beyond the city and via its

international networks across a five-year timeline. There is a good balance between open calls for fellowships and a thematic focus. The Panel believed this should be subject to an annual review to ensure that this balance is maintained with the aim to preserve curiosity-led research and a commitment to diversity of scholarship.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Panel were satisfied that the scientific outputs of Collegium fellows are of high quality when measured against international benchmarks. Unit publication numbers have risen in every JUFO category since 2012. The interdisciplinary scope of many publications is also a strength. Collegium fellows publish in an appropriate range of high-quality publications in journal and monograph form. The Collegium shows positive signs of strategic direction that has helped to refine application procedures for scholars and in articulating its research and publication aspirations.

GRADING: EXCELLENT

Research goals

The research goals are aligned with the University's

2017–20 Strategy with a focus on high-quality peer-reviewed publications. The emphasis on innovation and interdisciplinarity are both strengths, with a concerted effort to balance bottom-up curiosity-led research with top-down strategy. The commitment to internationalisation is also a strength – more than half of its fellows are international and the Collegium has an active International Academic Advisory Board.

The annual Winter School, a collaboration between the Collegium and the Doctoral School for PhD students, is a welcome initiative. There was good evidence that both doctoral students and post-doctoral instructors benefit intellectually and in terms of community building from the Winter School. A writer's programme to promote artistic endeavour is also to be commended.

The Collegium takes seriously its membership in the League of European Research Universities and it would like to be part of the Some Institutes for Advanced Study (SIAS) group, though plans were vague as to how it would achieve membership of this second group.

Research results

The Collegium has no tightly defined themes, but in recent years it has developed distinctive scholarly emphases: for example, mortality, memory, digital humanities and science policy. The Collegium has chosen not to “single out the most important results” across the census period, aside from the data on the range and categories of publication and the top 10 publications list that represent a chronological and strong disciplinary and interdisciplinary range in monograph

and journal article forms. Whilst the Collegium supports and facilitates individual research projects, it also has a strong collaborative ethos promoted through the e-journal COLLEGIUM.

Analysis of research outputs

The analysis of the Collegium's research outputs in the self-assessment document is detailed and realistic. The emphasis on monograph publications is important and impressive, whilst recognising that "a substantial number" of publications will always be at JUFO levels 2 and 3 as the Collegium seeks to develop the research aspirations of early career and post-doctoral researchers. The aspiration to produce publications in both English and Finnish is also to be commended.

The authors of the self-assessment document and the Faculty members with whom the Panel met recognise the Collegium's opportunities and limitations within the University and among the broader academic community. However, concrete plans to overcome these limitations might have been usefully included or presented. In addition, the report might have been less apologetic about the production of edited volumes and contributions to interdisciplinary journals that might not score as highly in JUFO terms, but may nevertheless have strong intrinsic value and intellectual merit.

International benchmark

The international benchmarks with other institutes for

advanced studies is well articulated. Whilst the status of the flagship Princeton Institute for Advanced Studies is an aspiration for the Collegium, comparisons with institutes in Berlin, Freiburg, Amsterdam, Uppsala, Nagoya and Aarhus are well made, even though the specific comparisons might have been more detailed. The Collegium compares itself, in particular, to the Swedish Collegium for Advanced Study with which it closely cooperates, though the Panel would have liked to see more detail on the types of collaboration being fostered between these Finnish and Swedish institutes. The Panel believed that closer links with Aarhus, Freiburg and Durham to facilitate external funding would be beneficial.

2.2 Societal impact

The self-assessment report acknowledges that societal impact is not a central mission of the Collegium. Yet it makes efforts to ensure the research conducted at the Collegium is visible to a wider audience, both locally and internationally. The Collegium's primary focus is on basic research rather than policy-oriented research. At times, though, the Collegium aligns these two trajectories: for example, its engagement with the topic of gender equality.

GRADING: VERY GOOD

Target areas, audiences, goals

Given the mission of the Collegium to help develop research at all stages of a career, from postdoctoral researchers onwards, societal impact is an intrinsic aspect of its activities. When the Collegium engages in public-oriented initiatives it tends to be directed either towards Helsinki residents or to the international community via scholarly and alumni networks. The Collegium makes efforts to present talks in Finnish and English in order to engage these different communities. The Panel would have liked to see more detail about how the Collegium could work with

museums and galleries to identify audiences more precisely and to extend outreach more broadly in Finland.

Activities and outcomes

The types of societal impact activities listed include public events, blogs, websites, news articles, other "popularised publications" and media work. The Collegium runs a series of talks such as Think Corner and Useless Knowledge, but it would have helped the Panel to have an indication of how many members of the general public attend and to what extent the reach was beyond Helsinki. The Panel was

impressed by the postdoctoral series funded by the Kone Foundation that focuses on artistic research, with a connection to the art publisher Parvus, and would encourage the Collegium to develop this beneficial interface between critical inquiry

and creative practice. A more fully articulated communication strategy would be helpful, though the discussion with Collegium staff gave the Panel confidence that outwardly facing communications is functioning effectively.

2.3 Research environment and Unit viability

The discussion with staff gave the Panel confidence that the University continues to value the Collegium, both as a hub for interdisciplinary research and as an opportunity for fellows at all stages of their postdoctoral career to focus on producing high quality research. The institutional cuts of 2015-16 seem to have affected the Collegium less than some other Units. The Panel noted that the Collegium has a skeletal administrative staff. We would encourage the University to review if this administrative support is adequate to the needs of the Collegium and is benchmarked against other comparable institutes for advanced studies.

GRADING: EXCELLENT

Leadership, goal setting and follow up

The Panel agreed that the leadership aims of monitoring research activities, defining areas of emphasis, and following up the recommendations of the Collegium Advisory Board are all functioning well. It also agreed that the board structure and membership is very appropriate, supported by the semi-formal Committee for Academic Affairs, ensuring that bottom-up agendas can inform strategic

directions. Internal governance structures are supported by an International Academic Advisory Board. The Collegium sets goals each year, with actions recorded online. The Panel notes that the lengthy process of finding a new director meant that the self-assessment form was started and finalised by different directors, lending it a slightly uneven feel.

Human resources, careers and recruitment

The community of researchers is the primary personnel group of the Collegium. The fellows' demographics mirrors the range of applications in various categories. There is a strong emphasis on a "mutually supportive environment". It would be good to see a stronger statement on equalities and the encouragement of diversity within the Collegium's recruitment strategy, though the application procedure looks clear and equitable. The Panel would like a more developed statement about how Collegium alumni fit into its mid-term and long-term plans, and how they can act as an advocates group to help (either formally or informally) Collegium activities and initiatives.

Researcher education

Researchers based in the Collegium receive peer feedback via weekly research seminars, with the expectation that all fellows present a research paper each year. This is standard for institutes for advanced studies and the Panel were pleased to see it operating effectively in the Collegium. We would nonetheless have liked to see a stronger statement about internal peer review of articles and monographs at an advanced stage before the typescripts are submitted to journals and publishers. This will ensure that the quality is as high as it possibly could be, though it needs to be handled carefully to ensure that independent researchers do not feel micromanaged. There are no doctoral students in the Collegium, but the Panel were pleased to see that its researchers contribute to the Winter School and we heard a very positive account of this initiative.

Research infrastructure

The Collegium has its own premises in the city, co-located with some of the departments in the Faculty of Arts. Most researchers in the Collegium have offices, with postdoctoral fellows sharing space. There is a dedicated seminar room

that can hold up to 80 and all Collegium fellows have access of the nearby University Library and electronic resources. The total physical space of the Collegium has recently been reduced, but this was due to the completion of an externally funded research project during the census period. The Panel asked about the state of the physical infrastructure of the Collegium, but there seems to be no cause for concern at this stage. The self-assessment document mentions specialist resources for particular research projects such as brain research but no details of specialist support are given. A clearer articulation of what this extra support entails might encourage applications from a broader research span in future years.

Funding

The majority of the Collegium's funding comes from the University of Helsinki, with a foundation endowment providing the financial resources for the Erkkö Professorship. The self-assessment form outlines a number of collaborations that have enhanced funding, but this funding is from fixed-term sources as is expected. Diverse sources of external funding underpins resilience and sustainability, though the Panel learned that it was not intended that the Collegium would house individual research projects that are funded

externally. The Panel was pleased to see evidence of efforts to increase sustainable external funding, but a more detailed plan would be beneficial. It would also have been helpful to see statistics relating to the career trajectories of Collegium alumni at postdoctoral and mid-career levels to gauge to what extent it contributes to the economy in and beyond Finland. But the Panel is aware that such data is difficult to obtain once the fellows have left the Collegium.

Collaboration

Collaboration is central to the ethos of the Collegium and in its development of a mutually supportive scholarly community, whilst recognising that individual researchers collaborate in different ways in their various scholarly fields. The events and initiatives of the Collegium foster the ethos of collaboration, although it would be good to see how this extends beyond the city of Helsinki. The international networks of the Collegium are strong, but it would be helpful to show how dialogues between international institutes for advanced studies could be fostered.

Connections with other constellations

The Panel believed that dialogues between the four Faculties of the University of Helsinki might be strengthened

to ensure that University faculty members do not perceive the Collegium as a "distant unit". In addition, the Panel would have liked to read a stronger statement about how the Collegium could collaborate with the Social Sciences and Humanities Research Centre to ensure that the two institutes are not duplicating each other, but are mutually supporting the postdoctoral research culture of the University. A University-level statement about its commitment to the Collegium and how it seeks to further cooperation between cognate academic units would have reassured the Panel that meaningful connections are being pursued at various tiers of management.

Societal and contextual factors

The self-assessment form notes the financial challenges faced by the University over the last four years, including the reduction of administrative staff that has directly impacted the Collegium. It is good to see that the Collegium does not believe that this financial turbulence has affected the quality of the research its fellows produce or its ability to attract a diverse community of scholars, even though there is now less administrative support for its fellows.

Life Sciences Panel

PANEL SUMMARY REPORT

1 OVERALL ASSESSMENT

Scientific quality

Overall, the Panel was impressed by the quality of research publications and research funding. Of the 14 Units reviewed (HiLIFE Joint activities and Infrastructure, Unit 21, was not reviewed as a Scientific Unit – see assessment report), three were graded Excellent (Organismal and Evolutionary Biology Research Programme, Institute for Molecular Medicine Finland and Institute of Biotechnology) and 10 very good.

Societal impact

This was noted to be excellent in six Units and very good in seven. It was clear that research was having impact on diverse audiences from government (policy / advocacy)

to patients and populations and commercial-industry partnerships delivering economic gain. There was in some cases a discrepancy between what was written in the SAR and articulation of strengths at unit interviews. Further work is required to manage impact at an Institutional level, its coordination and articulation of its importance. Greater academic ownership is required to take this forward.

Research environment and viability

On Research environment and viability, the picture was more varied, with three Units graded as excellent, five very good and six good. Overall, the Life Science Units are very well equipped with state-of-the-art equipment and large infrastructures, a prerequisite for long-term viability.

However, maintenance and renewal might be a future challenge and should be planned and dealt with accordingly. The recent cuts to University funding had understandably taken its toll, but additional leadership issues, structural problems and interactions across the Life Sciences Units, partnerships with the HUS Helsinki University Hospital and other University Faculties (notably natural sciences), together with a series of pressing workforce issues, run the risk of a decline in scientific excellence across Life Sciences at UH. Greater selectivity might be required in ensuring the real flagship areas of excellence are appropriately resourced. A unified strategy for Life Sciences at the highest level is urgently required to effect change.

2 STRENGTHS AND DEVELOPMENT AREAS: AN EXPANDED NARRATIVE

The panel appreciated that the organisation of the work of carrying out the self-assessment report in almost all cases has been an inclusive and transparent process.

There are a few caveats that we wish to highlight in the self-assessment process.

Most academics have primary and secondary affiliations but they appeared in the relevant self-assessment responses as staff members and not FTE equivalents. Not only does this significantly overestimate the capacity of academic power across Life Sciences but it also artificially

enhances the perception of scientific quality. Scientific outputs from many areas such as Neurosciences, Genetics & Genomics, and Cancer were seen across more than one unit. Whilst welcoming the vision for greater interdisciplinarity of approach to research, if the Rector wishes to see a more

accurate picture of academic capacity and scientific outputs, we suggest representing academic staff to their primary research focus only in future exercises and incorporating additional measures to correct for duplicate publications. Highlighting cross cutting collaborations with the narrative would suffice and avoid "double counting".

The grade of "Good" was noted to refer to National activity only with evidence of potential for International work. We would regard this as below average performance

(not Good) and our assessment results are made on this basis.

We were surprised that Equality, Diversity & Inclusivity were not specified as reporting metrics for the Units. Outside International benchmarking, practice was variable in how this is being addressed across the Faculties/ Institutes. We suggest that this is raised as a fundamental metric across working practices at the University and details are provided for any future similar exercise.

It was unfortunate that the timing of the assessment of the Faculty of Medicine occurred just 2 months after the agreement around new research priorities, and the panel discussion was restricted to just one hour to review almost 1000 members of staff. Understandably, the panel did not feel it had the quality of data to make meaningful conclusions on scientific output or impact, over and above what was presented on paper.

General points of note

The meeting of the five Faculty Deans and the Directors of the Institutes within UH Life Sciences together with Unit presentations revealed some general issues. These issues are by no means unique to Helsinki, but we suggest further work is required to maximise the opportunities afforded by the recent re-structuring exercises.

1. Strategy

It was unclear where overarching strategy was set and who was accountable for its delivery. There were for example numerous "Grand Challenges", with at times conflicting messages coming from HiLIFE and its Institutes and the Faculties, notably the Faculty of Medicine. Our understanding was that a University level council comprising Faculty Vice Deans for research and the Institute Directors come together to assist with this, but ownership and execution was lacking.

2. University values

On this note at a wider level there was a worrying (but not uncommon) description of "The University" being a 3rd party, that is a personal detachment from ownership of a collective vision and belonging. When asked how the Units with Life Sciences were contributing to the University strategy, there was a uniform lack of appreciation of what this entailed.

3. Geography

The added challenges of having expertise distributed across the Viikki, Kumpula and Meilahti campuses was evident. Whilst there is undoubtedly some excellent activity within the clinically based Faculties, a very close partnership is required with "Pre-clinical/Discovery Science" led research on the Viikki campus, if the full translational opportunities of the University are to be realised. Any "competition" in this

area must be viewed as being external (e.g. Copenhagen, Karolinska, Amsterdam, Imperial/UCL in London) and not internal. Medicine-Biomedicine is changing at pace but must embrace tomorrow's new and immersive technologies to move forward. The location of physical sciences, computation, digital, data, engineering, fluidics on the Kumpula campus adds additional challenges that must be managed and overcome. There were many examples of interactions with these disciplines by several units including Biological sciences/HiLIFE, less so with Medicine. The partnership across FIMM and Medicine works well. Neuroscience recently moved to the Meilahti campus and this was much needed.

We thank the organisers for the site visits that helped shape our assessment and recommendations.

4. HiLIFE

The move from 70 separate research infrastructure initiatives to 18 priority platforms, supported in part by core University funding through the HiLIFE structure was seen as a well-designed and much needed way forward. Sustainability of the model will be challenging; the move in some areas (e.g. Neuroscience animal models, iPS cells, Drug screening) to bring industry partnership platforms on board was innovative. Further infrastructure planning across local/ Scandinavian partners for larger and more complex equipment/ technologies is likely to be required as HiLIFE evolves. This also includes awareness of the unique future possibilities offered within Life Science by the European Spallation Source (ESS) under construction in Lund, Sweden. HiLIFE is a young organisation (2017-) but we sense some real challenges; as outlined above, those of strategy but also the variation of HR and academic processes between HiLIFE

and the Faculties unit. We develop this in our summary report for HiLIFE Joint activities and Infrastructure (Unit 21) and make firm recommendations below.

5. Training

Life Sciences is training an extensive cohort of doctoral researchers. We had the opportunity to meet many of them at the unit interviews – their inclusion was most welcome. We were not provided with time to completion rates but in some areas the process, particularly at the time of completion/vivas etc. seemed unnecessarily complex. The training of tomorrow's clinical academics, however, is suboptimal. This is a key factor in the future viability of clinical research across UH; our Faculty of Medicine (Unit 17) report highlights this in more detail. For post-doctoral fellows, similarly, structures for nurture and support were less clear and were variable across Units. Greater attention

to supporting future careers (either as scientific PI's/ Fellowship applications, or other careers) and mentorship also for career possibilities outside academia is required. The panel acknowledged the high percentages of international doctoral students, in most cases well above 35%, i.e. the University target according to the strategic plan of University of Helsinki 2017–2020.

6. Tenure track Professors

The implementation of a formal tenure track system with a clear tenure promotion seems well established, and considered to be an important element both for maintaining highly qualified junior academic staff and for attracting applicants from abroad. However, there were some indications that the appointment of academic staff is too slow and should be expedited.

Notes concerning the Assessment Themes

Scientific quality

The panel appreciated the fact that University of Helsinki as well as various Life Science disciplines are highly ranked in International University Rankings. This gives an excellent platform for the continuation of high-level research activities and further development of Life Science at University of Helsinki as part of the overall strategic direction of the University. The specific assessment of scientific quality is discussed in the individual Unit reports.

Societal impact

It was not always clear that there was a clear understanding of priority target areas of societal impact, the audiences with which to achieve this and the demonstration that impact had occurred. The panel suggest a co-ordinated approach to this across the Vice Deans for impact. Accepting that there may be subtle differences across some of the units in terms of which audiences to engage, Life Sciences should collectively agree its priorities (e.g. government policy/advocacy, patient

groups and populations, practice-changing clinical trials and patient care guidelines, commercial-industry interactions delivering economic impact) and formulate processes for their further development. Communications (e.g. media, social feeds) will be an important aspect of this strategy. Greater academic ownership of this as a priority issue (rather than an administrative issue) with a clear understanding of incentives – for example tracking through to University promotion criteria – is recommended.

Research environment and viability

The Life Science Units are very well equipped with state-of-the-art equipment and large infrastructures. The investment

in common equipment and core facilities have a positive effect on collaboration across disciplines and should be further developed.

Major Highlights

- State-of-the-art infrastructure field stations and platforms, e.g. Rationalisation and focus via HiLIFE.
- Documented scientific excellence in several areas – Molecular Medicine, Biotechnology, Organismal & Evolutionary biology.

- "One Health" concept as an example of profiling a discipline.
- Internationalisation and outreach is working well in many areas. Several impressive new recruits (e.g. Daly- FIMM), but the ability to recruit talents at a senior level from

- abroad seems limited in some Units.
- Evidence of integration across Units and the three campuses, e.g. AI, Big Data – there is more to do by integrating, for instance, Natural Sciences into Biomedicine, and Biomedicine into Man.

Major recommendations

- Setting an exciting vision for Life Sciences at University of Helsinki. An overarching strategy is urgently required. The University should give much thought to who should embark on this, how it is done to ensure inclusivity and essential "buy-in" from the 5 Faculties and HiLIFE Institutes, and how it will be implemented.
- It is our strong view that HiLIFE as currently configured is not the optimal focus for this activity and would be best served as an administrative rather than academic function, comprising as it does excellent existing

- academic Directors of its flagship units Biotechnology Institute and Molecular Medicine.
- The partnership with the HUS Helsinki University Hospital/The Academic Medical Center Helsinki is critical, yet is not formalised or underpinned with an agreed vision and strategy. Appropriate processes need to flow from such a partnership, for example agreements on data flow from patient to FIMM.
- Workforce requires attention across many areas, notably mentorship, career development of post-doctoral fellows

- and clinical academics. There is the opportunity and need to better support research technology specialists across HiLIFE infrastructures.
- Clear oversight required with academic ownership of societal impact – which audiences, how to engage and evidencing of impact.
- Strategic leadership and capability will need to be addressed in some areas – it was variable from outstanding to good-weak.
- Financial resources for more long-term strategic

initiatives at lower organisational levels e.g. Department levels should be considered.

- Further work is required on Equality & Inclusivity embracing, but not restricted to, International metrics.
- Strategic use of advisory boards also at a Departmental/

Unit level, for example by appointing members from the identified international benchmark institutions.

- Further selectivity may be required to ensure support for areas of greatest excellence if the current fiscal environment continues. A challenge here will be

signposting which areas the University can no longer prioritise.

- Implementation of a clear process to follow up on the progress of changes that the individual Units decide to initiate.

Life Sciences Panel

DEPARTMENT OF AGRICULTURAL SCIENCES (LS UNIT 10)

Faculty of Agriculture and Forestry

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The goal of the Department of Agricultural Sciences is to 'conduct research and provide higher education on animal production, plant production, environmental soil science, and agrotechnology, as well as to yield societal impact through research'. Thus the research goals described spans "from farm to fork" and "from fork to farm" and is uniquely represented by the Department of Agricultural Sciences in Finland. This breadth enables the Department of Agricultural Sciences to offer excellent opportunities for multidisciplinary research and education. However, the research goals "from farm to fork" and "from fork to farm" are broad and an almost impossible challenge for a small group (just 32 PIs, including 11 professors and 2 assistant/associate professors). The stated departmental goals are largely descriptive and lack direction and ambition. Revising this could give the Unit focus and direction, and increase their international profile.

Recent research activities have been focused on 5 important core areas: 1. from genomes to practice; 2. energy efficiency in agricultural and horticultural production; 3. well-being of animals and people; 4. field and water systems; and 5. overall management of plant protection. Future effort will focus on 5 related research areas that examine aspects of sustainability in the context of climate change and biodiversity loss. These new areas build on existing strengths and have much clearer direction than the previous ones.

The publication output (number and quality) from the Department is consistent with 25% above average of publications in the highest ranking journals (CWTS - MNJS).

The research targets of the Department of Agricultural Sciences are largely applied and therefore the majority of research projects have potential socioeconomic impact and interest. The Unit has identified a wide range of audiences and stakeholders and was able to show examples of where the potential is being translated into successful outcomes.

Research leadership within the Unit is weak and there are no clear structures to develop and manage research strategy, exploit funding opportunities and facilitate the success of individual PIs. There is no clear strategic vision for the future recruitment to the Department that ensures research excellence.

The Department of Agricultural Sciences has a strong and consistent track record for securing external funding to support the research. Securing the ERC grant was excellent. Although the external income is generally strong the contribution from Industry, International, Charities etc is quite small.

Strengths

- Excellent opportunities for multidisciplinary research and education
- Publication output consistently above average in the highest ranking journals
- Good understanding of the potential socioeconomic impact and stakeholders of the research with some examples of research being translated.
- Strong and consistent record of external funding

Development areas

- Research goals are largely descriptive and lack direction and ambition
- Current resources limit the potential to translate research to societal impact
- Research leadership and strategic planning needs to be improved

Recommendations

- The Unit's goal is currently descriptive and lacks aspiration of excellence – this should be replaced with something that both aspires to excellence but also gives direction to the research.
- The research leadership needs to be reorganised so as to provide a forum to develop the research strategy and fully exploit new funding opportunities to ensure future success; e.g. introduce a research committee and external research advisory board.
- Strategies should be developed to compensate for the loss of technical support to research projects
- A recruitment succession plan is needed to deliver the Unit's research goals and strategy by building critical mass in core areas to enhance income, publications, reputation and visibility.
- To make the research environment more attractive so as to recruit a greater number of international staff and attract visiting fellows.
- In addition, a rigorous tenure-track system would increase the appeal for young researchers and allow sufficient turnover of the research personnel.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The evaluation of scientific quality was based on the nature of the research areas covered by the Department of Agricultural Sciences, the publication record, the level and sources of competitive funding, the human resources available.

During the period under review, as a result of the reorganization of the Faculty, the Department of Agricultural Sciences has had substantive changes to its structure and also lost some financial autonomy. In 2018 soil science joined the Department whilst the Viikki Farm and Muddusjärvi Research Station were transferred to a new infrastructure unit. Additionally, funding constraints have led to the loss of staff in both administration and technical roles.

The SAR of the Department of Agricultural Sciences highlighted apparent discrepancies in the numbers of publications achieved between their own numbers and the CWTS report. Given the resources available, the Department of Agricultural Sciences is consistently achieving good research output of a scientific standard which is mainly national but also demonstrating some international recognition. However, this level of performance is not surprising given the breadth of the research portfolio and lack of critical mass in individual research areas.

The Department of Agricultural Sciences consists of a group of 32 PIs, including 11 professors and 2 assistant/associate professors. The Unit should strive to meet their goal for international staff ratio and highlight the wider international recognition of their PIs. .

The SAR of the Department of Agricultural Sciences describes the most important results from all of the 5 core research areas: 1. from genomes to practice; 2. energy efficiency in agricultural and horticultural production; 3. well-being of animals and people; 4. field and water systems; and 5. overall management of plant protection. The Department of Agricultural Sciences is publishing consistently year on year. All of the core areas are contributing but based on the data, the total contributions from each to the overall output could not be assessed, but plant science was the major category. According to the SAR over 30 % of publications belong to the two highest JUFO ranking categories - 2 and 3. Most publications (59%) involve international collaborations; information on how many were led by the Unit would have helped positioning of their research on the international scale. The CWTS report stated that their publishing in high-impact journals was 25% above average.

GRADING: GOOD

Research goals

The Department of Agricultural Sciences goal is to 'conduct research and provide higher education on animal production, plant production, environmental soil science, and agrotechnology, as well as to yield societal impact through research' and spans "from farm to fork" and "from

fork to farm". This is an important subject for research but this description lacks ambition and real direction. In addition, the breadth is an almost impossible challenge for a small group with just 32 PIs to address. The research activities in the review period focused on 5 important core areas: 1. from genomes to practice; 2. energy efficiency in agricultural and horticultural production; 3. well-being of animals and people; 4. field and water systems; and 5. overall management of plant protection.

Future research will examine aspects of sustainability in the context of climate change and biodiversity loss with research focused in 5 new areas: 1. mitigation measures and adaptation of agricultural production to climate change; 2. development and utilization of automation and novel technologies in agriculture; 3. new perspectives to genomics and nutrigenomics in agricultural production; 4. nature-based agricultural solutions; and 5. sustainable food systems and transition to resilient bio-economy with innovative uses of biomass for food, feed, fibre and fuel. Each of these builds on the existing expertise and in general have direction and deliver solutions, it will be important to ensure that each of these becomes more than a convenient label for research grouping and develops a coherent research direction and output. These new targets offer good opportunities for multidisciplinary research.

The SAR claims the twin ambition to develop the Department of Agricultural Sciences into one of the global

leaders in its field and to undertake that research is not only of a high scientific quality but also has a strong impact on society. These are laudable research goals but the Unit should ensure that they have the strategic plan, and the resources (human and infrastructure), to deliver to these goals.

Research results

The top five achievements in the Unit in 2012–2018 each include several research activities taken from research in the core areas.

- Alternative and novel protein sources for future food security
- Advances in energy efficiency and use of renewable energy in agriculture
- Accomplishments in sustainable agricultural production systems
- World-class outputs in plant molecular biology
- Exposing global ecological patterns: world-wide research combined with a large-scale media campaign

All these achievements have a good scientific and potential societal impact with possible translational application/adoption.

Analysis on research outputs

The SAR highlighted discrepancies between their report and that of CWTS. The number of papers published/quality has remained fairly constant throughout the assessment period. According to the SAR the Unit published 627 peer reviewed publications (106/year, equalling 3.3/ year for PIs). Among the publications, 30.1% belong to the two highest JUFO ranking categories, 2 and 3. The major category among publications is plant sciences. Most publications (59%) involve international collaborations although it is not clear how many were led by the Department of Agricultural Sciences. The CWTS report stated that their publishing in high-impact journals was 25% above average (CWTS - MNJS). Importantly, some of the publications were in the most prestigious top quality journals like Science.

Although the desire to increase scientific productivity during the assessment period through careful recruitment of scientific excellence has not been realised, this credible performance has been achieved despite significant budget cuts that reduced technical and administrative support.

A total of 63 students (12.6 graduates/year) graduated with a doctoral degree during the assessment period. Although this is a respectable number (approximately 0.7 per PI per year), it is somewhat on the low side by international standards for a department with this wide range of research interests.

The outputs of the Department of Agricultural

Sciences met their stated rather unambitious goal 'The goal of the Department of Agricultural Sciences is to conduct research and provide higher education on animal production, plant production, environmental soil science, and agrotechnology as well as to yield societal impact'. In fact the Department of Agricultural Sciences is consistently achieving good research output of a scientific standard which is mainly national but also demonstrating some international recognition. The Department of Agricultural Sciences is well placed to address the increasing global challenges of agricultural production and move from a nationally well-recognized unit into one of the global leaders in its field which has a strong impact on society. The route map to achieving this important goal is still to be elucidated.

International benchmark

The Department of Agricultural Sciences chose to benchmark itself against three universities which presently rank more highly than them in the international Shanghai ranking. They are the Swedish University of Agricultural Sciences, the University of Minnesota and the University of Göttingen. All of these units have research encompassing the broad spectrum found in the Department of Agricultural Sciences. The higher ranking Universities were selected for benchmarking because the Department of Agriculture would like to improve their performance. The comparison with these institutions is reasonable.

2.2 Societal impact

The evaluation of societal impact was based on the extent to which the self-assessment revealed activity aimed at appropriate targets. The research targets of the Department of Agricultural Sciences are largely applied and therefore the majority of research projects have potential socioeconomic impact and interest. Within the Unit, there is good understanding of the role and positioning of their research in society. The Unit has identified a wide range of audiences and stakeholders. Within the SAR there are some examples of where the potential is being translated into successful outcomes.

A major strength of the Department of Agricultural Sciences is their breadth and their ability to potentially deliver socioeconomic impact to a wide range of audiences and stakeholders. The ability to translate this potential is limited by the available resources.

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

The research targets of the Department of Agricultural Sciences are largely applied and therefore the majority of research projects have potential socioeconomic impact and interest. The Unit has identified a wide range of audiences and stakeholders from food, feed and other industries, machine/implement manufacturers, agricultural and environmental administration (including ministries), national and EU level policymakers, plant and animal breeders, trade, advisory organizations, farmers, interest groups (e.g. the Central Union of Agricultural Producers and Forest Owners MTK), universities of applied sciences and other schools, and public audiences including consumers/food citizens.

The potential stakeholders and audiences beyond academia for each target area is clear and well described. The identified targets are appropriate.

Activities and outcomes

The Unit used a wide range of means to disseminate, communicate and valorise their research outputs. The major way was through publication of results in scholarly refereed

journals and in newspapers, professional journals and magazines (paper or on-line articles) aimed at professionals or the general public. They have developed web tools for open use. They have published guides- and textbooks. Their activities included 147 press and other media contributions (24.5/year) and 144 public speeches (24.0/year). The Unit is involved in training events and discussions among farmers and growers (professional and hobbyist), agricultural advisory services and, other stakeholders. Other research projects have utilised citizen science which involved volunteers in both data collection and a manipulative field experiments.

Very good examples of translation are the Unit's contribution to the European Parliament policy publication The environmental role of protein crops in the new Common Agricultural Policy (2013) and the outcomes of a project (2008-2016), which improved cropping practices for several farmers.

In conclusion the Department of Agricultural Sciences was effectively able to develop projects with high society interest and also develop some good examples of translational outputs.

2.3 Research environment and Unit viability

The assessment was based on the data provided in the SAR and from the interview responses these covered a broad range of topics including human and financial resources, infrastructure and organisation.

Whilst the physical research infrastructure and the performance of individual PIs is good, the lack of research leadership within the Unit means that it is not as well positioned as it could be for the future. There are clear opportunities for further development to ensure that the operations and procedures for research are systematic and robust to ensure future success.

All the research activity was initiated by individual PIs and there was no clear leadership or structures for developing research strategy, oversight of research and facilitating development of new multidisciplinary projects. The apparent absence of a scientific advisory board and loss of the Departmental Advisory Board in 2017 are disappointing.

However, the Unit has done very well to maintain both their scientific output and their income from external sources to support research and win a ERC grant. However, there are still opportunities to increase funding from other sources, particularly Industry and the EU.

The Unit is internally evaluated for several parameters that include societal outputs, amount of external funding, and numbers of bachelor's, master's and doctoral degrees obtained each year.

Budgetary cuts during the review period has led to the loss of posts, whilst academic positions were maintained 8 support posts were lost; this has impacted research

activity and increased the burden on the academics. This apparent imbalance needs to be addressed to ensure the PIs are adequately supported.

GRADING: GOOD

Leadership, goal setting and follow-up

Teaching rather than research appears to figure as the major priority in the current management structure; the management group consists of the Head of the Department, the Deputy head, the Directors of our two Degree Programmes a University Lecturer, and a Research Technician. Although individual PIs are performing well the leadership and organisation of the Units research activities is missing, as is leadership within the core research groupings.

The Unit is internally evaluated for several parameters that include societal outputs, amount of external funding, and numbers of bachelor's, master's and doctoral degrees obtained each year. Overall performance is discussed as a unit at the meetings of the Management Group, Study Programme Boards and during teachers' meeting.

Human resources, careers and recruitment

The size of the research staff in the Department of Agricultural Sciences has remained quite stable during 2012-2018 despite considerable budget cuts across the University. Currently the Department of Agricultural Sciences has 32 PIs of which 11 are full professors and 2 assistant/associate professors. It is not clear how many if any of these are International. The Unit has only 9 postdoctoral researchers

and a comparatively small cohort of postgraduate students; the ratios of numbers of postdocs and PhD students to PIs are low for this area of science.

The budgetary cuts 2016-2018 has led to the loss of posts, whilst academic positions were maintained 8 support posts were lost. This has impacted research activity and increased the burden on the academics for example necessitating the use of short-term research assistants who may not be sufficiently skilled to undertake the working place of experienced technicians. This apparent imbalance needs to be addressed to ensure the PIs are adequately supported.

The SAR identified a lack of engagement by some staff and this is a clear concern that needs to be addressed. Whilst the overall performance of the Unit is discussed at the meetings of the Management Group, Study Programme Boards and during teachers' meetings. The Unit should ensure that they have mechanism for dealing with individuals who are not engaging or succeeding.

Researchers in all phases of their career are encouraged to apply for funding in order to gain further experience and academic qualifications, and to support research training in the case of PI

The SAR identified difficulties in getting permission to hire new research and non-research staff members when somebody retires or changes jobs. There is no clear planning for recruitment at the tenure of PI-level researchers.

Researcher education

The PhD students play a major role in the research of the Department of Agricultural Sciences. The SAR describes the

procedures for admitting PhD students and how their projects are formulated. Doctoral students are often recruited from the top MSc students but also through national/international contacts or advertisements once the supervising PI has received funding to support the thesis research. In addition, they have many doctoral students with personal stipends to support their studies. The Doctoral students learn research methodology and other scientific and complementary skills when working as a full member of a research team.

The progress of the research is monitored by team meetings held on a regular basis. Doctoral students participate in formal annual staff evaluations. In these discussions with the superior, an appraisal of the previous year's performance is conducted, and clearly defined goals are outlined. In addition, as a part of the doctoral programme, each doctoral student reports on the progress of his/her studies to the monitoring group nominated by the Doctoral Programme.

Whilst this all seems satisfactory, to better assess the performance of the PhD programme, it is recommended that the Unit regularly follows e.g. what formal training is in place, how long the average PhD student takes to complete their studies, how many students drop out, the destination of student and the support systems available to students.

Research infrastructure

The Department of Agricultural Sciences utilizes several sets of infrastructure managed by the Faculty: Viikki Research Farm including Muddusjärvi Research Station (until 2018, formally a part of their Department), Viikki Plant Growth Facilities, and laboratory facilities. The Research Farm, Muddusjärvi Station, and Viikki Plant Growth Facilities are

also infrastructure platforms of the Helsinki Institute of Life Sciences (HiLIFE). The existing modern and unique infrastructure offers good support to their multidisciplinary research and teaching, from field studies to laboratory analyses.

In the greenhouse, they have access to the new National Plant Phenotyping Infrastructure (NaPPI) platform which operates the full continuum from genomics to noninvasive high-throughput phenomics and culminates in high precision metabolomics and chemical imaging.

Funding

The majority of the departmental budget comes from internal funding of about €4.80M (56.7%) this was supplemented with a substantial amount €3.6M of external funding. Most of the external funding (36.1%) came from the Academy of Finland, 32% from ministries, 19.6% came from the EU and other international funding whilst domestic funds and foundations account for 11.4%. Currently less than 1% of their income comes from Industry and this is a potential source for much greater support. A unit of truly International standing would be expected to hold more than one ERC grant. The Department has adopted a sensible and pragmatic approach to research funding that both exploits ad hoc opportunistic funding sources whilst at the same time trying to secure long term funding for ambitious strategic research.

Collaboration

The Department of Agricultural Sciences has a large number of multi- and interdisciplinary collaborations between different research groups in the Department, in the Faculty, and in other Faculties/Units of the University of Helsinki.

They also have a large number of collaborations Nationally and Internationally. Whilst these are all appropriate and have built up a strong collaborative network until now few appear to be strategic for example enabling the sharing of teaching, training and research facilities. The active negotiations of a research and education collaboration with the Zhejiang Agriculture and Forestry University in China is to be welcomed; this kind of initiative offers the possibility of increased efficiency and the chance to deliver more research even if it does not directly increase research income.

Connections with 'other constellations'

Many of the Department's PIs are affiliated to joint operational units of the University such as HiLIFE, INAR and HELSUS, and to Viikki Plant Science Centre (ViPS) which is described as virtual research environment. The strengths include enhanced cooperation beyond the Department and the availability of new resources (infrastructure, some new tenure-track positions) that are channelled to the Department or shared with other units. The weakness is that recruiting these new tenure-track professors (i.e. creating the profile for the field) may mean that the Department loses some other existing but still necessary resources.

Societal and contextual factors

Achieving food security is a global challenge that will not go away in the next few years. Thus the sustainability of agricultural production, sustainable intensification, and sustainable food systems are currently and will remain of major relevance for the Department of Agricultural Sciences. Indeed providing solutions to this will enable them to obtain the global recognition that they seek.

Life Sciences Panel

DEPARTMENT OF FOOD AND NUTRITION (LS UNIT 11)

Faculty of Agriculture and Forestry

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinised for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognised top discipline journals across the Unit when compared to peer groups. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a

high degree of international recognition and should also establish a visible scientific leadership role in the respective research area. Examples of markers of success are reflected in underlying peer-reviewed research grant income and leadership roles in international research consortia.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside of health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the Unit. Strategic oversight, management of activity and ownership by individual academics were additional factors that were considered. Excellence is achieved when the activities are realised and the output of the science flows,

for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the Unit, and the design of decision-making and strategy processes, can be influenced directly by the Unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross-University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The Department of Food and Nutrition is part of the Faculty of Agriculture and Forestry, in which five further Departments as well as an Institute are located. With 17% of the staff of the entire Faculty, it is of medium size. After a reorganisation of the Faculty, the Department was newly

formed in 2018. Until 2010, the divisions of Food Chemistry, Food Technology and Nutrition were located in different Departments of the Faculty. This new structure is seen as useful, both by the Unit itself and by the panel members of the evaluation, since cooperation opportunities can be

better exploited. This will support e.g. the investigation of relationships between food (ingredients), food processing and nutritional effects on human health. Due to the short time that the new Department have existed, the effects cannot yet be determined. The same applies to the strategy

process carried out by the Department in autumn 2018. Nevertheless, the process led to the definition of the most important research areas of the Department that are the subject of the evaluation.

The scientific quality of the Department is graded very good. Some research directions have been systematically and profoundly studied over a longer period of time, and international visibility could be established. In particular, work at the interface between technology and analytics as well as at the interface between nutrition, food ingredients and health effects is exemplary. This multidisciplinary and partly system-based approach is well reflected by the new structure of the Department. This approach could be further reinforced and expanded by strengthening cooperation with other Departments in the Faculty as well as with other Faculties of the University of Helsinki.

The results of the research have a high social and

economic relevance. The Department strives for dialogue with other stakeholders, such as authorities, NGOs, policy makers, the food industry and citizens in society. Moreover, some research leads to direct use, such as two spin-offs. This also applies, for example, to the preparation of guidelines for the prevention of obesity in children and adolescents. Some scientists from the Department are members of expert groups such as the European Food Safety Authority (EFSA) and can thus contribute their knowledge to the generation of recommendations or opinions, which in turn can form the basis for legislation. Thus, the societal impact is excellent.

The Department's viability can be graded as very good at various levels. Several recruitment processes for professors have been completed or are in progress in the recent past. Renewal processes are very well represented by the recruitment of early career researchers and the

development of innovative topics. The Department is very successful in attracting third-party funding. Processes for making decisions are well established. The institute has several significant infrastructures that, however, could be used more effectively by improving personnel capacity for technical support. Together with the Department's access to other platforms within the university the overall infrastructure is very good.

Strengths

- The multidisciplinary and system-based approach leads to solution-oriented research
- Proven impact on society on various levels

Recommendation

- Strengthen collaboration with other Departments and Faculties of Helsinki University

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The scientific quality of the Department can be described as very good. Some research directions have been systematically and profoundly studied over a longer period of time (e.g. oat / beta glucan or vitamin D in the diet). Thus international visibility could be established. In particular, work at the interface between technology and analytics as well as at

the interface between nutrition, food ingredients and health effects is exemplary. The Department has a strong research output (e.g. publications, PhD candidates), which could be further strengthened if some results were also published in more general journals with a higher citation / impact.

It should be emphasised that the research of the

Department addresses clear problems or objectives that exist in real terms and works on them with a basic scientific approach that in turn allows transferable solutions to be derived. This is a particularly difficult and ambitious type of research, since it demands a very good understanding of practical problems from the researchers as well as a focus

and enormous depth in dealing with the underlying research question in order to gain significant scientific impact. The sometimes very good connections relations with low income countries could be used to expand research questions more intensively and systematically together or in relation to developing countries.

Strengths

- excellent research in the interface between technology and analytics and between nutrition, food ingredients and health effects
- high visibility of research topics that are promoted over a long period of time. International visibility

Recommendations

- Increasing the scientific impact in publication by focusing partly more on general journals
- Developing some research topics for low income countries

GRADING: VERY GOOD

Research goals

The overall goal of the Department is to conduct research that contributes to strategies for solving specific problems and national and global societal challenges related to food quality and safety and to nutrition-related health. Under these objectives, the Department has reviewed its own research activities and defined five areas: New plant-based protein sources, Bioactive ingredients, Exploitation of by-products and microbial resources to improve nutritional quality, Contribution to nutritional policy, especially regarding children and adolescents, and New health relevant knowledge on food safety. Each of these areas is characterised by a clear analysis of the problem,

but at the same time each area has a broader scope in terms of content and methodology in order to profitably bring the wide-ranging positioning of the Department into play. In addition, the topics have been chosen in such a way that either a long tradition is emerging that is suitable for building up a leadership position in the field or new discoveries are the basis of a research area demonstrating the dynamics in the Department.

Research results

New plant-based protein sources. The focus was on faba bean which has been investigated with the approaches of different disciplines such as chemistry, food technology and nutrition and health sciences. The research addresses several important drawbacks of faba beans preventing wide use in human nutrition such as low sensory quality, presence of anti-nutrients and lack of vitamin B12.

Bioactive ingredients. Significant results have been produced for beta glucan from oat concerning its rheological properties and its health functionality. Moreover, the composition and technological functionalities of several cereals and pseudocereals have been systematically studied.

Exploitation of by-products and microbial resources to improve nutritional quality. Novel functionalities were discovered by combining wood hemicellulose in food, and research has been conducted in terms of composition, technological and sensory functions. The mechanism of vitamin B12 biosynthesis in *Propionibacterium freundenreichii* was explored and will be a basis to fortify plant food.

Contribution to nutritional policy, especially regarding children and adolescents. Important life style and diet factors were identified impacting the health of various population groups including low-income countries. More

specifically, the importance of vitamin D during the entire live span has been demonstrated.

New health relevant knowledge on food safety. Various topics were discussed and led to significant results such as the reduction of anti-nutrients in faba beans, the stabilisation of food systems with respect to lipid and protein oxidation, the elimination of harmful peptides and proteins associated with celiac disease. In addition, studies showed that the high level of a number of different undesirable components is more likely to be responsible for dietary-related effects in the process of carcinogenesis than individual compounds.

Analysis on research outputs

The research output is classified by the Department on the basis of publications, doctoral theses, career paths of graduates and third-party funding.

The number of teaching and research staff (level 1-4) amounts to 56 in the Unit (Department of Food and Nutrition) which corresponds to a share of less than 20% of the entire Faculty in 2018.

The average number of publication is approx. 135 (level 1-4), which corresponds to 2.5 per FTE teaching and research staff. This is slightly above the average of the entire Faculty (706 per year level 1-4) showing a ratio of 2.4 per FTE (average of 296 FTE 2013-2017).

The Department itself classifies the proportion of JUFO level 3 publications as low and attributes this to the predominantly low impact factors of most scientific journals in the field of nutrition and food sciences. The assessment that the proportion of JUFO level 3 publications cannot simply be increased is plausible. The proportion could only be achieved with publications that are concerned with partial aspects that are not to be assigned to the field

of nutrition and food sciences. This would only harm the independence of the disciplines in nutrition and food science if the balance is strongly shifted from discipline-specific to more general journals. Therefore, it is recommended to also strive for some publications in more general journals to increase the scientific impact and thereby strengthen the discipline at the same time.

The number of doctoral theses completed is 23 in 2013-2017, i.e. 4.6 PhD per year which is adequate compared to the number of professors (a total of 6 in level 4). It is an

expression of the success in attracting third-party funding as well as an expression of the attractiveness of the research groups to foreign graduates.

International benchmark(s)

The Department of Food and Nutrition has chosen Wageningen University as its benchmark, which in fact ranks first in many areas of agricultural and food science worldwide. The decisive factor for this was that food chemistry, food technology and nutrition sciences are in

one unit (VLAG Graduate School). VLAG has very good cooperation with the food industry and very successfully pursues the approach of problem-oriented research, which leads to the development of very fundamental questions.

There are very good relations with VLAG through closer cooperation and exchange between scientists, especially at the level of doctoral students. This means that there is an opportunity to learn exactly how VLAG works and to derive successful strategies for the Department.

2.2 Societal impact

The research of the Department of Food and Nutrition has a high social and economic relevance and researchers consequently and very successfully strive for dialogue with stakeholders. The expertise of individual researchers is included and recognised by national and international bodies that make recommendations or develop guidelines. The outreach activities of the Unit are very well demonstrated by the number of articles in professional journals and media visibility. In addition, the direct use of research outcomes was realised through spin-offs.

Strengths

- National and international societal impact
- Awards for science communication
- Research leads to direct use on various levels

GRADING: EXCELLENT

The results of the research have a high social and economic relevance. This is already a given on account of the professional focus on nutrition and food and the associated needs of consumers. In addition, the Department strives for dialogue with other stakeholders, such as authorities, NGOs, policy makers, the food industry and citizens in society.

Particularly noteworthy is the fact that some research leads to direct use. This applies, for example, to the preparation of guidelines for the prevention of obesity in children and adolescents. In addition, some scientists from the Department are members of expert groups such as EFSA and can thus contribute their knowledge to the generation of recommendations or opinions, which in turn can form the basis for legislation.

In addition, the Department publishes 5-10 articles per year for professional journals (not classified according to JUFO criteria). A high number (100-150) of lectures and articles in the media are reported. The awarding of several prizes in the field of science communication is in line with this.

Two spin-offs and seven patents are very good proof of the economic exploitation of the research results.

The Department is very active in facilitating the transfer of results within the community, using different channels and targeting different stakeholders. The success is impressively documented by official recommendations, spin-offs, patents and prizes for the dissemination of science.

Excellence has been clearly achieved as the activities have been rewarded and the expertise of the scientists flows, for example, into high-ranking national and international committees or is decisive for official decisions and guidelines.

2.3 Research environment and Unit viability

The Department is characterised by a flat hierarchy including a broad commitment of employees on the one hand and attractive opportunities for the development of early career researchers, in particular for doctoral and postdoctoral researchers, on the other. Both the personnel situation, in particular the recruitment, and the technical resources are characteristic for the future viability of the Unit. The Department operates on a broad and solid basis with regard to cooperation with other institutions (national and international) as well as with regard to the acquisition of third-party funds.

Strengths

- Successful recruitment processes on all researcher levels
- Successful support of early-career researchers
- Versatile plans to maintain the level of competitive funding

Development areas

- Low number of technical assistants and/or engineers
- The need for access to a statistician at the Faculty level

Recommendation

- Cooperation with other Departments and Faculties would need to be further or strategically intensified in order to benefit from PROF1 funding.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

In autumn 2018, the Department carried out a strategic

process in which all employees were involved in the consultations on the orientation and definition of common research fields. On the one hand, this corresponds to the flat hierarchies in the Department and, on the other hand, a high degree of commitment should be achieved through broad involvement. The process was led by the management of the Department and the core research areas, which were finally formulated, are generally recognised. This is first and foremost an expression of effective leadership in the newly established Department. Nevertheless, the further effects of this process cannot be assessed at the time of the evaluation (March 2019, i.e. < 6 months).

Human resources, careers and recruitment

The total number of employees for teaching and research (56 FTE) and in particular the number of professors and PIs, in total 18, indicates that the Institute has a critical size to be visible in the field of Food Science and Nutrition on an international level. In order to keep this critical size, it is of the utmost importance to fill positions when retirements are up-coming (particular those at level 4) in the future.

The recruitment process is an important building block for the Department's ability to renew itself. In addition to the recruitment of professors, the Department has decided to recruit specifically at the early career level (incl. postdoctoral researchers). With regard to attractive career perspectives the Department has a very positive view on the tenure-track system. In 2017, three new professorships were appointed in the Department of Food and Nutrition. The commission had provided a structured catalogue of

questions for the external experts and information on the direction of the Institute. The criteria were essentially aimed at the personal excellence of the applicants. A new professorship for sensory science is currently being advertised.

At the postdoctoral level, the Department has recruited at the international level and, depending on the expertise required, specifically from individual universities. Furthermore, there is a distinct culture of promoting young scientists in the acquisition of grants (e.g. ERC grants, Marie Skłodowska-Curie Individual Fellowship) and thus promoting early independence in research. Both approaches at the junior researcher level strengthen the Department's ability for renewal in the short and medium term and thus complement the long-term effects of filling professorships.

Researcher education

PhD students are financed in different ways: within the framework of third-party funded research projects, positions in doctoral schools, scholarships and through industrial cooperations. The research topic is always agreed with the responsible PI and the application for admission to a doctoral school is submitted at the end of the course. The doctoral students are firmly integrated into the PI working. The basis of a successful integration in the research group/community is that the agreement on the research topic is between the PI of the research group and the PhD student. In addition, PhD students are involved to a lesser extent in the teaching and supervision of Master's theses. The Chinese Scholarship Councils account for a significant proportion of doctoral students.

Research infrastructure

The infrastructure of the Department is characterised by analytical instrumentation and technical facilities, so that processes in the production of food as well as the effects on humans can be mapped. The breadth of the infrastructure is both a challenge in terms of maintenance and a strength. The infrastructure requires regular investments, which can be described as adequate by a financial volume of 150 - 300 k€ considering additional access to further platforms. Next to instrumentation, technical assistance is of high importance to secure maintenance and technical expertise in the Department. However, there is a clear lack in the number of assistants and/or engineers.

Funding

More than 40% of the Department's funding is based on third-party grants, which is a very good share. Based on 22 PI and an annual third-party funding budget of 2 to 3 million

euros, approximately 100 k€ is allocated to each PI. The third-party funding is raised by various funding institutes and, to a lesser extent, by industry. The most important third-party donor is the Academy of Finland, followed by Tekes (Business Finland). The Department's considerations to maintain the successful acquisition of third-party funding are plausible and are addressed at several levels: recruitment, coordinated procedures, targeted support, and planning into the scientists' schedules. The Department points out that access to a statistician would be necessary to support grant application, ideally at the Faculty level.

Collaboration

Cooperation with other scientific institutions is very widespread. Collaboration is established with institutions in Finland as well as with international institutions. According to the Departments's self-evaluation, this is based on relationships between individual PIs and the intention to

identify particularly important partners that could also be used as strategic partners. Cooperation with other Departments and Faculties within the University exists, but would need to be further or strategically intensified in order to benefit from PROFI funding.

Connections with 'other constellations'

Double affiliations of PIs with other units (HiLIFE; HELSUS) and the up-coming One-Health Programme (all funded by PROFI) are possible.

Societal and contextual factors

The Department defined by-products from food production and their functionality as food ingredients as a new area to be developed. This topic can be established under the umbrella of "Bioeconomy", which has been recognised as an important area that is or will be prioritised by European governments and by public research calls.

Life Sciences Panel

DEPARTMENT OF FOREST SCIENCES (LS UNIT 12)

Faculty of Agriculture and Forestry

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinised for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognised top discipline journals across the Unit when compared to peer groups. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a

high degree of international recognition and should also establish a visible scientific leadership role in the respective research area. Examples of markers of success are reflected in underlying peer-reviewed research grant income and leadership roles in international research consortia.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside of health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the Unit. Strategic oversight, management of activity and ownership by individual academics were additional factors that were considered. Excellence is achieved when the activities are realised and the output of the science flows,

for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the Unit, and the design of decision-making and strategy processes, can be influenced directly by the Unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross-University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The scientific quality of the Department of Forest Sciences is currently of very good quality, though investment in low impact publications is best reduced. The publication indices point to a very good standard, and international cooperation in the scientific process is considerable. The Unit has an

impressive level of activity with respect to interaction with society at large and holds contacts that enable the Unit to impact on forest practices. The Unit has been able to show that it can deliver and has a balanced structure (gender, staffing). It is attractive to PhD students and post docs.

Challenges refer primarily to retirements and funding. The explicit strategy for either is not in place (although actions are implemented in this direction) meaning that the future posture of the Unit cannot be taken for granted. Operational structures appear to be dictated by teaching

delivery. The current level of investment in teaching seems to compromise the development of future research strategic development and income generation. Given the upcoming retirements, this situation – if not changed – could suppress research quality and societal impact as well. How funding and recruitments fit into the strategy is thus to be seen. Work on strategy is ongoing and is engaging the Unit members. Steps have been taken to define new funding opportunities and vacancies are being filled. In many ways, what is most important for the Unit is to continue to keep up its good work and prepare for the future.

Strengths

- Good scientific quality in most of its operations.
- Good position as regards topics associated with climate change, sustainability and other high profile areas.
- Takes advantage of all three cross-disciplinary constellations INAR, HiLIFE, and HELSUS.
- Research links science with practical applications.
- High level of interaction with the surrounding society and substantial impact through good contacts with the Finnish forest sector.

Development areas

- Research strategy compatible with the delivery of high quality teaching but not driven by teaching delivery to the extent that this is the case.
- Overall management and sub-unit structure of the Unit.
- Broad and effective funding strategy.
- Rationalisation of teaching to create time for research and income generation
- Recruitment strategy as an integral part of the research and funding strategies.
- Abundance of low impact papers.
- Future outlook and strategy with respect to societal impact.
- Manage the constellations to the advantage of the development of the Unit.

Recommendations

- Develop a progressive research strategy compatible with the delivery of high quality teaching but not driven by teaching delivery.
- Ensure better connections between the various groups, possibly through bottom-up aggregation, and naturally flowing from the research strategy.
- Develop a broad and effective funding strategy to ensure the delivery of high quality research.
- Prioritise and rationalise teaching to create time for conducting research, research-related societal impact and extensive investment in the obtaining of funds to ensure the viability of the Unit.
- Develop a clear recruitment strategy that dovetails with the future outlook and respective research, income generation and research-related societal impact generation strategies.
- Be vigilant as how to accommodate the influence of the constellations in order for them to be beneficial to the organisation and not be disruptive.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit performance is excellent in various areas. The publication indices point to a very good standard, and the international cooperation in the scientific process is considerable. A larger share of the scientific production falls into JUFO levels 2 and 3 compared to the Faculty as a whole. Supporting each other in consistently producing the best possible work would pay off in the long run. The work on the research goals is in progress and capitalises on experience of the existing formula for describing focus areas as well as the opportunities and threats.

Strengths

- Good scientific quality in most of its operations.
- Good position as regards topics associated with climate change, sustainability and other very relevant areas.
- Takes advantage of all three constellations INAR, HiLIFE, and HELSUS.
- Research that links science with practical applications.

Development areas

- Work on the new research strategy to be formulated and put into place.
- Ensure the Unit gains further visibility by using online means of communication (including a strong web presence).

GRADING: VERY GOOD

Research goals

The existing research strategy is being revised. Still, the description of the Unit still rests on the work under the 4 existing Focus areas. As a basis for assessing the work on the new strategy it is of some interest to follow them. They are:

- The interactions between climate change and forest and peatland ecosystems
- New methods of managing forest information
- Socioeconomic changes and the global forest sector
- The economic-ecological models of forest use and conservation, including forests as a source of wellbeing.

Focus Area 1: The climate change impact research is broad and successful. It is broad in the sense that it covers boreal as well as tropical forest; mineral and peat lands. There is a focus on process modelling which has received international recognition. Among the Top 10 publications provided by the Unit is a *Nature* article from 2014 with 165 citations.

Focus Area 2: The Unit has a strong position in remote sensing. It cooperates with the Finnish Space Agency and works with the interpretation of the data to make it useful for practical forestry. The methods are adapted and used by forestry for planning purposes. The Top 10 listed publication in this area has 17 citations since 2014. The remote sensing scores 1.52 in the MNJS index.

Focus Area 3: The Top 10 listed publication (9 citations since 2016) explores the possibilities to merge the

ecosystem services concept with business services logic. It is thus an example where concepts rooted in ecology and forest management meet business economics. It is also an example of a result of HELSUS cooperation.

Focus Area 4: This area is purported "...To combine strong modelling-based research in ecological and natural resources economy". The Unit should also have good opportunities do so with having growth and yield modelling (process modelling) and forest economists in the same corridors. However, two Top10 listed papers of this focus area (a REDD+ investigation and a review of landscape models) – both related to this area – show no signs of cross-disciplinary work within the Unit whereas the Top10 listed paper on optimal stand management uses a process model developed in the Department (or its predecessor).

The Department is currently (since autumn 2018) defining a new strategy for research, education and societal interaction whose specifics have not yet been settled. The 'catchwords' social change, environmental change and sustainability management are considered as components of the budding research strategy. Covering the full supply chain, from primary forest production to customer, is also clearly important to the Department (and we suspect in particular for their teaching). Whether such aspiration will help them develop and implement a strong science and associated funding strategy and continue to publish high quality work remains to be seen. The activities are brought

together under the climate change umbrella.

The Unit has undoubtedly a potential to go in this direction. However, a more in-depth analysis of how this should be realised in terms of what gaps are to be filled, the needed cooperation and broadened funding sources is still not in place. The procedures associated with strategy development and activities of a strategic nature are treated in section 2.3 Research environment and Unit viability.

Research results

The high MNJS values for some fields indicate that the research in these areas is novel and/or seminal work. The examples given by the Top 10 publications testifies to the fact that the Unit promotes new concepts and ideas in different fields.

The achievements indicate a capacity of the Unit to translate quality research results into policy processes. Examples of this are The Finnish Climate Panel and IPCC Special report on 1.5 degree target and the establishment of a Chair on International Forest Policy in 2016 (still to produce results). The research has also resulted in a method adopted by the FAO and the World Bank to collect data on rural livelihoods, 3D mapping techniques adopted by forestry, and

a process model that enables analysis of climate change and forest management on a pan-European scale.

Analysis on research outputs

The Unit shows generally good productivity and impact judging from bibliographic analysis (MNJS 1.17 and increasing; MNCS 1.19 and increasing). The PP (top 10%) of 0.12 is also an indicator that its science is of above average quality.

The productivity is good (P per staff excl. other $608/84 = 7.2$; P' $273/84 = 2.25$). It is also good in respect to the rate of JUFO 2+3 publication: $(28+47)/84 = 0.89$. The interview indicated that much of the JUFO 2+3 papers are by PhD and post docs, which is an indication of good supervision of PhD students and early stage researchers. The burden from other tasks on senior staff is a matter of concern to the extent that they are less prominent in very high level quality publications associated with JUFO level 2-3.

International cooperation in the scientific process is evident (PP (Intl collab) 0.52). This is corroborated by the cooperation with many international organisations and many foreign students.

Some areas are probably more in the forefront than

others, depending at least partly on staffing. From the bibliographic profile you can read that Remote sensing and Multidisciplinary science are very influential (high MNJS), the latter though with only 18 P publications (6 P'). Also plant science comes out with a high score. The bulk area, FORESTRY, also scores high taking into consideration the fact that the volume is big and that some material is probably more of national than international interest and thus less prone to citation.

Integration with the constellations INAR, HiLIFE, and HELSUS is an important factor contributing to the quantity and quality of the Unit. The fact that fellows in the constellations have good opportunities for research make them relatively more productive in the JUFO 2+3 stratum.

International benchmark(s)

The Unit has selected the University of British Columbia (UBC) as a benchmark. Several good arguments are given for this. It is among the top four ranked forest sciences universities in the world, it maintains comparable topics as the Unit, and it works in a region where forestry is an important part of the economy and thus applied research forms a natural part of the research agenda for both organisations.

2.2 Societal impact

The Unit has impressive activity as regards interaction with society at large in terms of dissemination and direct contacts. Impact is felt not the least through longstanding contacts with different institutions in the forest sector.

Strengths

- High level of activity that seems to be promoted by leadership and/or tradition.
- Good networks and close collaboration with actors in the Finnish forest sector.
- Members and participant in many international assemblies.
- Makes actual impact through their channels and not only dissemination.

Development areas

- The audiences and methods for interaction are traditional in a way that may be challenged by audiences requiring participation.
- There could, in a period of budget cuts and vacancies, be difficult to find room for the current level of activity without sacrificing research work.
- There could be a risk that with the departure of retirees the Unit will lose contact with government agencies and forest sector stakeholders.

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

The target audiences are not explicitly stated, rather they emerge from the areas of activity. The following appears to be of prime interest: (i) Organisations within the Finnish forest sector. (ii) Government agencies related to the forest sector. (iii) International organisations related to policy, climate change, and development issues.

The choice is rather a consequence of established networks that have worked and still work. This does not mean that the networks will work also in the future.

The SAR give the impression that senior staff are best placed to engage with society. This is misconceived and old-fashioned; participatory (or transdisciplinary) approaches are now mainstream and should be highly visible, if not the norm, for any applied research field. Engagement and the learning flowing from it should be two-way, and not one-way communication from expert to the public. More participatory approaches would strengthen researchers' portfolios, and genuine co-production of knowledge would provide better understanding of the thinking in the public arena and vice versa. This is time consuming, and requires input from the social sciences, but it is also rewarding and necessary to sustain key future foci. Currently, societal impact is –arguably – fairly traditional. The interview indicated that younger researchers are increasingly engaged in dissemination and communication activities, i.e. the Unit appears to be on the right track as far as this is concerned.

Activities and outcomes

The basic impression of the Unit activities regarding the surrounding society is that it has a high level of activity, is relevant and has documented impact. It also shows a sound balance between high quality research and research aimed at practical application, the latter not being meaningful without the former. The following gives some more specific comments on this topic.

The outputs include a number of national and international reports, some in high profile assemblies like IPCC, and some (national) leading to concrete outcomes. The publication of articles in professional journals is extensive. Membership of civil society advisory bodies is abundant and represents a channel for disseminating research results.

The documented outcomes (impact) related to national bodies include silvicultural guidelines for wet/peat lands and uneven-aged management guidelines, a database for emission factors, guidelines for national greenhouse gas inventories, and road construction recommendations.

The documented outcomes (impact) related to international bodies include IUFRO harvesting guidelines, European scale forest model (available as R code), a guidebook on socioeconomic surveys, a carbon analysis tool (CarboScen – the use of which was not described in the SAR; the ambition is undoubtedly there though).

Additionally, it is worth mentioning a spin-off company in remote sensing and consultancy work for a number of companies and authorities as indications of societal relevance.

2.3 Research environment and Unit viability

The Unit has a very good track record as regards most indicators (publication, external funding, association with the international community, gender balance, external funding). Thus, the Unit is well-functioning judging from the tasks it fulfills. Work is initiated to deal with some of the weakness and threats of the Unit, primarily related to retirements and funding. The strategy is still not in place and it is, once it is there, an open question if it will succeed. This is not to express distrust of the Unit – it has shown a capacity to deliver – but to stress the importance of getting all the pieces together to make use of the full and considerable capability of the Unit.

Strengths

- The Unit has identified the threats regarding funding and staffing, understands the challenge of this, and has brought it into the strategy.
- It has an organisation that functions and can deliver (judging from the indicators).
- It is attractive to PhD students and post docs.
- The gender balance is good among professors.
- It makes good use of 'constellations'.

Development areas

- How retirements and funding should be approached needs to be clarified.
- The management structure needs to be clarified. It may be that the Unit is not optimally rigged in order to purposefully handle a situation that may require or give an opportunity for major structural changes.

- The high teaching load needs to be reduced in order to exploit more the Unit's research capacity.
- Potential problems in managing the different logics governing the Unit and the 'constellations'.

GRADING: GOOD

Leadership, goal setting and follow-up

The discussion under this point will be structured so that the formal and, to some extent, the informal organisational structure is presented. Then follows an account of the procedure to develop strategy and some of the strategic issues the Unit has decided on, is considering, or has identified. At the end a few remarks are made about Faculty-/UH-level support to the extent that it does not appear under other headings.

The formal organisation consists of (i) Head of Unit, vice-head (external relations), directors for BSc and MSc programmes, and (ii) the Management Board which consists of 5 members, including Head of Department, Vice Head and Directors of the MSc and BSc programs and Vice Head of the INAR constellation. The directors MSc and BSc programs and vice-head of the INAR constellation represent also the research groups (sub-units). The research groups, 13 in total, represent autonomous entities that are self-organising. They have their own weekly and monthly meetings.

The groups do not have formal representation as they do in the board or elsewhere. The consequence of this is that the Unit head bears the responsibility to directly

communicate and supervise groups. This has implications concerning who is responsible for the personnel, e.g. who intervenes if things go wrong. Budget issues are the prerogative of the Faculty. The interview gave a clear indication that the Department is managed in a bottom-up manner, i.e. initiatives are expected to come from the members of the Unit and then processed by the Unit head. What tasks are dealt with by the board is not clarified. Thus, the organisation is not well defined in the sense that standard operating procedures are in place together with a more elaborate formal organisation. This puts considerable weight on the management capacity of the Unit head.

The Unit is heavily engaged in Bachelor and Master's level teaching. In fact, the description of teaching responsibilities dominates the text of the Unit's organisational structure. The formal organisation for teaching is staff meetings at least once a semester, sometimes twice. The teaching is planned at the meetings.

The ongoing process of developing the new strategy is linked to teaching in the sense that once the teaching meetings assemble they are synchronised with the teaching planning meeting. The strategising meetings are open. With a total staff of more than 100 this could indeed pose the usual problems of big meetings (speaking to a larger audience, the dominance of certain speakers, etc.). The responses during the interview indicated that junior staff also felt able to participate in the process. How effective the process is cannot be judged at the current stage. The annual report is mentioned as a valuable tool in this work. It appears to be a mistake to stop producing the report when

the obligatory report disappeared (now reinstalled again). However, writing the report is a complex and demanding task as will be illustrated below.

A number of issues of a strategic nature are currently processed by the Unit. One is to find ways to better integrate the different sub-units. The path to take in this respect is described in the first section of this report and includes efforts to link sub-units to each other. This effort is based on the experience of the functioning of the previous strategy based on 4 focal areas. This direction has its rationale in the diversity of the Unit; it encompasses research going from basic science to policy issues, and includes also computer science and engineering. It is admitted that resources are required to be able to utilise this diversity.

With 13 groups, potentially some are so small that they will face problems in maintaining a critical mass. Also for this reason a strategy aiming at forms for cooperation is valuable.

Another issue concerns the teaching load. The insight of the Unit is that teaching draws resources from other tasks, primarily research. It appears feasible to do that since funding is not directly tied to teaching volume, i.e. teaching can be reduced without forcing staff reductions. A possible, and welcome, consequence of a reduced teaching load would be even more JUFO 1-3 publications.

A fact worth mentioning is that the Unit hosts an Institute, the Viikki Tropical Resources Institute VITRI. This arrangement seems to work well and the Institute is fully integrated in the work on the strategy.

Nor surprisingly the matrix/line organisation at the UH/Faculty level has taken time to settle. The problems seem mostly related to administration and support that have moved to the University level and have increased the administrative burden on researchers. BSc and

MSc programmes are decided by the Faculty but the organisation of the work remains with the Unit.

In summary, the organisation is somewhat diffuse. This is also true of the strategy process. Both the organisation and the strategy process reflect a management style of bottom-up processes and limited formalisation that has both pro and cons. The track record of the Department would speak in favour of the viability of the way the Unit is managed. The priorities in the strategic work appear well motivated in view of the needs and competencies of the Unit. However, the result of the efforts is still to be seen. Monitoring the progress would be recommended.

Human resources, careers and recruitment

With regard to human resources the most urgent tasks refer to vacancies and retirements. The vacancies (2 professorships) seem to be resolved in a planned manner. The coming 35% staff retirements is another matter. They represent a threat as well as an opportunity. The Department may experience a loss of resources, networks, competencies. It may also use the situation for strategic positioning, abandoning some fields and developing new ones. It is this situation that makes the research goals central. There is no plan in place for how to approach the situation. This is perhaps one of the most serious threats we see for the further development of the Unit.

The structure of the Unit appears more balanced in other respects. The share of PhD and post docs (about the same number of each) is 53% (47% for the Faculty as a whole) excluding other staff. The gender balance is not a major issue as far as the statics in the SAR can be followed; of 18 professors 8 are female and the composition of the interview team, even if not a statistical sample, did not contradict the gender balance indication. The share of staff

with an international background is between 19% and 30% (level 1-4) and is higher in all categories compared with the Faculty as a whole.

Researcher education

The PhD programmes and admission rules are regulated by the UH/Faculty level so the Unit has little influence on the procedures. What it can influence are the numbers (which are good; see above), the study time (where there are no indications that the Unit's study time is longer than comparable Units) and the general circumstances.

A few observations can be made on the circumstances based essentially on the interview. The PhD students do not appear to be involved in basic training despite the teaching burden of the Unit. This is beneficial for the studies but also means that researchers do not get teaching experience, and teaching is a very likely future career. Publications in peer-reviewed journals are the rule for article-based theses.

Concerning early stage researchers there is little to say based on the SAR. There is nothing in the interview that would indicate that they are not integrated into the everyday life of the Department. The Unit hosts 3 fellows belonging to the constellations. The fact that fellows chose to be employed at the Unit indicates that the Unit is an attractive environment for researchers.

Funding

The Unit has experienced budget cuts over the last few years. However, the Unit has a healthy balance of base funding and external sources (about 50/50). This is perhaps not as much as one would expect for an industry-facing Unit, on the other hand it makes the Unit less exposed to potential failures in acquiring external funding. The single big issue is the reliance on the Academy of Finland, possibly

in combination with the retirement of successful senior staff. The Unit has clearly identified this potential risk. It also reviews some of the options to counteract this threat.

One strategy would be setting up bilateral arrangements with selected countries, and an attainable source would be EU funding. The Unit has an extensive international network but EU-based sources do not seem to have been thoroughly explored.

Another option that is mentioned refers to the constellations; the Unit is involved with all three (INAR, HELSUS, HiLIFE) and has already had a positive inflow of research resources from them. The Unit mentions that "... all three new operating Units will develop new research and strengthen current research and education that are among the Unit's goals ...". It has not been possible to corroborate this contention but the fact that fellows would appear to seek out the Unit plus the observations of the interviewees about the value of the HELSUS program in connection with the research of the Unit are positive signs of future development.

Even though the Unit fully realizes that it is a challenge to obtain the necessary funds to continue operations it still does not have a clear vision what these sources might be. As a matter of priority, a clear funding strategy needs to be developed that will allow the realization of the Unit's research strategy. The upcoming retirements (35% of staff) make the development of a clear

financial outlook even more important.

The programme for diversifying funding seems to be in its infancy, or is not clearly spelled out in the SAR. Funding opportunities for the Unit are affected by societal changes, government funding schemes, the agenda of other funding agencies, international agreements and what follows from them, as well as by the position of other academic competitors. It would have been interesting to have been given an account of how the Unit appreciates these changes and what it might mean in terms of guiding the Unit's funding programme. This could be done in the form of a SWOT analysis with an assessment of external threats and opportunities and internal strengths and weaknesses that accompany them. This is not something that the Unit (or any other Unit) had been requested to supply, it is only a recommendation that might help in future strategizing.

Collaboration

The Unit is cooperating with practically all Faculties, Departments or other Units dealing with ecological, economic, and social sustainability within the UH. The University of Eastern Finland (School of Forestry) is the most important collaborator nationally in the academic arena. Several national research institutes are on the contact list and are cooperating partners (see also section 2.2 Societal impact).

The Unit refers to collaboration with 40 countries and over 100 organisations. Not all of course are active, at least not at the same time. However, the level of international collaboration in publications and the level of international staff attest to a high level of international interaction and reputation.

Connections with 'other constellations'

As mentioned above, the Unit is involved in all 3 constellations and profits from that arrangement in terms of fellows staying at the Department. Having said that, the Unit has identified the possible drawbacks of the constellations. One drawback might be that their mere size attracts funding that might otherwise go to the Unit directly and/or that some of the traditional areas of the Unit will be marginalised. This fear may be even more motivated when coupled to the restructuring of the Academy of Finland that would combine forestry with a wider scope of topics.

The major concern seems to be that the constellations complicate management. So far there is no indication that the Unit is not coping with the problem. However, it is good that they have identified the potential problem. One of the Unit professors, Anne Toppinen, is director of HELSUS. The connection of a constellation head with a department, in this case the Unit, would hopefully mean that severe problems would be avoided.

Life Sciences Panel

DEPARTMENT OF MICROBIOLOGY (LS UNIT 13)

Faculty of Agriculture and Forestry

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

Strengths

Scientific quality

The Unit is achieving a high level of scientific productivity in the areas of microbiology and microbial biotechnology.

Societal impact

The Unit undertakes excellent and diversified outreach activities with significant societal impact. In fact, the Unit has surpassed many far better-funded and larger institutions in raising public awareness with regard to the societal relevance of microbiology for human health and natural ecosystem functioning.

Research environment and Unit viability

The research environment in the Department is very good, with adequate research infrastructure, a participatory and well-designed leadership structure and an extensive network of collaborations. The PhD programme is strong, with appropriate structures for fostering and evaluating student progress.

Development areas

Scientific quality

The Unit would likely benefit from a tenure-track professorship in microbial bioinformatics to add value to the ever-growing flood of microbial genome-scale data and for hypothesis generation. This could also generate added value for the existing three focal areas: food microbiology, environmental microbiology and microbial biotechnology.

The microbiology Unit is underresourced, specifically with regards to core funding, and this can only be partly compensated for by extramural funding.

Societal impact

Despite the success of the Unit regarding societal impact, there is still scope for a more structured approach to target its audiences and development of engagement strategies with tangible impact.

Research environment and Unit viability

Deteriorating finances and the lack of a third professorship threaten the viability of the Unit.

Recommendations

The appointment of a third professor in the Unit is an issue of high priority for University of Helsinki (UH) and is likely to be self-financed in the long run. The Panel is not convinced that the Faculty has sufficient appreciation of the importance of microbiology for human health and ecosystem functioning.

The Unit should consider the appointment of a tenure-track professorship in microbial bioinformatics to generate added value for the current PIs.

Systematic and concerted efforts from departmental PIs are needed to identify promising future research fields which build upon existing research lines in the Department and to apply for and attract ERC funding.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

Despite its relatively small size, the Department covers a broad range of research activities in general and applied microbiology. The overall publication record is very good and partly even excellent. Many of the publications involve international collaborations. The Unit hosts highly valuable expertise in its field. The key development area is computational microbiology and genomics to harness the ever increasing amount and complexity of genome-scale datasets in all areas of microbiology.

GRADING: VERY GOOD

The evaluation of scientific quality is based on the nature of the research areas embraced by the Department of Microbiology Unit, the publication records of the PIs, the level of competitive funding, numbers of students and postdocs and the extent to which the PIs have obtained external recognition.

The Department of Microbiology has been established as an individual Unit at the beginning of 2018. The Unit comprises currently 79 members with only two professors (a third professor retired in 2016) and seven university lecturers. Despite its relatively small size, the Department covers a broad range of research activities in general and applied microbiology, including microbial genetics, molecular biology, genomics, microbial ecology, bacteriology, mycology, virology, microbial metabolism,

food microbiology as well as microbial and environmental biotechnology. These diverse research activities are bundled within five research areas: microbial ecology and experimental evolution, fungal biology and biotechnology, cyanobacterial biology and their bioactive compounds, animal and plant RNA viruses and food microbiology. It should be noted that UH has the sole national responsibility for educating microbiologists and is the only higher education institute offering master's- and doctoral-level education in microbiology in Finland.

Current research lines are based on food microbiology, environmental microbiology and microbial biotechnology, which represent also the three main teaching areas of the Department. These three areas also mirror the main scientific interests of the current lecturers and researchers.

The Department maintains and utilizes a unique microbial culture collection (HAMBI), which contains > 3,000 bacterial and archaeal, >2000 fungal and >1,000 cyanobacterial strains. There is clear evidence for multiple national and international collaborations that have resulted in a number of EU projects and COST actions. External funding of the Unit is at 53%, and thus 10% higher than in the Faculty of Agriculture and Forestry. However, during the reporting period the Unit has not been able to attract important EU funds such as ERC grants.

The overall publication record is very good and partly

even excellent with 30% above average compared to the Faculty of Agriculture and Forestry (5 and 24 JUFO level 3 and 2 publications in 2018, respectively). The proportion of highly cited publications (PP10%) remains relatively stable during the reporting period (MNCS of 1.40) in the areas of Microbiology and Applied Microbiology, which is an admirable research achievement given that the Department hosts a comparatively small number of groups and only two professors. Many of these publications involve international collaborations.

Key Research Results

A notable discovery has been the demonstration of active transfer of antibiotic resistance genes between bacterial species and the factors contributing to the transfer. For instance, an extensive and previously undescribed sharing of antibiotic resistance genes was found between Actinobacteria and Gammaproteobacteria, suggesting that the former might represent an important reservoir of antibiotic resistance genes for the latter. Even small concentrations of antibiotics cause the selection of antibiotic resistance and promote the transfer of antibiotic resistance genes. A study of significant societal impact on the maternal gut and breast milk microbiota demonstrated that infants inherit the legacy of past antibiotic consumption of their mothers via transmission of antibiotic resistance genes, but microbiota composition still strongly impacts the overall resistance load.

Fungi were identified as significant sources of new enzymes, natural products and metabolic activities. Collaborations within large fungal genomics consortia have resulted in high-quality and widely-cited original research publications.

The Department hosts highly valuable expertise in cyanobacterial biology and this is an excellent example of how dedicated long-term research activities and trust in scientists in a university environment can pay dividends in the form of serendipitous findings. Work within the Department revealed that cyanobacteria are unusually potent producers of bioactive compounds. A number of structures of novel compounds and their structural

variants were resolved and shown to be produced by non-ribosomal and ribosomal pathways and at least one of these compounds with a known target is now being tested for its biological activity in biomedical research. The group working on plant-virus interactions has developed methods to purify viral ribonucleoprotein complexes from various cellular compartments of virus-infected plant cells. This was key for the identification of several host proteins that regulate viral translation and replication as well as a novel type of infection-induced RNA granule, suggesting that RNA granule formation and viral translation are interrelated processes.

International benchmark

The Unit has chosen the Centre for Microbiology and Environmental Systems Science, University of Vienna, Austria as their benchmark. The criteria for choosing the Department of Microbiology and Ecosystem Science as benchmark remain somewhat opaque, though there is one clear thematic overlap in the area of microbial ecology. Compared to this benchmark, the research output in the Department of Microbiology at UH is significantly lower and this is likely linked to the fact that the UH Unit hosts currently two professors compared to six in Vienna.

The Unit shows impressive dedication, commitment and spirit to increase awareness of microbiology in a

2.2 Societal impact

number of target audiences within Finland. There is evidence of successful valorization activities in the Unit. The overall level of societal impact is excellent and to enhance this even further, the Panel recommends a more structured approach to target its audiences and development of engagement strategies.

GRADING: EXCELLENT

The Department of Microbiology considers the service it provides to Finland in educating microbiologists and biotechnologists as 'extremely important'. The visiting group was deeply impressed by the dedication, commitment and

infectious spirit of the Department as a whole to increase awareness of microbiology in a number of target audiences within Finland. Beyond the national level, research results have produced policy briefs at the EU level such as Science for Environment Policy, European Commission DG 2018. Similarly, HAMBI is the national collection of microorganisms and the only university-based and public open-access collection of microbes in Finland. Given the ever-decreasing costs of genome sequencing, it might be worthwhile to consider applications for national or European funding to establish annotated genome drafts of this culture collection and to make the results accessible to the public via a HU access server. This would certainly enhance the value of this

unique culture collection for the wider research community. At least for the bacterial and cyanobacterial cultures this appears a realistic goal. One could also imagine that such a project would fit well into the research programme of a tenure-track professorship in microbial bioinformatics.

The discovery of microbial bioactive compounds to be used as drug leads is considered to be one of the long-term goals for the Unit's stakeholders and audiences. A tangible valorization of the Unit's research activities is the spin-out co-op Bionautit. This cooperative enterprise was founded in the reporting period by former and present researchers of the University of Helsinki. Commercial activities include commissioned and subcontracted laboratory research in

the wider areas of microbiology biotechnology, indoor air quality and soil and water remediation as well as training for various private industrial sectors and public organizations. Probiotics isolated by the food microbiology group have been included in two products.

A true highlight during the reporting period has been the publication of a Finnish textbook entitled 'Fungal biology' for schools, vocational schools, universities

and laboratories. The importance of this extra effort of departmental academics in public outreach cannot be overestimated as it increases awareness in the public regarding the fungal kingdom and has filled a major gap in microbiology textbooks. The visiting group has noted that the work of one of its senior staff has attracted wider recognition in the form of a "Knight, First Class, of the Order of the White Rose of Finland" award.

Overall, the societal impact and valorization of the research of the microbiology Unit appears impressive in comparison to other much larger departments. Nevertheless, there is still scope for a more structured approach to target its audiences and development of engagement strategies with tangible impact.

2.3 Research environment and Unit viability

The Unit has regular procedures of development activities such as monthly departmental meetings in place. Monthly time intervals to discuss research progress and stimulate ideas for collaboration appear somewhat scattered to the Panel. The training platforms for PhD students and post-doctoral scientists are in excellent shape. The research groups work in well-equipped laboratories, which provide excellent facilities. The Panel strongly supports the future goal to open and fill the microbial biotechnology professorship. In addition the Panel suggests that the Unit considers applying for an additional tenure-track professorship in microbial bioinformatics.

GRADING: GOOD

The available data suggest that the working time of the personnel in the Department of Microbiology is disproportionately focused on teaching, administration and

grant writing and that the number of professors is too low.

The impact of genome-scale microbiology is growing and will in future underpin functional analysis of microbial traits of pure strains or microbial assemblages, including exploration of natural genetic variation within individual microbial taxa or in community contexts. Thus, we suggest that the Unit would likely benefit from a tenure-track professorship in microbial bioinformatics. Ideally, this professorship might create added value between the three existing focal areas of food microbiology, environmental microbiology and microbial biotechnology. Such an appointment might also foster collaborations between the groups of the Unit.

The head of the Department dedicates 50% of her time to leading the Department. Monthly departmental meetings have been implemented for decision-making within the Unit and departmental meetings are also held on a monthly basis to discuss research progress and stimulate

ideas for collaborations. Monthly time intervals for the latter meetings are somewhat unusual and it might be worthwhile to consider instead weekly intervals, which would give the PhD students and postdoctoral scientists more opportunities to obtain constructive feedback on their work from the senior scientists in the Unit. Ideally, these Unit meetings can serve as a launchpad for novel collaborative research projects.

PhD student training plays an integral role within the remit of the Unit and there was a consensus among the visiting group that PhD education is part of the Unit's daily work. The Department considers the number of PhDs reviewed (n=55) and official opponent tasks carried out nationally and internationally the Unit members (n=26) to be indicators of the quality of its research training. The training platforms for PhD students and post-doctoral scientists appear to be in excellent shape. This includes well-thought-through PhD thesis committees and support for postdoctoral scientists in applying for personal post-doctoral fellowships.

From a total of 79 staff in the Unit, 14 (19%) receive their salary from the University. Thus, most of the personnel in the Unit are supported by a variety of external grants. The research groups work in well-equipped laboratories, which provide excellent facilities that do not hold back the Unit's scientists from performing outstanding research work.

The University's budget cuts in 2016 resulted in the Department of Microbiology retaining only 1.5 professors. This leaves the viability of the entire Unit vulnerable. A major future goal is to open and fill the microbial biotechnology professorship and secure additional resources to cover the expanding teaching load. This has the strongest possible support of the visiting group. The disproportionate

administrative and teaching duties make it difficult for these scientists to continue to compete for and obtain external funding. As mentioned above, the visiting group also suggest that the Department consider applying for an additional tenure-track professorship in microbial bioinformatics, which, in turn, would certainly strengthen the research impact of all existing groups in the Unit.

The Unit partners in many international projects such as a Nordic Centre of Excellence, various EU projects and a number of COST actions. The Unit also aims to submit joint national grant applications with national partners to obtain grants from the Academy of Finland and Business Finland. Unfortunately, the Department has not been able to attract

ERC funding during the reporting period.

Deteriorating finances threaten the viability of the Unit. The appointment of a third professor is an issue of high priority and is likely to be self-financed in the long run as it is reasonable to expect that a professorship in microbial biotechnology and/or microbial bioinformatics will attract extramural funding that will recoup the University investment in this position. The societal relevance of microbiology for human health and the importance of understanding microbial activities in natural or managed environments cannot be overestimated. The Unit has shown its competence, passion and dedication in making internationally recognized contributions to this end.

Life Sciences Panel

ECOSYSTEMS AND ENVIRONMENT RESEARCH PROGRAMME (LS UNIT 14)

Faculty of Biological and Environmental Sciences

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The Ecosystems and Environment Research Programme (hereafter EcoEnv) is a young, bottom-up derived, dynamic and impressive unit. The calibre of its science is still mixed, but already clearly very good, and with the potential to become excellent over time. The Unit has excellent viability and works hard to ensure that its geographically distributed nature does not lead to isolated staff or research silos. Likewise, synergies are actively sought across the three research foci (Arctic, Baltic, Urban). The level of external funding generated is impressive, with the Baltic Sea research operating almost without internal funding support. Connection with policy for the bigger units is excellent and with very good public engagement. The smaller unit has not yet reach those levels. Nevertheless, societal impact of EcoEnv as a whole is clear very good and again with the potential to become excellent.

Strengths

- Forward-looking and dynamic bottom-up generated group, driven to conduct excellent science and creatively and positively contribute to society in diverse ways
- Generation of some world class science
- Strong capacity to obtain external funding

Development areas

- Capitalise on the connections between the three research foci
- Expand the size and societal reach of the Urban research focus

Recommendations

This young unit has enormous potential and is already very strong. Further strengthening the social fabric, actively searching for synergies, and supporting each other across research foci to develop a strong contract with wider society would allow the Unit to become even more powerful. Ensuring that the Unit profiles itself well, and the respective research staff therein, online would assist EcoEnv to be recognised as a powerful entity within UH, Finland and internationally. Given the level of external funding, and strong connections with UH constellations, support for this may be provided by the centralised communications office.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

High calibre research, of very good quality, just the volume of it is arguably less from what would be expected from an excellent group. Based on the discussion with the representatives of the Unit, we suspect that this is an

artefact of the reporting time and young nature of the Unit (only two years old). There is a place for basic papers (JUFO Level 1; the origin of JUFO 0 work was not touched upon); given the quality of the researchers within the Unit,

mechanisms of support could be developed to bring many up to JUFO Level 2. Judging the current state of play, considerably more papers reporting world class science are likely to emerge in the near future. Also here, using

and encouraging each other, thereby capitalising on the various instruments already in place to communicate, inspire and influence thinking and operations, would foster the emergence of such high calibre outputs.

The Unit seems geared up for more interdisciplinary work, in part likely connected to HELSUS. This is likely to result in a lower numbers of publications in lower ranked journals initially due to transaction costs and generally lower ranking of interdisciplinary journals, but the resulting science may gain in terms of insightfulness and societal relevance. The aspiration to invest more in international collaboration, on the other hand, is likely to lead to publications with greater impact, and the fact that the Unit already punches above its weight with respect to journal choice to publish work with international collaborators is a good sign. Focus on publishing more of the very best, rather than investing in basic work, and leading such publication endeavours, would bring the Unit up to unambiguously excellent.

Strengths are clear focal areas in which high calibre work is done. The clear profiling is likely to bring further strength as attracting national and cross-border (notably re. Baltic Sea and Arctic)/international attention, likely leading to the further strengthening of research teams and their respective research capability and ability to continue to lever the necessary funding. Ensuring such strengths are visible online, and ensuring a lively external communication strategy, would assist the Unit, Faculty and UH more generally.

We were not privy to a breakdown of publications (or number of scientists) working in each of the three area, and hence it remains difficult to judge and further assist development of individual components. So far, the three 'groups' appear to operate fairly independent, though it was clear from the discussion with the representatives of

the Unit that this is changing. From what is volunteered in terms of specific research results, the Baltic Sea work seems dominant and with a lot of work in top journals of specific fields/focal arenas (e.g. *Global Change Biol*, *Environ Sci Technol*, *Ecology*, *Geophys Res Lett*) whilst also disseminating in the highest possible multidisciplinary journals (*Science*, *TREE*, *Nature*, *Biological Reviews*). The arctic focussed work seems to be able to do likewise, with papers in *Nature* and *Science* family journals among other -more specific -frontier journals (e.g. *Environ Sci Technol*), communicating work that has the potential to directly influence (international) policy. The urban-focussed work has also conducted science that was published in top tier journals (*Front Ecol Evol*, *Nat Ecol Evol*, *Global Env Change*) but little emphasis was chosen to put on the groups work, suggesting fewest PIs operate in this area; discussion with the team confirmed the latter, and given the importance, potential of this focal area and presence of world class scientists providing the Urban theme with a strong backbone, we recommend expanding capacity in notably that field.

Weaknesses based on the written materials seem few and this was confirmed in discussion. Arguably the most striking was the focus on methodologies, which could be at the expense of new conceptualisation (although new methods can certainly lead to the latter too). Some of the Baltic work seems rather Finland focussed, which does not make it less important science but there was rarely reference to other Baltic countries e.g. Sweden in the research part. Perhaps the research networks, and hence policy influence on other Baltic states, are less developed. Whether major gains would be made to invest in this direction, through enhanced partnership, may be a question worth reflecting on. There is obviously stiff competition (e.g. Stockholm

University) but this may be turned into strong as possible collaboration (by identifying what UH would bring to the other parties in terms of thinking, methodologies/expertise and data).

The other key advance that EcoEnv can make is that to work out what the three groups have in common, i.e. are there synergies (in terms of methods, conceptualisations, and ecosystem connectivity) that are currently not capitalised on, or clear ways in which the groups can inspire and facilitate each other. From the interview, it was clear that such synergies are already being actively sought – a development we highly encourage.

GRADING: VERY GOOD

Research goals

Strong rationale, and a natural continuation of the current working practices and recent (2018) formation/reassembly of the Unit. The goal for the next 5-10 years to make new scientific openings and breakthroughs, in terms of methods, ideas and key questions in notably the three focus areas (Arctic, Baltic Sea, Urban) is good and realistic. The emphasis on methods suggests that the self-declared multi & interdisciplinary way of working and applied focus has concerned the (productive) mixing of epistemologically relatively similar disciplines. Fundamentally different ways of looking (at own work and conceptualisation of focal research/environmental problems) would arguably be best served by a genuine meeting of minds from fundamentally different disciplines. Among the listed PIs there is one social scientist; further expansion of humanities/social science involvement may be considered (and is indeed expressed – see below) but this will only bring value if staff are genuinely keen to learn from and reflect on own

operations, belief systems and thus understandings. Also, it inevitably will bring transaction costs and may initially reduce productivity indicators (number of publications, impact factor of journals published in) and thus may 'self-harm'. Perhaps analysing the WISE project (Academy of Finland Strategic Research Council project the Unit is involved in) may be useful to judge how ready the Unit as a whole is for further investment in social science-type interdisciplinary appointments and/or work; this may particularly pay off in the Urban envelope, but of course a political science perspective would also bring potentially great benefits to the other two foci. Encouraging this kind of interdisciplinary research could be done by attracting associate staff, which may initially be a safer way to go. Were the focus indeed on greater methodological advance then the proposed strategy of multi-disciplinarity (rather than inter or transdisciplinarity) and looking to appoint younger researchers with strong methodological skills is sensible and likely rewarding. The declared aspiration "To become a leading unit on dynamic policy assessment within global environmental change impacts with a specific focus on Arctic and urban areas' is well in line with subsequent investment in multidisciplinary and strengthening methodological capacity.

Research results

Powerful research results are highlighted in the self-assessment. The high profile (published in *Nature Geoscience*) study on continental-scale temperature variability during the past two millennia is emphasised more than once, but is a (70+ author) consortium study and hence difficult to judge how central the two EcoEnv researchers have been to the work. The selection of the 10 key papers is somewhat concerning in that respect, as

four of them do not appear – on the basis of where the relevant researchers are in the author list – to be driven by EcoEnv staff. Yet, the portfolio as a whole is impressive, and revealing versatility, creativity and policy/societal relevance. What are the most important results chosen by the Unit is in the eye of the beholder. The series of studies on Eemian and early Holocene climate fluctuations as analogue to contemporary climate change stands out, as does the Baltic Sea eutrophication work. Connections between drivers of vulnerability and society response to climate change is likewise a hot topic, but detailed information on this work was unfortunately not provided in the SAR.

Analysis on research outputs

A good volume of publications (4-5 per Prof/Ass Prof per annum, based on the publication and staff data available in external bibliometric analysis and SAR; when expressed per PI 5.6 – 6.7), slightly increasing over time. The latter is likely in part due to increasing levels of collaboration. The fractional publication volume remained indeed constant, whilst the estimated collaboration (PPcollab) score increased over time (as did PPint collab). Importantly, JUFO level 2&3 papers are being published at a good and consistent rate. Looking that the top 10% of papers, bibliometric analysis (PPtop 10%) suggests performance against this indicator to be equal to world average and dropping over time. The Unit as a whole, however, continues to publish in above average impact journals (MNJS), although this may be changing as the mean normalised citation score (MNCS) has slowly dropped over time to 'average impact'. From the example papers volunteered (including a likely highly influential *Nat Geoscience* paper, be it as two of many co-authors), and other key outputs mentioned in the SAR text, it is clear that very strong,

exciting, innovative and internationally recognised science is being generated by EcoEnv researchers. Clear examples of discoveries, creative findings and conceptual openings are given, from across all three focal research areas, and several are publicised in top journals (e.g *Science*, *Nature* group; *TREE*, *Frontiers Ecol Evol*). Although not picked up by the Biometric analysis, the SAR indicates a dip in productivity, but this seems due to below average numbers of JUFO level 0 & 1 papers and hence not a concern. In the interview we discussed how many of those top publications were really driven by EcoEnv staff. *The Biol Rev*, *Nature Geoscience* and *Science* papers selected saw Unit staff somewhere in the middle of longer author lists, indicating they were not in the driving seat. Rebuttal defended the choice of journals, stressing that all 10 selected papers were chosen on the basis of strong involvement of EcoEnv staff. Whilst involvement in such multi-author studies published in top multidisciplinary journals is obviously key (and demonstrating good networking /collaboration), aiming to actually lead those would provide the Unit with yet greatest prestige.

The Faculty has a healthy ratio of Masters degrees and Doctoral degrees, and seems to cater well for student career progression within science. No information was provided on how much Master student supervision/teaching is taking place within EcoEnv. The interview revealed variable investment and possibly limited strategy to equalise and ensure a healthy balance. For the Unit to reach excellence across the board, sharing teaching responsibilities is likely to be important, as is integration of teaching and research where possible.

The goals set are aspirational but realistic and in line (but see caveat re. further investment in social science) with current working practice. The bringing together of all staff

in one place (whilst maintaining field stations as precious resource) will likely facilitate movement towards the goals were atmospheric conditions continue to be invested in and pressure on staff is managed accordingly by the organisation at large.

International benchmark

Benchmarking Stockholm University's Climate, Seas and Environment 'research profile area' is a natural, if not obvious, choice. To aspire to reach the same scientific level and become a leading unit in Scandinavia in terms of the Baltic and Arctic is setting the bar at good and reachable height. Less convincing is the Stockholm Resilience Centre

as benchmark unit, as emulating their working practices and successes would arguably require considerably investment in social and possibly also political and economic sciences. Whilst this could be a choice, and notably fitting the urban and Baltic foci of the Unit, the current research portfolio as portrayed in the documentation provided seems relatively far away. Likewise, Wageningen University is arguably less in reach than the Stockholm University, notably due to a stronger focus on areas away from the respective home country. Indeed, a surprisingly high percentage of EcoEnv staff across all levels (even PhD students – and considerably higher than for the Faculty as a whole) is Finnish, and much of the work has a Nordic focus. Whilst this is sensible,

important and likely wise (and with Wageningen University & Research (WUR) also having a strong operational focus in its home country), WUR continues its highly international tradition with research arguably in many (and often developing) nations and embedding of different (e.g. Alterra, including its social science grouping) units which allows them to do a lot of wide-reaching science. Nevertheless, asking what EcoEnv could do in the North what WUR is doing elsewhere could well be productive and inspirational; this is likely most productive for those with an urban focus but it may possibly also bring out areas of mutual interest cutting across the three themes.

2.2 Societal impact

Strong investment in public engagement (e.g. 45% of the Faculty's popularised articles/newspapers) and making connections with policy research areas. Notably the Arctic and Baltic endeavours seem to be very well connected with policy actors/policy facing science-based groupings, and know how to interact with them. This seems less developed for the urban focus. In fact, there is very little reference to the urban theme with respect to societal impact (which is surprising given the realm is prototypically human), the exception being stakeholder involvement in joint programmes working on storm-water management and the development of an environmental monitoring system (EMMI). Discussion confirmed that in part this is due to

the Urban unit being youngest and smallest, but possibly also because of a different view on the value of public engagement (i.e. as a means to lever further funding for research). Whilst overall the societal impact is very good, to reach excellence the Urban focus would require support from the other foci to bring it up from its current (good) level.

We note that at the Units' Faculty level the respective documentation appeared to communicate a strong sense of societal impact to serve awareness and recoup resulting financial gains in terms of donations, business interest or otherwise. Public engagement for purposes other than wealth creation by University (to do more and better

research) seemed less important. The EcoEnv unit as a whole has clearly struck a different balance, which we applaud.

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

Examples (eutrophication and oil spills in Baltic; climate change related questions in Arctic regions) are convincing and collectively emit a clear sense of purpose and modus operandi as far as target areas (notably groupings of researchers connected to policy-development). Importantly,

the examples map on strongly to actual research conducted. For the Arctic and Baltic interest areas target audiences are clearly well mapped out and are such that yet stronger policy impact is likely to be generated in the near future. There are also major opportunities for the 'urban' strand, and the proposed focus on adaptation of climate change is pertinent but as yet has to be developed.

Activities and outcomes

Some great examples of engaging approaches are being given, such as providing the general public a virtual

expedition (<https://www.helsinki.fi/en/news/science/what-does-it-look-like-under-the-ice-in-antarctica>). Examples of considerable personal society-facing investments were made clear too (as e.g. regular interviewees, expert witness, expert councillor, forensic expert; the compilation of a well-watched TV series, and numerous appearances in other media outlets).

In terms of business-facing commercialisation of research (outcomes and capabilities) evidence of significant income generation from a considerably number of businesses (30+) was reported, funding part of the

waste-oriented research. It is not communicated how these operations relate to the groups wider interests (could be connected to eutrophication questions in the Baltic), and thus to what extent this funds research that the Unit wants to conduct first and foremost. The emergence of two spin-off (SME) companies was reported and a further two planned. It is unclear whether those entities remain strongly connected to the EcoEnv unit in terms research or impact, or whether they will simply go their own way (either way having merits).

2.3 Research environment and Unit viability

The Unit is excellently positioned for the future. Being young (established in 2018) it is still lean, making it research focussed with a low proportion of 'other staff' compared to its Faculty; the latter can help with keeping administrative transaction costs to a minimum, but not if those are generated by other layers of the organisation in excess of the capacity of support staff and researchers. The Unit achieves a very high level of external funding. For this to include private donations, and not only to use the income to employ the postdocs and PhD students but also 10 Professors, is outright impressive. The decision to recruit five tenure track professors to its focus areas by 2023 is an important investment decision by the Faculty, and one that the Unit deserves and needs to reach excellence. A main strength is also the realisation that cutting service staff and increasing

digitalization has increased the administrative burden on research staff. The level of transparency across management levels, and hence the likely sense of collective, appears high – again, a major asset, and critical for multi, inter and transdisciplinary research of high calibre and impact.

Main weaknesses are the low level of international employment and possible concerns how the Faculty will assist this unit to focus research (and teaching). Likewise, reorganising all staff services under the University services runs the risk of creating an 'us and them' culture as well as an increase in complexity/information demand and flow channels. Developing and maintaining instruments that foster a sense of shared purpose (society facing service in the form of education and research) and prevent administrative demands from spiralling out of

control, crowding out opportunity and energy for research and impact generation and will be key. Some level of harmonisation of time invested in teaching across staff would likely to benefit the Units' research too.

GRADING: EXCELLENT

Leadership, goal setting and follow-up

The management model of the Unit appears pleasingly 'horizontal' and transparent, with sufficient opportunity for influence by quite some (admittedly high ranked) staff to influence matters at Faculty and unit levels. All PIs seem to be invited into the Unit management arena and as such can help find a sense of collective and contribute to the setting of directions. The combination of top-down and bottom-

up approaches (including all staff meetings) is welcomed, and mechanisms appear in place to overcome power imbalances which may prevent those least empowered from contributing. Some of the wording used is not quite in line with such sentiment (i.e. superiors, subordinates), and in that sense having an anonymous system (questionnaire, ombudsperson – whatever works best culturally) for the less daring to speak out could be of considerable value (in addition to the –group based – instruments described). Arguably, the Unit can learn most from those staff (and students) with least influence on the system.

Human resources, careers and recruitment

The most striking feature of the Unit, HR wise is the low level of international employment: 15%, even at PhD level (12% at professor level, 19% postdoc), whilst at PhD/postdoc level at the Faculty this is 40%. Discussion brought out some of the reasons why the Unit has such a high proportion of Finnish staff and demonstrated a clear desire to move away from this. The aspiration to appoint more European researchers would help address this, with likely perpetuation of internationalisation of research – a position confirmed by early career staff at the Unit.

Career support wise, some good policies (offering research leave for those at advanced stages of their careers; travelling grants for earlier career staff) and ideas (offering postdocs and PhD students project management duties) are in place. Recruitment procedures as described seem sound (include the expectation of an equal gender balance, and effort to increase chances of ‘minority candidates’).

Researcher education

The question what can be done to make the Unit as attractive as possible for notably non-Finish PhD students and post docs is worth asking; the same may apply when attracting more senior staff, though here the research profile and international appearance thereof may be a yet more decisive factor.

Part of the answer may also be in how PhD students are attracted, i.e. on the basis of explicit (and funded) research proposals or less defined, and possibly regional-appearing ‘research areas’? If the latter, then this may enforce Finnish students to come to the fore.

Instruments to integrate PhD students into the wider research environment seems in place. The PhD defence system may also play a role/be further capitalised on in terms of generating a sense of community.

Research infrastructure

Bringing all staff of this Unit together in one place is arguably the single most important infrastructure advance described. The exact roles and opportunities that come with the field stations, and the extent to which these are used, are not particularly clear. The new research vessel will no doubt be a major boost for the Baltic/marine ecology work. The wording in the SAR signals a level of concern about how infrastructure is maintained (pointing to the critical need for external funds). What infrastructure is considered core and thus funded by HU/the Faculty is not spelled out.

Funding

Impressive level of external funding (69% of total in 2018), which may be difficult to maintain (given that national funding declining and with the Unit expanding in size more demands may be placed on staff). The Unit is set for a strong future, and with a genuine chance to continue bringing in a large amount of external funding. Maintaining a high level of transparency (and thus the potential to keep differential [stated or otherwise] objectives between different management layers and resulting alienation to a minimum), sociality, sense of shared purpose and desire to discuss and undertake work with others (within the Unit and outwith) are likely the best instruments to ensure grant proposal writing remains driven by the desire to conduct high calibre research.

Connections with ‘other constellations’

The relationship between HELSUS and EcoEnv remains somewhat unclear; the same holds for the relationship between the urban focus of EcoEnv and the new (UH) Institute of Urban and Regional Studies.

Societal and contextual factors

Identifying the increasing frequency of extreme climatic events, ever increasing urbanisation and the adverse effects of climate change and eutrophication on the Baltic Sea and other aquatic systems as the most important threats in the coming years seems highly valid, and carving out a hugely important set of areas in which to conduct high quality science with impact to the benefit of society.

Life Sciences Panel

MOLECULAR AND INTEGRATIVE BIOSCIENCES RESEARCH PROGRAMME (LS UNIT 15)

Faculty of Biological and Environmental Sciences

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

MIBS is very well resourced, especially in regard to external funding, and is achieving a high level of scientific productivity in areas of biology of fundamental importance. Recent

recruitments are of very high quality and should enhance its standing in the future. Although the quality of the PIs is generally very high, there are some weaknesses, which

should be reflected on by MIBS. In particular, it is not clear that the genetics group forms a strong, well-defined subunit. The apparent decline in the average quality of publications

over the past few years is also a source of concern, which may of course be reversed by the recent recruits.

The societal activity was of very high quality. MIBS appears to have identified appropriate targets and devoted considerable effort to reaching out to them, including success in obtaining patents based on basic research. While MIBS is doing very well here, a more clearly defined strategy for organising outreach would be desirable, perhaps with support from the Faculty.

The research environment in MIBS is extremely good, with excellent research infrastructure, a well-designed leadership structure, and an extensive network of collaborations. It has a strong PhD programme, with appropriate structures for fostering and evaluating student progress.

Strengths

- Successful recruitments and high PI quality in general
- Well identified societal impact target areas and activities
- Excellent research infrastructure
- Well-organised PhD programme

Development areas

- Lack of strategic thinking regarding subunit structure, societal impact development, and recruitment.
- Apparent lack of support for career progression to independence for the postdoctoral fellows.
- Relatively low numbers of PhD students and postdocs per PI for this area of research.

Recommendations

- In line with the University strategic goals, MIBS should continue to try to increase the international component of its staff and PhD students.
- Similarly, MIBS should also seek further international sources of funding, especially ERC grants.
- MIBS should consider developing a more strategic approach to future recruitments, especially with regard to expanding areas of research that complement its existing strands. The development of more joint ventures with other life science units and natural science units should be considered as part of this strategic approach.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

Overall, MIBS is well resourced, and is achieving a very good level of scientific productivity in areas of biology of fundamental importance. However, it is not clear that it has achieved the very highest level of scientific achievement, in the sense of truly innovative research across a broad front. But recent recruitments are of very high quality and should enhance its standing in the future.

MIBS consists of a group of 39 PIs, including 17

professors and assistant professors (3 have emeritus status). Two of the professors are international appointments, and one is an Academy professor. The PIs have identified 4 main research topics with respect to current and future goals: structural biology (with a strong emphasis on viruses), cell and developmental biology, genetics, and neurobiology. There seems to be a good critical mass in each of these areas, with the possible exception of genetics (with only 3

PIs listed). The genetics group PIs have strongly overlapping interests with PIs in other groups, so there is some question as to whether this represents a meaningful grouping.

Overall, the majority of the PIs in MIBS have extremely good records of research productivity, with a high rate of publications both in leading specialist journals and high profile general journals. Some of the PIs have produced very highly cited papers, indicative of their having made notable

contributions to their fields. It is very encouraging to note that this group includes the 3 recently recruited tenure-track professors and the 3 HiLIFE tenure-track professors. This suggests that the research quality of MIBS will be maintained in the future. The general level of funding of the PIs and the research infrastructure is extremely good, with MIBS contributing nearly 30% of external funding to the Faculty, with 25% of the staff.

The relatively small number of ERC grants (with a recent decline), and of Academy professors, is also a negative indicator, as is the rather small fraction of international appointees at level 3 (6%). The numbers of PhD students and postdocs (about 50% of the number of academic staff) seem rather small for a research institute of this size in this area of science.

Strengths

- High-quality PIs and new recruitments

Development areas

- The genetics group is small, with overlapping interests with other groups
- A lack of outstanding levels of achievement

GRADING: VERY GOOD

Research goals

The stated goal of MIBS is to understand the mechanistic basis of life at different levels from molecules to whole organisms. This is, of course, a very important component of modern biological research, which needs to be fostered by the University. Inevitably for a relatively small unit devoted to this aim, and which has had a very short history, the focus is on areas of interest to the PIs who founded MIBS, which

are outlined above. MIBS plans to further integrate these different areas, and to extend interdisciplinary interactions outside MIBS. These goals are laudable, and their fulfilment should strengthen the standing of MIBS.

The rationale for these goals is based firmly on the existing interests of the current PIs, which underly the list of specific goals for the next 5 years. The aims to attract more international staff, and to increase the international mobility of the PhD students, are important, and should be encouraged.

There is always a case for an academic unit building on its strengths, which is clearly what is planned here. There is, however, a risk that this could lead to important new research areas being overlooked. MIBS has recognised ways to respond to new challenges; this is clearly of great importance for its future viability; this is clearly of great importance for its future viability.

Research results

MIBS has listed research outputs over the period 2012-2018 for the four areas described above. In structural biology, there have been publications on the structures of several viruses, leading to insights into how the protein complexes that surround their genetic material are assembled, as well as that of a sodium pump of a thermophilic bacterium. This work is supported by expensive infrastructure, for which the researchers in question are responsible. In cell and developmental biology, a diverse set of research outcomes is reported, ranging from studies of the ultrastructure of the phagophore (involved in the digestion of components of the cell) to the reprogramming of immune system cells to allow their migration. Studies in genetics included investigations into the regulation of larval growth in *Drosophilavia* ribosome synthesis, the molecular basis of the differentiation of

mouse brain neurons into different functional classes, and the genetics of several human diseases. Neurobiology also encompassed a very broad range of research outputs, including the role of ion transporters in synaptic transmission, neuronal development and plasticity, the properties of glutamate receptors and their role in the maturation of synapses, the effect of vasopressin in suppressing brain activity during birth, and the mechanisms involved in the detection of single photons by the retina.

This research is mostly fundamental science, directed at improving our understanding of basic biological processes, and is of high quality with respect to successfully contributing to this goal. Some of the research has clear potential for future applications, notably cancer genetics and the possible use of therapies based on vasopressin signalling to avoid brain damage due to lack of oxygen during birth.

Analysis on research outputs

The self-analysis of research outputs makes a strong case that the four research areas have a very good record of productivity in terms of rates of publication in international journals of high standing, including leading specialist journals as well as high profile general journals like *Current Biology*, *Nature Communications*, *PNAS* and *Science*. Neuroscience had a particularly high profile. As noted in the self-assessment, there is some variation among PIs in numbers of publications and amount of research output, with some PIs having extensive teaching duties and a lack of external funding. There is a stated aim to increase the research activities of these individuals, although it is somewhat unclear as to how this is to be achieved.

The detailed bibliometric statistics are a little hard to interpret, given that MIBS has only existed in its present

form for a year, and has recently recruited new staff members. In addition, the relatively small numbers involved make it hard to see if there are any temporal trends, as was noted in the self-assessment. For example, while the number of JUFO level 3 publications apparently increased in 2017 (to 18 from 13 the previous year), a chi-squared test reveals no significant difference between 2017 and 2012-2016.

The statement that LS15 has a higher proportion of level 3 publications (16%) than the other LS faculty (8%) in 2017 is, however, correct (the 1 d.f. chi-squared is 9.12, $p < 0.01$). In contrast, the Biotechnology Institute (which overlaps in personnel with MIBS) had 24% of its publications at level 3.

There is a marginally significant (chi-squared = 4.73, $0.02 < p < 0.05$) difference in the proportion of top 10% publications between 2015-16 and the previous years analysed by CWTS, and the apparent downward trend in the MCNS (mean field-normalized citations scores over the whole period 2012-2016 (from 1.25 to 1.01) is a source of concern (but it is hard to do statistics on this measure). As noted in the self-assessment report, these negative

trends may have several causes, including reduced research funding and decreased activity by staff on the verge of retirement. The fact that MIBS has recently recruited six new staff members, who all have impressive publication records, suggests that the research outputs should increase over the near future in both quality and quantity. The importance of this recruitment was strongly emphasised in the self-assessment with regard to future expectations, and indicates good judgement on the part of MIBS and HiLIFE.

The self-assessment states that 146 PhD students graduated in 2013-2017 from the programmes associated with MIBS. This is a respectable number (approximately 1 per PI per year), but is apparently somewhat on the low side by international standards for a research institute in this area of biology.

Overall, the research outputs suggest that the MIBS programme is succeeding in meeting its stated goals in contributing significant research advances in the areas of interest to the four groups of PIs into which it is divided. The weakest area in terms of numbers and impact appears to

be genetics, and the strongest is neurosciences, which has a very high bibliometric profile. The number of publications per PI is excellent, and the work seems general to be of very high quality. The future success of MIBS will no doubt be strongly affected by the new recruits, but the prospects look very good.

International benchmark

MIBS chose the Faculty of Biosciences at the Heidelberg University as its benchmark institution, on the basis that it covers a broad spectrum of research areas in biology, many of which are in common with MIBS, and is a teaching as well as research institution.

While the rationale for this choice is reasonable, there is a problem in comparing the two institutions, since the Heidelberg one is much bigger, and more comparable with the whole Faculty of Biological and Environmental Sciences and HiLIFE at Helsinki (although lacking strength on the evolutionary and population biology side compared with Helsinki).

2.2 Societal impact

The evaluation of societal impact was based on the extent to which the self-assessment revealed a high level of activity aimed at appropriate targets. This activity was impressive. MIBS appears to have identified appropriate targets and devoted considerable effort to reaching out to them.

No obvious weaknesses were apparent, and indicators of successful outreach activities such as public prizes and seed money for commercialisation are very good. However, there did not seem to be any clear strategy for developing this area, as became clear during discussions with the members of MIBS.

Strengths

- Highly appropriate research-based choices for societal impact target areas and matching activities

Development areas

- A clear strategy for developing societal impact developing strategy is missing

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

The self-assessment rightly pointed out the need for public engagement by scientists, which is especially acute in the light of the current world situation and the increasing levels of irrationality among political leaders and the general public. MIBS identified the general public, biomedicine, patient organisations, agriculture and start-up companies as target areas, based on the research are covered by the Unit.

These are highly appropriate choices, as several of the research areas either have potential applications or have produced scientific results of interest to the general public.

Activities and outcomes

The self-assessment provides an extensive list of activities, including school visits, MSc training of school teachers, appearance on radio and TV, articles in the general press, public lectures and seminars, and social media. In addition, MIBS members participated in joint events with policy makers, health care professionals, and business groups. A start-up company for cancer diagnostics has been founded by Prof. Nyström, and patents for tests for DNA repair deficiency have been obtained. These activities have been recognized by two public prizes and by seed funding for commercialization of innovations.

In general, the activities and outcomes match very well, and reflect the nature of the research interests of MIBS members.

2.3 Research environment and Unit viability

The panel assessment was based on the data provided in the self-assessment, which covers a broad range of topics. Overall, the research environment in MIBS is extremely good, with a satisfactory level of external funding and research

infrastructure, a well-designed leadership structure, and an extensive network of collaborations. While MIBS clearly is well positioned for the future, there is a recognized need to keep abreast of new trends in molecular biosciences, which

is a challenge for a relatively small unit in this area.

The leadership structure is well thought-out, and should help towards ensuring the viability of the Unit. The PhD programme appears to be satisfactory in organisation

and quality, although there are concerns about the number of students relative to the number of PIs. The research infrastructure is excellent. The level of research funding is very good, although not outstandingly high for this area of science. MIBS is aware of the need to improve on this, especially with regard to international funding such as ERC grants. The main issue is whether the four research areas form a coherent unit, with tangible added value from interactions between groups. The panel felt that there was a need for more strategic thinking by the leadership of MIBS.

Strengths

- Excellent research infrastructure

Development areas

- It is not clear that the four research areas form a coherent unit
- More strategic thinking needed, especially regarding external funding

GRADING: GOOD

Leadership, goal setting and follow-up

MIBS has a director, vice-director and a self-assembled steering group of 8 other members at various levels of seniority, spanning the range of research and undergraduate and graduate level teaching programmes. The University and Faculty of Biological and Environmental Sciences provide basic infrastructure as well as salary contributions for academic and support staff. The steering group meets monthly and communicates with the other researchers in the Unit via monthly lunch meetings, research seminar gatherings, and electronic modes of communication. It is responsible for general goal setting, with specific research goals set by PIs.

The steering group plans to monitor success in meeting goals by publication outputs and success in obtaining external funding. Annual performance reviews of individual researchers are conducted by their supervisors, including reviews of PIs themselves by the director or vice-director of MIBS. As is usual practice, individual PIs meet regularly with members of their research groups.

The leadership structure for MIBS is clearly defined, with a steering group that is flexible in composition and which has developed good plans for communicating with staff and PhD students. The arrangements for performance review and feedback are satisfactory. The main concern regarding support from higher levels of the University was lack of help with information about personnel and means of establishing channels of communication within the programme. There was limited knowledge of, or engagement with, any University strategy relating to Life Sciences.

Human resources, careers and recruitment

The personnel structure of MIBS is such that 39% of the teaching and research staff are level 3 or 4, and thus count as PIs. These constitute approximately one-third of the Faculty appointments at this level. 31% of the teaching and research staff are level 2 (i.e. postdoctoral staff), and 22% are doctoral students (level 1). Among levels 1 and 2, 41% and 35%, respectively, are international. It is stated that many of the current 16 University lecturers and researchers will be retiring over the next few years, providing an opportunity to plan recruitment in a way that will enhance teaching and research.

This seems generally satisfactory, although (as already noted), the ratios of numbers of postdocs and PhD students to PIs are on the low side for this area of science; these ratios are much higher in the Institute of Biotechnology (BI). Perhaps new, more research active, recruits will be able

to attract funds to increase this ratio. More international appointments at the PI level would also seem desirable, as was noted earlier in the self-assessment.

There are also some technical support staff provided by the Faculty. The statement in the self-assessment is not entirely clear, but it seems that there is some concern that too much is expected of individual research groups to fund their own technicians, resulting in a waste of resources. This is, unfortunately, a very widespread problem internationally, due to shifts away from centrally provided support, and is not easy to solve.

The self-assessment describes procedures for evaluating the progress of post-docs and doctoral students, which parallel those outlined above for the PIs. These generally seem appropriate, but the self-assessment is frank in identifying some weaknesses, notably a current lack of means of dealing with people who are not succeeding. This is always a difficult problem for an academic institution, but probably would be helped by a mentoring system whereby someone who is not directly involved in the research would be able to meet regularly with the person involved (this already exists for the doctoral students).

The self-assessment describes the progress that has been made in recruitment and promotions, which has been mentioned above. This all looks very good, but it is left unclear whether there was any strategic plan behind the recruitments, or whether they were largely opportunistic. This lack of forward planning may not be good for the long-term viability of the Unit.

Researcher education

The self-assessment describes the procedures for admitting PhD students and how their projects are formulated. The PhD students play a major role in the research of MIBS,

forming about 50% of the research personnel. The students are each supported by a thesis committee, which monitor the scientific validity of their projects, that they have the appropriate coursework, and evaluate progress. There are also organisations in place to help with student welfare, and MIBS is planning to improve interactions between its PIs and these organisations.

This all seems very satisfactory. However, it would be good to have been provided with some more information, e.g. on how many years the average PhD student takes to complete a thesis, how many students drop out, what proportion go on to postdoctoral work, and whether funding is available to assist students whose projects have run over time for reasons outside their control. In addition, while mention is made of coursework, there is no mention of what types of courses are available or how much time beginning students are expected to spend on courses. Without this information, it is hard to assess the performance of the PhD programme.

No information was, however, provided about career support for postdoctoral fellows, such as training on how to write fellowship applications.

Another lack is that there is no description of the research seminar series that MIBS presumably runs. Seminars by outside speakers provide an important means of training for postdocs and PhD students, and for meeting prominent scientists in their field. It would have been nice to know how frequently seminars are held, and to what extent they involve international speakers.

Research infrastructure

MIBS conducts research that requires high quality (and high cost) infrastructure, often involving use of facilities elsewhere in the University or beyond, especially as the

different research areas have very different needs. The self-assessment describes an impressive list of such infrastructure, some of which involves HiLIFE.

It seems to have excellent procedures in place for maintaining and developing its facilities, with the PIs concerned being heavily engaged, especially as HiLIFE is evaluated regularly by an international panel. Overall, the research infrastructure appears to be outstanding.

Funding

MIBS is funded partly by the University (28%), mainly core funding for salaries and rent. Most research funding comes from competitive grants, both national (58%) and international (9%), and a small proportion of industrial/translational funding (4%). 6 ERC grants were awarded during the review period. For 2018, the mean level of competitive funding per PI was 139 thousand Euros. A difficulty in assessing the funding is that many PIs have funding that is credited to other units, due to the recent formation of MIBS, estimated as 3 million Euros currently (an additional 77 thousand Euros per PI). The net level of competitive funding is therefore of the order of 200 thousand Euros per PI in 2018, which seems very good. On the other hand, the Institute of Biotechnology, which involves a comparable number of PIs and type of science, received approximately 12 million Euros in 2018 compared with 5.4 million Euros for MIBS, although this difference may be partly due to overlapping personnel.

The self-assessment states that the level of core funding is not adequate for the staffing needs of the Unit, which is said to be a general problem that reduces the competitiveness of Finnish research in general, but of course is a common experience internationally.

The self-assessment also notes that MIBS has a broad

range of sources of external funding, but is aware that the level of international funding needs improvement, and describes some planned measures to enhance this, such as encouraging staff to sit on international review committees. It also proposes to reduce the cost of core facilities by charging industrial customers. A major concern is that central funding for PhD students appears to be dropping, which will have negative effects on research. MIBS plans to seek international sources of funding to counter this trend.

As the self-assessment notes, competitive grants are usually awarded for a period of 4 years maximum, so that PIs cannot rely on sustained funding. This is also an international problem, and is not going to go away. It would have been good to have been provided with statistics on the frequency with which grant applications are successful; in many countries, even highly successful PIs are accustomed to having to write several grant proposals in order to get one funded. Overall, it appears that MIBS is aware of the need to improve funding, especially at the international level, and is developing plans to do this, which should be strongly encouraged.

Collaboration and connection with “other constellations”

MIBS has a wide network of collaborations across the University, especially with HiLIFE and the Institute of Biotechnology, and contributes to MSc teaching in several joint programmes. PIs also collaborate nationally with a variety of academic institutions as well as industry. There is an impressive list of international collaborations. Overall, the level of collaborations is excellent.

MIBS believes that the establishment of HiLIFE and HELSUS offers opportunities for increasing collaborations, as does the initiation of an international programme for developing infrastructure for structural biology.

Societal and contextual factors

The self-assessment emphasises the negative impact of University budget cuts, which have been alluded to above. This is, of course, a phenomenon that is widespread across the globe, and the University still seems to enjoy a very good level of support by international standards. As the self-assessment notes, applications of basic biological research to problems of medicine, agriculture and environmental

sustainability are likely to become increasingly important in the next few years. It believes that MIBS is well positioned to play a significant role in this in Finland and beyond.

The description of future trends rightly emphasises the increasing role of intensive computational methods and data processing technology in modern biology, and stresses the need to invest in training and recruitment in these areas, in which it is relatively weak at present. For example, there

is currently little activity in genomics and its applications to medical, agricultural evolutionary problems, in contrast to units such as the Institute of Biotechnology and Institute of Molecular Medicine Finland (FIMM). MIBS should probably envisage more joint ventures in these areas with these other units.

Life Sciences Panel

ORGANISMAL AND EVOLUTIONARY BIOLOGY RESEARCH PROGRAMME (LS UNIT 16)

Faculty of Biological and Environmental Sciences

1 SUMMARY

1.1 Description of the use of criteria

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research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

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by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

Organismal and Evolutionary Biology Research Programme (hereafter OEB) is an excellent unit, exhibiting world-class research and influence in a range of areas. Although

founded only recently (2018), it builds on a very strong foundation of outstanding work in ecology at the University of Helsinki, including the scientific legacy of Ilkka Hanski.

OEB is a 'bottom up' constellation of research groups aimed at promoting collaborations across broad-sense ecology, and forging new connections between ecological

geneticists, evolutionary ecologists, plant biologists and bioinformaticians. At present, OEB is ranked 17th in the Shanghai world ranking of ecology departments (and is the 2nd highest ranked department in the University of Helsinki). The self-assessment report provides evidence of extensive and productive international links, and a vibrant population of researchers, many of whom are from outside Finland. The large number of talented young scientists is a particular strength. It is clear that OEB is already functioning at a high level in terms of its scientific quality and that its societal impact is consistent with what would be expected from a unit of this calibre.

Strengths

- OEB is a recognised internationally as a leader in ecological research
- Excellent scientists at all levels
- Strong funding profile, including prestigious ERC awards

Development areas

- The added value of, and degree of interaction between, the different research groups could be clearer. Is OEB more than the sum of the parts, or is it a collection of (admittedly very good) groups working largely independently of one another?
- Industrial cooperation is highlighted as an area for development.
- Aspirations to raise standards in behavioural ecology and strengthen bioinformatics infrastructure are noted.
- Greater collaboration with researchers in other Finnish research institutes would be beneficial.
- There should be improved documentation of the impact of knowledge activities, with more concrete examples of change that has come about as a result of contributions with societal and environmental relevance.

Recommendations

The panel agreed that this is an impressive unit and an international leader in the field. The OEB appears to have a clear vision about the challenges ahead, and the opportunities that will flow from methodological innovations such as 'big data' and genomic advances.

The panel recommends that OEB leadership acts proactively to maintain the vigour and international profile of the research groups rather than relying on 'bottom up' processes to become the main driver deciding the direction of travel. It should reflect on whether to plan future recruitments to strengthen important areas in which it is relatively weak, such as molecular evolution, or to continue to build on its current strengths.

Promoting synergy between the groups and PIs will be key in building the resilience of OEB in the longer term. Other priorities are to ensure that the Unit's goals are aligned with the University strategy, and that societal impact is both documented and rewarded.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The University of Helsinki has a longstanding international reputation for excellence in ecology. The late Ilkka Hanski was the best known of its ecologists, recognised by several international marks of distinction. His work, together with

that of his colleagues, built a strong foundation which is being maintained in the new OEB unit, founded in 2018. OEB, which was formed, 'bottom up', from a diverse range of research groups has world-leading strengths in a number

of fields including evolutionary genetics, metapopulation ecology, climate change biology and ecoinformatics. Evidence for this conclusion is provided by an impressive publication list that includes influential papers in leading

journals such as *Nature* (and *Nature* family journals) and *Science*. OEB members also have strong record of success in securing funding from prestigious and very competitive bodies such as the ERC and the Academy of Finland.

Hanski's influential work on metapopulations continues to be the widely cited; it is clear that OEB, which includes a number of his former students and postdocs, is well-placed to build on this outstanding legacy. However, OEB is actively developing other initiatives particularly those that take advantage of technological advances, particularly in genetics and bioinformatics. For example, there are ambitious research programmes in place to conduct large-scale analyses that have the potential to inform understanding of the consequences of climate change and to forge new interactions amongst researchers within the OEB and further afield. There is also regular 'horizon scanning' to identify new opportunities.

OEB is a 'constellation' of research groups and PIs, many of whom are world leaders in their fields. The balance of researchers at different career levels is excellent and the impression is one of a vibrant collection of people and projects. At the same time OEB has a complex structure and it isn't always clear how research priorities are decided or who reports to whom, particularly in the case of people with more than one affiliation. As this is a new initiative it will be important to make sure that mechanisms are in place to promote synergies between groups and PIs. In light of the recent restructuring within the University, the relationship between OEB and other groupings, particularly HiLIFE, will also need careful management.

The panel was unanimous in agreeing that OEB is excellent in terms of its scientific quality, and is well-placed to remain among the top 20 in the world in ecology. To meet this goal the management of OEB will need to be

vigilant with regard to emerging challenges in the field, and to ensure that OEB members are supported in navigating an ever-changing funding and publication landscape. Promoting synergy between the groups and PIs will be key in building the resilience of OEB in the longer term.

Strengths

The many strengths of the OEB include

- International recognition as a leader in the field. OEB is ranked 17th in the Shanghai world ranking of ecology departments (and is the 2nd highest ranked department in the University of Helsinki).
- Excellent outputs (about 135 publications per annum), many of which are in leading journals, and many of which are highly cited. Most subject areas within OEB are securing citations at a rate greater than the average in the field, substantially so in some cases.
- Strong international collaborations and membership (42% of members are from outside Finland) enhances the global reputation of the Unit.
- Excellent career stage/age profile ensures a vibrant research community.
- Strong record of securing research funding, with excellent support for applicants including grant coaching.
- Strong commitment to open access publications, including increasing the fraction of papers published in this format.

Development areas

- The degree of collaboration between the research groups is not always evident. To what extent is OEB more than the 'sum of its parts'? How does the new structure leverage research innovation and integration?
- It was not entirely clear how well the plant biology

component matches the more population level approaches of the other research strands.

- The relationship between the research groups, Research Centres and Centres of Excellence is unclear. How do these function on a day to day basis?
- While the presence of large numbers of PhD students and postdocs is a strength, what structures and mentorship are in place to support their career development, above and beyond guiding them towards the completion of their projects?
- A proportion of PhD projects overrun the funded 4 year term. It is noted that actions to remedy this are in hand
- It is noted that there appears to be an issue with the maintenance of research stations.

GRADING: EXCELLENT

Research goals

OEB has an organismal focus, and covers a wide taxonomic breadth, ranging from single celled taxa to vertebrates. Its approaches are equally broad extending from molecular biology to microbiology. This scope means that OEB is well placed to tackle emerging challenges, of both applied and fundamental nature, such as issues connected to climate change. The THRIVING SPECIES project is an example of an initiative in this area. OEB already has a leading international reputation in ecology and aspires to retain this standing in the future.

OEB has set out 7 goals, which include contributions to fundamental understanding (e.g. elucidating organismal responses to environmental change), to ensuring that the necessary infrastructure is in place and sharing advances with relevant audiences, both scientific and general. These goals are appropriate and well justified.

Research results

The research results chosen by the Unit include impressive publications in leading journals, and showcase work at the cutting edge of the field. Papers highlighted in the report include those published in *Nature*, *Nature Genetics*, *Nature Communications* and *Science*.

Research in OEB is of both fundamental and applied relevance. For example, new advances in statistical analyses of big ecological data sets are proving influential, while

genetic analyses of aquatic organisms shed new light on longstanding evolutionary questions, such as sexual conflict. Publication of the genome of silver birch is not just a scientific achievement but also an advance with clear relevance to wood production in Finland.

Analysis on research outputs

The observation that 70% of publications are in the top 10% of highly cited publications speaks for itself. OEB is performing

extremely well as this and the other metrics show.

The panel agrees with the comment that the 'outputs meet our goals very well'. Aspirations to improve industrial collaborations are noted.

International benchmark(s)

The selection of benchmarks and rationale behind the choices are both appropriate, although Integrative Biology at UC Berkeley is a much larger and more diverse unit.

2.2 Societal impact

The broad remit of OEB leads to opportunities to engage with a range of stakeholders and to promote knowledge exchange in a number of topical themes. For example, OEB researchers are contributing to public understanding of climate change through participation in government bodies such as the National Plant Protection Council. Research on plants and their physiology is also directly relevant to Finland's forests and forestry industry. Documented outputs include reports to Government Ministries and participation in media events. Contributions are also being made to teacher training.

While there is good evidence of participation in a diverse range of activities with potential societal impact, it isn't always clear, from the written report, how this participation has made a difference. The OEB has excellent (in comparison to other Finnish Universities) connections with the Ministries of Environment, and

Education and Culture, and this is a strength. However, the submission provided less in the way of concrete examples of how these connections have resulted in change that has been beneficial to society and to the environment. Verbal examples provided during the meeting provided reassurance that there are indeed tangible benefits in areas including genetic assessments of the status of wild populations, expert witnessing and contributions to the EU Natura initiative. Nonetheless, given the increasing emphasis on the quantification of research impact and justification of its societal relevance, it would be advisable to systematically document not just the activities, but also the outcomes of the activities. It appears that the societal impact within OEB emerges as a by-product of the research related activities of the individual groups rather than being a strategic priority of OEB as a whole. OEB may wish to explore mechanisms to ensure a 'joined up' approach to societal impact within the

Unit as a whole, and to ensure that contributions to societal impact by OEB members are recognised and rewarded.

The panel agreed that, in light of growing concerns about the environment, the OEB's research is of substantial societal relevance. Relevant stakeholders have already been identified and productive relationships forged. The contributions to education and outreach are also very good. The quantifiable outcomes of these initiatives were not always clear in the written report but became clearer during the on-site meeting. We recommend that OEB formally documents its Societal Impact, both in terms of ongoing activities, and as quantifiable outputs, and takes these contributions into account in annual reviews and promotions. A strategic approach to the delivery of Societal Impact within OEB could be beneficial.

Strengths

- The potential of OEB research to benefit society and the environment in diverse ways has been identified
- Relevant stakeholders have been identified
- Relationships with key players in Government and NGOs already in place
- Contributions to Government and the Media documented

Development areas

- More concrete examples of the translation of OEB research into outputs that have benefitted society and the environment needed
- Links with industry could be strengthened.

- Better quantification of the impact of societal contributions, in other words how initiatives and interventions have made a difference in practice, is needed.

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

The nature of the research conducted within OEB lends itself to societal impact. The choices provided are relevant and well-justified given the nature of the work involved.

Activities and outcomes

The written report provides a narrative account giving

examples of these features. Key outcomes include the relationship between biodiversity and allergies, but this interesting point is neither expanded nor quantified in any way. Contributions to various reports are also mentioned. There was an opportunity to discuss examples of concrete contributions during the meeting, and it is clear that these are substantial.

The quantifiable outcomes of these initiatives were not always clear in the written report, but became clearer during the on-site meeting.

Better and more consistent documentation of the outcomes of societal impact activities, and a coherent strategy on how the members of OEB can better contribute to this important task, would strengthen the evidence that the Unit is an influential contributor in this domain.

2.3 Research environment and Unit viability

The structure of the OEB grouping is quite complex and, indeed, was not entirely clear from the narrative. For example, it appears that some PIs report to their Research Programme Director while others are under aegis of the OEB steering committee. While this system may work well in practice, it also leaves scope for confusion. A clearer statement of leadership roles, and procedures that can be used if problems arise, would have been helpful.

There appears to be a good range of support mechanisms and courses for group leaders. It is noted that various meetings happen 'regularly', without quantification in many cases of what is meant by regular.

Goal setting is expected to 'trickle down' to research programmes, yet since the Unit is organised on a 'bottom up' basis the balance between individual decision making about research goals, and direction from higher organisational levels is unclear.

OEB appears well placed in terms of its human resources. The development of a new Bio-Data service is both timely and innovative. Infrastructure appears good and is well-organised. Given the importance of field work in this domain of biology, maintenance issues at the field stations are a potential concern. It is, however, noted that these issues are now being addressed.

The panel agreed that OEB is very well positioned for the future. Career structure is well balanced, members are diverse in terms of international origin, and the Unit appears well motivated and well-integrated. At the same time the complex structure of research groups, with PIs coming under different overarching structures, suggests there is potential for confusion. It will be essential to ensure that there is clarity regarding reporting and responsibilities. There also appears to be a tension between the 'bottom up' philosophy on which the Unit is constructed, and the 'top down' need to set and meet strategic goals at the Unit, Faculty and University level.

Strengths

- Collaborations also appear excellent and the relocation of other research groupings to the Viikki Campus provides new opportunities for increased connections with other constellations of researchers.
- External funding is excellent and it is clear that OEB is one of the more successful units within the University of Helsinki in this regard. The moves to further strengthen the EU funding stream seems appropriate.

Development areas

- The linkage between OEB's goals and ambitions, and the University strategy, is not well developed.
- OEB members belong to a variety of Units and groupings with different remits and ambitions. This has the potential to create confusion, for example in terms of prioritising of research goals and reporting.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

It is noted that some PIs report to their Research Programme Director, while others come under the OEB steering committee. There needs to be more clarity and consistency in lines of reporting.

Goal setting is initiated at the Faculty level and followed through to the OEB level. Annual development reviews of OEB members are held and feedback on performance provided.

Human resources, careers and recruitment

The age/career structure of OEB is well-balanced and a strength.

There appears to be excellent career support for

researchers including those at the doctoral and postdoctoral levels. Representatives at the meeting spoke very highly of the mentoring available to them. At the same time there was less clarity about where to go to resolve any problems that might arise, although the doctoral students are able to raise any concerns at regular review meetings, with the supervisor outside the room. There may be scope to improve the support given to members of these groups as they move to subsequent positions.

Recruitment practices appear to depend on the body (e.g. Faculty, HiLIFE, OEB) responsible for a position and it will be important to ensure clarity and consistency in how these operate.

Researcher education

OEB has an excellent record in the recruitment of graduate students, many of whom are from other countries. OEB is clearly an attractive venue for ambitious and able students in this research field.

There appear to be good procedures in place to agree research topics and goals, and to plan research. Both formal and informal mentorship are important here.

Doctoral students appear well integrated into the research community with OEB. Given the number of students graduating each year, ensuring that they are supported in their career development is a priority. A successful unit such as OEB will be a very stimulating place to one, but one that places considerable demands on its junior members. It is essential, therefore, that students (and postdocs) know who to approach for help (both scientific and pastoral) should the need arise.

Research infrastructure

OEB has access to ample facilities on campus and also

benefits from access to field stations.

Infrastructures largely fall under HiLIFE and appear well organised.

Funding

OEB has been very successful in securing funding from a range of sources, including from prestigious and highly-competitive agencies such as the ERC. Income sources are well-diversified.

There are clear strategies for maintaining funding streams, and this is a priority within OEB. The use of grant coaches, who assist applicants at all levels, is a strength.

Collaboration

Collaboration is already excellent at all levels - within the University, within Finland and globally - and there are plans to strengthen links further through increased networking with international colleagues. It would have been good to see some plans to foster collaboration with FIMM, with its vast resources for studying human population genomics.

The move of SYKE and LUKE to the Viikki campus will open up new opportunities for collaboration.

Connections with 'other constellations'

Connections with HiLIFE are important, and OEB hosts a number of HiLIFE fellows.

Concerns were noted about the handling of common project funding.

Societal and contextual factors

It is noted that there will be an increased need to find effective ways to share research findings with end users and the public, and to deal with the trend towards open access publications, particularly in light of the rapid shifts in the journal landscape.

Life Sciences Panel

FACULTY OF MEDICINE (LS UNIT 17)

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The Faculty of Medicine encompasses nearly 1000 employees; together with the HUS Helsinki University Hospital, it has an important focus on medical research and

education. The research spans basic to clinical research with emphasis on translational research and a particular focus on new treatments and diagnostic methods.

The Faculty of Medicine is a key component of the Academic Medical Centre Helsinki (AMCH) which comprises the Faculty of Medicine, the Hospital District of Helsinki and

Uusimaa (HUS) and the Institute for Molecular Medicine Finland (FIMM), which is part of the Helsinki Institute of Life Science (HiLIFE). The Faculty of Medicine is divided into three “Units” - Clinicum and Medicum which are responsible for 12-14 departments each. Clinicum is more clinical whereas Medicum is more biomedical orientated. The third unit is a Research Programs Unit (RPU) comprising 5 areas of activity. Together, they have highlighted 5 key achievements; Impact on patient treatment, involvement in biobanking, novel framework agreements with national and international companies, clinical trials and new structures for doctoral education.

The Faculty of Medicine aspires to be amongst the top European Universities in all fields of Medicine and to have positive impact on society and individuals, improving health and care for its patients.

The Faculty of Medicine chose to submit its assessment as a single unit in the form of a written submission comprising approx. 1000 academic staff and

with dialogue restricted to an interview slot of just one hour. Based on the data presented, the panel was uniform in its conclusion that only a cursory analysis and report could be undertaken. Either a breakdown of activity based on managed structures or research groupings (as for other Units that we assessed) and/or a more comprehensive report with greater time to explore issues would have been preferable.

Having read the submitted materials and heard feedback from prior Unit Assessments, the panel discussed how it could make best use of the face to face interview time with Faculty representatives. The following “headline” topics were shared with the Faculty team as items for priority discussion:

1. the partnership with HiLIFE
2. the partnership with the HUS Helsinki University Hospital and the Academic Medical Centre Helsinki (AMCH)
3. Data flow from patients to support the flagship activity of genomic-epidemiology based research in FIMM

4. Clinical neurosciences and links to the Neuroscience Center (NC) (Unit 24)
5. Societal impact
6. clinical academic careers

The enclosed report is based on the panel assessment of the submitted written report (albeit with its limitations) and feedback on the above topics.

The panel rated this unit Very Good for scientific publications and quality. Areas of notable research quality were oncology, endocrine/metabolism and genetics. Societal impact was graded Good as was research environment and viability. Again, these gradings were made based on the information submitted; It is possible/ likely that more information particularly on Societal impact and managerial structure organisation/ career development and succession planning would have reflected differently on the societal impact and research environment.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

GRADING: VERY GOOD

The panel would have wished for more granularity on data such as numbers of academic staff performing research, how these were split across Clinicum, Medicum and the Research Programs Unit, income/ research active staff, numbers of clinical PhD's in training and how posts are funded. The panel accepted that the Faculty faced the challenge of delivering a comprehensive education portfolio as well as nurturing and sustaining research but the largely "departmental" structure across Clinicum and Medicum was dated; peer group Institutions have moved to larger more integrative structures to foster research collaborations.

The RPU was seen as an initiative to solve this problem but the research priorities of the Faculty remain unclear and muddled throughout the narrative. The 5 stated priorities refer to malignancies, brain and mind, inflammation, metabolism and degenerative processes but these contrast with the RPU priorities from 2013-2018 that have evolved once more to 9 priorities coming into effect from 2018-2019 (Applied Tumour Genomics; Clinical and Molecular Metabolism; Human Microbiome Research; Individualised Drug Therapy; Translational Immunology; Sleep and Stress in Health and in Transition from Acute to Chronic Diseases; Systems Oncology; Translational Cancer Medicine and Translational Stem Cell Biology and Metabolism).

Within this the metrics indicate areas of International Excellence. The Faculty hosts three Academy of Finland Centres of Excellence, in Biomembrane Research, in Tumour Genetics Research and in Complex Disease Genetics. External funding particularly from the Academy of Finland, Tekes and other domestic foundations has increased in recent years and this has helped to offset the reduction in government/ Institution funding. European funding has remained static at a low level of 4% of total.

Publication numbers have increased but the numbers of JUFO level 3 papers as a % of total have remained static at approx. 7%. Bibliometric analyses indicate the highest citations across critical mass areas of Oncology, Endocrinology & Metabolism, Genetics, Psychiatry and Biochemistry/Molecular Biology. The category "Clinical Neurology" performed well but not "Neurosciences" which is puzzling. There had been a slight reduction in impact since 2014 and it was noted that within the priority area of inflammation, immunology was not a highly cited category. There was a welcome increase in international and industry collaboration that was driving higher quality outputs.

With lack of clarity over Faculty research priorities, the interview with Faculty staff explored the relationship of its research with yet different priorities arising from the overarching HiLIFE structure. There was a lack of clarity around how these priorities had been set and agreed, their relationship to Faculty strengths and how they were being

implemented across UH Life Sciences.

Specifically, the relocation of Neuroscience Center, (NC, Unit 24) from the Viikki campus to the Meilahti campus offers the opportunity to develop a coherent neuroscience strategy, informed by clinical questions. The Unit is providing important outstanding infrastructure platforms, such as in vivo imaging and human iPS-derived neuronal cell differentiation. However, the integration with clinical neuroscience in the Faculty of Medicine has not been clearly achieved; a clear scientific direction that will lead to fruitful integration is required.

Similarly, critical to the success of the Faculty's ambition to translate its research for patient benefit, there was lack of clarity over a joint vision/ strategy across the Faculty and HUS or AMCH. Greater detail on underpinning infrastructure at this crucial hospital-University interface, for example clinical research facilities for first in man studies, embedded clinical trials units, health economics and statistics, research methodologists, commercialisation/ industry engagement would have given greater reassurance to the panel that discovery medicine conducted within UH Life Sciences can be rapidly and effectively translated. Here it is noted from the report of additional research income across HUS of €100M that "is not visible to the UH". It was not possible to explore this in greater detail, in particular details of the financial arrangements for funding clinical academics who deliver clinical care as well as education/

research. Such partnerships with clear fiscal agreements are fundamental to the success of any Academic Medical Center.

One undoubted flagship area, renowned across the world is the University and Unit strength in population/ disease-based genetics/ genomics and its Biobanks. The recruitment of Mark Daly to FIMM is a major coup. The development of hospital based “data lakes” was welcomed. The Faculty within AMCH must be encouraged to work in partnership to ensure that “secondary use of patient data” (approved by government legislation during our site visit) becomes a reality. There are many potential regulation hurdles that might impair progress if interpreted in different light. GDPR arguably should make this process easier as such data flow is very much within the “public interest” but without strong management others may interpret this differently. Joint ownership of this issue and an agreed

way forward is essential and must be at the core of any University-Hospital partnership. The panel see this as a critical issue.

Recommendations

- Urgent work should define – with an evidence base – the research priority areas of the Faculty ensuring these align with those of HiLIFE. The present landscape is confusing. A related joint research strategy should be developed with hospital/ AMCH partners with clear fiscal accountability.
- Leadership, project management and operationalisation of this activity should be defined. At present across HiLIFE, Faculty, HUS and AMCH this is unclear.
- We would encourage a highly selective approach in agreeing a limited number of priority areas. Accepting

that the Faculty must deliver high quality education across many disciplines of Medicine, it can only afford to invest in a few areas of research excellence. Current research funding and bibliometric data provide a strong pointer to areas of real strength.

- The move of Neuroscience academics offers the opportunity for a refreshed and focussed strategy aligned to clinical strengths.
- Aided by government legislation, UH (the Faculty) should work closely with healthcare providers to ensure the rapid flow of data for secondary use for research purposes, clearly under agreed mutual ethical/ consent frameworks.
- The Faculty should specifically develop a plan to increase its European research funding, evaluating best practice from other Universities.

2.2 Societal impact

GRADING: GOOD

With just 1.5 pages of text in the self-assessment report and a general lack of evidence base behind some of the statements/ target areas, the panel had difficulty in grading this section. The Unit might look at other Life Sciences Units who tackled this important aspect of academic output in an excellent and comprehensive manner (Department of Microbiology, FIMM).

The Unit outlined several admirable and relevant

target areas that included the production of new knowledge for the best treatment, prevention of illnesses, promoting public discussion in the field of health sciences, new and more effective treatments, commercialisation of research and of critical importance Professional education, but with the exception of education where the delivery was clear, specific details were lacking. Stakeholders were identified but these were seen as being predominantly confined to the Helsinki area. Wider national and international outreach particularly in flagship areas was lacking (or at least not described).

Some goals were reported (e.g. 82 % of researchers reported that their results on scientific projects had led to changes in diagnostic, therapeutic or rehabilitative practices in clinical work and 52 % of researchers stated that the changes had been implemented on a national level) but these were researcher not stakeholder driven.

At interview there was lack of appreciation/ awareness of the societal impact priorities of the Faculty and little evidence of academic ownership of this issue. The interview Unit participants gave many “bottom-up”

exemplars of good impact but there was no coherent agreement on which audiences needed to be engaged, how this should be done and, how evidence of benefit would be collated.

How impact was supported by professional and support staff with a focus on policy, alumni engagement, patient and public engagement and commercialisation engines was unclear.

Recommendations

- The Faculty, in liaison with other Life Sciences Units, agrees a priority list of common target areas and stakeholders for generating maximal societal impact.
- Over and above this, the Faculty will have unique targets and audiences (for example around practice changing clinical trials and guidelines, health policy, economic gain through IP/ Digital assets) that should also be defined.

- Personal and organisational ownership of impact priorities and their implementation is required. Documentation of good-excellent outcomes might shape future promotional criteria.

2.3 Research environment and Unit viability

GRADING: GOOD

The scale and significance of research within the Faculty speaks for itself. The self-assessment report provides an honest and accurate reflection of the current and likely future landscape. Within this the future viability of the Faculty is very clear and, by and large, the relevant challenges and actions seem to have been addressed.

Again, with the above caveats on the level of detail within the report and insight gleaned from the Unit interviews the following areas were highlighted as recommended areas for future focus – that in turn restricted our grading of this domain to Good.

Leadership, goal setting and implementation

The description of governance and management both across the Faculty and from Faculty to the Rector/ Vice Rector for research and other Life Science Units including

HiLIFE was absent/ unclear. Accepting recent years have seen periods of change, there was confusion across both the panel and the Unit interviewees as to where priorities were set, agreed upon and implemented. There are significant strengths across UH in natural sciences; modern medicine requires the infusion of physical-chemical, computation, engineering and social science expertise to maximise opportunities. Here the panel saw data and artificial intelligence (AI) skills as being key; greater collaboration and partnership fostering multidisciplinary research across all UH campuses is encouraged. On mathematics/ data and AI, an enhanced collaboration with Aalto University is possible.

Similarly, as noted in section 2.2, across the critical clinical/ healthcare partnerships, the leadership structure of the Faculty and in particular its research engine as it links to the HUS Helsinki University Hospital/ Academic Medical Centre Helsinki was unclear/ absent.

How the Unit supports effective leadership and particularly succession planning must also be clear for all concerned. Are there any leadership development courses at different levels?

Workforce, career development

This was seen as an important issue and was discussed at length at interview involving established academic staff and trainees. We noted from the self-assessment report a significant increase in academic staff from 501 to 627 during the review period. Some of this might in part be due to the re-organisations, but at a time when education activity was viewed as modest (compared to peer group Medical Faculties across Europe), the rationale behind the increase wasn't clear. Many times we heard about the Faculty size and scale, but "big" is not always "best" and in turns drives challenges around financial sustainability. Picking up on the points raised in section 2.2, in current financial climates, the

Faculty must be much clearer in which areas (on research grounds) it will invest, and importantly in which areas it will not. Without seeing staff breakdown across the research areas, the panel could not comment further, but a selectivity is encouraged in moving forwards. This approach is required not only across the UH Faculty but also with HUS/ AMCH.

The panel noted the fall in administrative staff from 319 to 214 during the evaluation period. This and the centralized approach to manage career development of professionalized staff is not unique to UH, but we accept brings challenges. Ensuring the focus of activity of this workforce changes to accommodate new academic priorities is the greatest challenge.

We fear for the next generation of clinical academics across UH. This critical part of the workforce is unique in being able to link laboratories to the bedside and is the backbone of the translational engine of any successful University-Hospital Academic Medical Centre. The UH MD PhD programme (10 / year) is one way that this cohort can be developed but we heard that supervision and mentorship was lacking with no onward career structure for these highly trained individuals, nor others entering the academic track from PhD programmes later in training. Accepting wider national funding issues, we recommend that the Faculty-Hospital leadership address this issue as a priority; these are tomorrow's leaders in healthcare research and innovation. One small issue that can be immediately rectified is the stipulation that all MD PhD's need three first author papers in order to progress – this simply drives poor quality publications.

Over and above clinical academics per se, career pathways for younger researchers was unclear, with some post-doctoral fellows in position for 20 years! We recommend establishing mentoring programs and follow up strategies. As for other units, post-doctoral researchers with

key technology/ underpinning infrastructure essential skill sets should be supported through new career structures. Team Science should be supported through appropriate HR platforms; not everyone will or should become independent PI's. As an exemplar the Medical Research Council (MRC) in the UK has outlined a career map (Interactive career framework) for researchers in training with a new grade of research technical specialist for PhD's.

In the absence of data, the panel recommends a focus on equality, diversity and inclusivity and this should be a core human resources and academic goal. There was a healthy focus on International mix/ recruitment across its staff, but gender balance less so. Positive action to achieve these goals particularly supporting female trainees through career breaks, and regular reporting of progress should be established as normal practice. The future workforce needs need to be defined.

Research infrastructure

The reorganization of the core facilities to 18 platforms under HiLIFE was seen as being successful. These facilities now include tissue preparation and histochemistry units, sample storage and biobanking facilities, genomics, metabolomics, proteomics, stem cell units, bioinformatics services, imaging services etc. The feedback during the interview with the Faculty members was that HiLIFE was working well in its oversight and prioritisation of core infrastructure and that this was clearly enabling high quality research across the Faculty.

Collaboration and Connections with 'other constellations'

This has been highlighted as a critical factor for future viability throughout our report.

With regard to HUS/AMCH, the panel heard about weekly executive led meetings across Faculty and Hospital teams but there was no agreed strategy (at least on paper) or mutual projection of research priorities and how these will be delivered. Importantly there appeared to be no connection with University priorities across Life Sciences.

For HiLIFE, the feedback was that HiLIFE was working well in its oversight and prioritisation of core infrastructure that was clearly enabling high quality research across the Faculty. The partnership with FIMM (Unit 23) was particularly strong and endorsed through our site visit; biobanking, population genomics, digital pathology, drug screening platforms, but this was in place before the formation of HiLIFE. However, there was lack of clarity of how priorities/ grand challenges from HiLIFE were delivered through the Faculty. Over and above infrastructure the added value of HiLIFE was not forthcoming. Accepting that it was still a new initiative, staff referred to HiLIFE as an "amorphous" structure. Clarity around its role in informing Faculty-University priorities, and conversely how the Faculty will deliver the numerous HiLIFE grand challenges is required. The panel members confusion on this issue was voiced by Faculty staff at panel interview.

The need/ opportunity for greater infusion of interdisciplinary expertise from other campuses across UH is highlighted above.

Societal and contextual factors

The Unit has identified future important trends and new innovative platforms, e.g. digital solutions of research and education in health care, new digital system to document patient records and outcome of treatments, big data and storage, bioinformatics, bio imaging, artificial intelligence, virtual reality for research, education and healthcare, and

personalized medicine. These are important approaches but are adopted in a somewhat ad hoc manner across the Faculty with no strategic oversight.

Recommendations

- Develop a functional governance structure across UH (including HiLIFE) & between the Faculty/UH and HUS and AMHC. Identify and define agreed leadership roles.
- Through this structure articulate jointly owned research priority areas, a strategy and operations plan. Increased selectivity is encouraged on research grounds.
- We recommend that the Faculty-Hospital leadership address career development of its clinical academics a priority, with a focus on equality, diversity and inclusivity.
- The need/ opportunity for greater infusion of interdisciplinary expertise from other campuses across UH.

Life Sciences Panel

FACULTY OF PHARMACY (LS UNIT 18)

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinised for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognised top discipline journals across the Unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a

high degree of international recognition and should also establish a visible scientific leadership role in the respective research area. Examples of markers of success are reflected in underlying peer-reviewed research grant income and leadership roles in international research consortia.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well-defined target groups and uses suitable formats and/or formats that have been tested by the Unit. Strategic oversight, management of activity and ownership by individual academics were additional factors that were considered. Excellence is achieved when the activities are realised and the output of the science flows,

for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice-changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the Unit, the design of decision-making and strategy processes, can be influenced directly by the Unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross-University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The Faculty of Pharmacy is very good in terms of scientific output, external funding, internationalisation and recruitment and is excellent in terms of valorisation and societal impact.

The goal of reaching the top 10 European centres for pharmaceutical research seems feasible provided that an action plan is enforced.

Strengths

- International ranking by subject
- Scientific output in terms of publications
- External competitive funding that increased by 72% in 5 years

- Multidisciplinary and international staff
- Excellent valorisation (3 spin-offs, 65 invention disclosures, 15 patents and patent applications)
- Awareness and actions to connect science and society and reach non-scientists
- Expertise for policy makers and patients

Development areas

- Actions taken to increase funding and personnel
- Actions taken to publish 1 or 2 annual papers in very high impact factor journals

Recommendations

- Take actions to reach the main future goal (Top 10 European position)
- Plan the recruitment of academic positions (future of PROFI tenure track positions, replacement of coming retirements)
- Clarify management and decision making between the DRP and the Faculty of Pharmacy

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The research at the Faculty of Pharmacy is led within the Drug Research Program (DRP). The Unit (Faculty of Pharmacy/DRP) leads an internationally recognised research as demonstrated by the publications in high impact factor (IF) journals of the field(s) and the external competitive funding obtained.

Strengths

- International ranking in the subject pharmacy (24 to 101-150)
- Progression of research output during the last five years
- Publications cited slightly above average in high IF journals in the field of research

- Multidisciplinary research on different aspects of drug development leading to publications and PhD theses in various fields related to pharmacy
- Young promising PIs (6 granted PROFI tenure track positions and second term assistant professors)

Development areas

- Lack of annual publications in general very high IF journals
- The organisation between the Faculty of Pharmacy and DRP is not clear. How are decisions made on recruitment, structures or budget?

GRADING: VERY GOOD

Research goals

The research is led within the Drug Research Program (DRP).

The Faculty of Pharmacy and the DRP aspire to be one of the top 10 European centres for pharmaceutical research and education by 2030 and provide performance indicators. This seems ambitious in relation to the current ranking by subject (Shanghai ranking in pharmacy and pharmaceutical sciences 101-150 in 2017, 24 in 2018; QS ranking pharmacy and pharmacology 51-100 in 2019). The indicators suggested, e.g., 5 EU funded projects by 2023 (4 ERC and 2 IMI during the previous evaluation), 1 to 2 articles in Nature/Science quality journals (0 in 2018), 250 scientists (188 in 2017) are also ambitious, but supported by the progression of the research output during the last five years.

The 3 obtained and 6 applied tenure-track positions obtained through the strategic profiling of Finnish universities (PROFI) and 3 second term assistant professors should help to support this goal. If action plans are enforced, reaching this goal should be feasible.

Research results

The research is multidisciplinary and focused on drug research. Two major themes are mentioned in the SAR “drug discovery and action” and “drug delivery and targeting”, each subdivided into 3 areas/groups. The current website presents 9 “DRP research units” (although 10 according to Unit self-assessment report) and 35 “research groups”. Most of these groups performed very well in their respective niche.

The results demonstrate that most teams participated in international projects, address unmet medical needs and have a potential medical or societal impact.

Analysis on research outputs

The publication output increased steadily over the year. It is slightly above the average MNCS of 1.10 in pharmacology and pharmaceutical science, where most of the papers are categorised in 2016. The annual output is approximately 1.25 per scientist. The output is not evenly distributed between the academics. Articles are published in the best journals of the fields, some with IF factors >10, but no regular publications in high IF general journals are reported. Interestingly, publications are split between pharmacy and pharmacology (31%), chemistry (22%), biochemistry/molecular and cellular biology/medicine (19%), material science and bioengineering (11%), with MNCS varying between 0.67 in medicinal chemistry to above 3 in biomaterials and biomedical engineering.

With respect to the quality of the scientific output where performance indicators MNJS and MNCS come out relatively low compared to other Units, the panel

appreciates that a significant proportion of the papers in pharmacy are from translational research. While discovery of biological concepts and potential drug targets as well as the final clinical trials may be reported in higher impact journals the interim development phase does not yield the same rewards publicationwise. The panel therefore notes other relevant outputs for translational research and that the Unit reports 65 invention disclosures delivered, 15 patents and patent applications filed and 3 spin-off companies created over the assessment period.

The Faculty of Pharmacy awards approximately 16 PhDs per year, which are also spread over different disciplines, mainly biopharmacy (24%), pharmaceutical chemistry (20%) and pharmaceutical technology (17%). The number of PhD students per PI is rather high (1.63).

The research output confirms that the DRP addresses most of the topics related to drug discovery and development and that the average publication output is very good.

International benchmark(s)

The present benchmark is the Department of Pharmacy from the University of Copenhagen, which is very similar in size and output to the Faculty of Pharmacy at UH. To reach the goal (top 10 European centre in pharmaceutical research in 2030), the future benchmark will be the School of Pharmacy at the University of California San Francisco (UCSF), which is highly ranked and internationally recognised.

It is not clear how this benchmark will benefit the Unit.

2.2 Societal impact

The Unit has clearly identified audiences and stakeholders and has developed activities to reach them.

It is very active in research valorisation.

Strengths

- Excellent command of societal impact with many highly relevant examples
- 3 active spin-offs, 65 invention disclosures and 15 patents and patent applications
- Actions for various stakeholders: policy makers, patients, schools among others
- Strong awareness of the need to connect science and societal activities

Development areas

- Except for economic growth, it is difficult to evaluate the impact and outcomes.
- The need for greater co-ordination and messaging at DRP/ Faculty boards. There is a Vice Dean for impact who sits on the Faculty board but not on the DRP board.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

Like most faculties and research institutes of pharmacy, the UH Faculty of Pharmacy (and DRP) has identified the main potential targets and is acting appropriately to reach these targets. The targets for societal impact “reach beyond mere pharmaceutical education” and aim to reach stakeholders and policy makers.

The faculty scientists participate in the reconciliation of society with science by participating in science communications for layman e.g., media or TEDx.

The Faculty contributes to the economic growth by the creation of 3 spin-offs and the production of 65 invention disclosures and 15 patents and patent applications (highest normalised number for UH).

The Faculty provides information on drugs-based research to policy makers and relevant Finnish ministries. In particular, the Clinical Pharmacy Unit contributed to the action plan for rational pharmacotherapy. The Faculty also contributes by its implementation research to develop safe medication practices for patients.

Activities and outcomes

The Faculty of Pharmacy acknowledges the need to disseminate and communicate research output in media e.g., online videos or interviews.

Several academics hold scientific expert positions for research programme evaluation panels and for funding agencies, both at the national and international levels. They also serve as editors or board members of peer-reviewed journals. One academic was awarded the Academy of Finland award for societal impact in 2016. The awards are mainly national.

The Faculty members contribute to addressing regulatory issues. They also play a role in promoting green pharmacy.

The Faculty of Pharmacy led to the creation of 3 spin-offs that have attracted capital and created jobs. It participates in “slush science competition” to attract investors and raise awareness among students for science-based jobs. It has submitted 65 invention disclosures and 15 patents and patent applications in 5 years.

These activities indicate that the Faculty has an excellent command of the societal impact for different stakeholders and is active in research valorisation.

2.3 Research environment and Unit viability

The staff Unit is multidisciplinary and international. Significant and increasing external funding is being obtained.

The Unit must clarify the management and strategic planning between the DRP and the Faculty. It must plan the future, in particular in terms of academic recruitment.

Strengths

- the establishment of the DRP in 2015
- internationalisation of the staff
- multidisciplinary of the staff
- scientific output of the PhD students
- ambitious but realistic vision of the future of the DRP

Development areas

- leadership and goal setting in research split between the Faculty of Pharmacy and the DRP
- no apparent strategic planning of the recruitment for academic positions (future of PROFI tenure-track positions, retirements) and of the actions to increase the funding sources or collaborations

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The Dean of the Faculty of Pharmacy manages Faculty operations and is responsible for Faculty duties. The DRP has been responsible for the research activities of the Faculty since 2015. The interactions and decision making in terms of recruitment, budget allocations or strategy and implementation plan is not clear. Who is responsible for the

research: the Dean, the Vice Dean, or the PI in charge of the DRP? Why is the Chair of the board/Director of the DRP not part of the Faculty council and how does the tasks of the Director differ from those of the Vice Dean of Research?

The setting strategy and organisation in divisions (Faculty) and research Units (DRP) is not clear. There are now 10 research Units (9 presented on the current website) and 3 divisions, but is the operational organisation and the balance right between bottom-up and mandate-down decisions from the Faculty board?

Although the management practices and roles of different actors is not clear to the evaluation panel, the different participants seem satisfied by the current practices; the DRP seems to form a coherent and dynamic group with an ambitious but realistic vision for drug research in UH.

The support from UH for grant writing and leadership management training seems useful and efficient.

Human resources, careers and recruitment

The personnel staff is different for the Unit (195 work contracts) and the Faculty (188 FTE). The personnel distribution is approximately 7% professors, 17% university lecturers and researchers, 20% post-doctoral fellows, 40% PhD students and 15% other staff.

Nineteen professors, including 4 second-term assistant professors are listed in Annex 2, which does not include the 2 recently granted PROFI tenure-track positions. Seven professors will retire in the near future. The future of the PROFI positions is not mentioned in the SAR.

This staff is multidisciplinary in terms of background

and research topics.

The personnel is international (39% on average as compared to 12% at UH). It varies between 52% for university lecturers and researchers to 40% for post-docs and PhD students.

The young researchers are positive about career support.

The multidisciplinary and the internationalisation of the staff is excellent. Strategic planning of the recruitments and the future of PROFI tenure track positions is needed.

Researcher education

The Faculty is host Unit for the doctoral programme in drug research and hosts PhD students from other doctoral programmes. Approximately 16 PhD students graduate each year.

Seventy percent of the scientific output is based on the research done by PhD students. Three to 4 peer-reviewed original articles are requested for the PhD thesis, which takes on average between 3 to 5 years. This constraint leads to an increase in the number of publications but not necessarily in the quality and IF of these publications. The training environment is very good. A mentorship programme is in operation.

Research infrastructure

As the Faculty is multidisciplinary, each subgroup listed their infrastructure. Basic equipment is available.

The representatives of the Unit are satisfied with the access to the infrastructure and platforms of HiLIFE.

Funding

Although UH funding to the Faculty decreased by 14%, external funding has increased by 72% from 2012 to 2017. For a total budget of ca 17 M€, 56% of the total Faculty funding was based on external competitive grants from various sources. This ratio of external competitive funding is rather high compared to the UH average. For an academic staff of 48 PIs, the funding is excellent. 4 ERCs and 2 IMIs (innovative medicine initiatives) from the EU and 69 projects from the Academy of Finland were obtained.

Future external funding is expected to come from diverse sources, mainly the EU, the Academy of Finland and Business Finland. With the ongoing tenure-track positions and scientific recognition of the professors, maintaining 4 ERC grants and increasing the research funding from industrial and international research foundations seems feasible. However, no action plan is provided on how to maintain and increase (see goals) this funding and consequently the staff.

Collaborations

The Faculty is a very active research Unit with many internal UH (in particular with HiLIFE), Finnish and international collaborations. Good connections are reported with the Faculties of Science (e.g., shared 50:50 appointment in mass spectrometry) and medicine (biomedicine), HiLIFE, HiLIFE platforms and hospital pharmacies. Established collaborations are in place with other Finish universities. The Unit participates in several EU-funded consortia and the ULLA (European university consortium for pharmaceutical sciences) network.

The SAR mentions “international collaborations will be developed further within the DRP” and “large multidisciplinary research projects” are to be developed. However, how this will be done is not specified and should be further detailed.

Connections with ‘other constellations’

HiLIFE established in 2017 aims to support high quality life science research and increase cooperation among the

research groups. Strong connections between the DRP and HiLIFE have been developed with structural measures e.g., 3 PI of DRP as HiLIFE fellows and beneficial access to the platforms. The Unit thus appears to make very good use of HiLIFE.

Societal and contextual factors

The Faculty significantly improved its scientific output during the last 5 years and has made some excellent recruitments, e.g. outstanding international tenure-track professors.

The SAR mentions that the building was renovated and that state of the art facilities are available.

It also mentions that the Faculty during its 15 years of existence has formed a “stimulating and cooperative research environment”. This was confirmed during the interview. The Panel agrees with the Unit SAR that the establishment of the DRP “has clearly enhanced collaborations and improved the overall quality of our pharmaceutical research”.

Life Sciences Panel

FACULTY OF VETERINARY MEDICINE (LS UNIT 19)

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinised for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the number of papers published overall together with those published in internationally recognised top discipline journals across the Unit when compared to peer groups. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a

high degree of international recognition and should also establish a visible scientific leadership role in the respective research area. Examples of markers of success are reflected in underlying peer-reviewed research grant income and leadership roles in international research consortia.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside of health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the Unit. Strategic oversight, the management of activity and ownership by individual academics were additional factors that were considered. Excellence is achieved when the activities are realised and the output of the science flows,

for example, into high-ranking national and international boards, government policy, new patents/start-ups, or are decisive in official decisions and practice-changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the Unit, the design of decision-making and strategy processes, can be influenced directly by the Unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross-University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The overall research goal for the Faculty is to “ensure sustainability and improvement of the health and welfare of animals and humans”. The Faculty has decided to choose the “One health” approach for achieving this research goal, for which the rationale is well explained and it is understood

that the decision is taken after careful analysis of the Faculty’s past and current scientific strengths. The Faculty in general carries out research that is of a very high quality, and in some areas it is world class. The Faculty’s goal to focus on a long-term research commitment to food safety,

translational animal models, and animal health and welfare, is well justified given past and current achievements.

The Faculty clearly articulates its ambition to influence the health of humans and animals in society in its overall “One Health” strategy in the areas of safe food,

control of zoonoses and antimicrobial resistance, animal health and welfare and translational medicine. The Faculty has well thought through activities to continue and enhance its societal impact and is very explicit in identifying key stakeholders.

The Faculty has a long-term strategic vision to support the research environment by alignment along one common theme, the “One health” approach, that is widely shared at the Faculty. This, together with the ongoing recruitment of several level 2-4 positions in the field and access to a very adequate infrastructure makes the Faculty excellently positioned for the future.

Strengths

- Very high scientific quality, some world class groups.
- Excellent societal impact with strong roles in several policymaking processes.
- Extraordinary visionary and successful strategic development of the Faculty.

Development areas

- Increased governmental core funding
- Increased number of international research staff
- Improved balance in numbers between the staff categories

Recommendations

- Make sure that the momentum in implementing the very vital and well-funded One health strategy is not lost.
- Exploit the translational medicine path further and use the biobank for this task.
- Continue and enhance the unique and fruitful interactions between animal health and welfare.
- Support the equine and small animal medicine research towards a larger coherence for the sake of effectiveness.
- Consider further strengthening the stakeholder dialogues/interactions by establishing common structures at the Faculty level for this purpose.
- Sharpen the strategy for increasing international funding and develop a plan for increasing the number of international staff at all levels.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The overall research goal for the Faculty is to “ensure sustainability and improvement of the health and welfare of animals and humans”. The Faculty has decided to choose the “One health” approach for achieving this research goal, for which the rationale is well explained and it is understood that the decision is taken after careful analysis of the

Faculty’s past and current scientific strengths. The Faculty in general carries out research that is of a very high quality, and in some areas it is world class. The Faculty’s goal to focus on a long-term research commitment to food safety, translational animal models, and animal health and welfare, is well justified given past and current achievements.

Strengths

- A very thought through and clear vision and direction.
- Very high quality of several research outputs, some groups are world class.
- Generally the research is of outmost relevance for society.

Development areas

- The slight decline in quality/impact of scientific publications over the assessment period and low rate of open access publishing
- Somewhat fragmented research lines in equine and companion animals.

GRADING: VERY GOOD

Research goals

The overall research goal for the Faculty is to “ensure sustainability and improvement of the health and welfare of animals and humans”. The Faculty has therefore chosen the One health approach as a common theme for its research. This is a new initiative that builds on past strengths within the Faculty: food safety, the interaction between animal health and welfare and translational animal disease models including biobanking. The Faculty’s generic research goals are an increased proportion of open access publishing (currently among the best in the UH) and further development of international research cooperation.

These two generic goals are laudable and are a given for any modern university. However, it is somewhat strange that currently about half of the publications are open access. The rationale for choosing the One health approach is well explained and it is understood that it is taken after a careful analysis of the Faculty’s past and current scientific strengths. It is a bold – and so far very successful – decision by the Faculty to gather around a theme like this. Future gains will likely be generated by this conceptual profiling and from synergies within the Faculty.

Research results

The most important research results chosen are listed in

the following and their scientific novelty, societal relevance and impact or use and applicability is commented on and assessed.

Within the Department of Production Animal Medicine there are highly active research groups working on welfare, including animal health. This approach is commendable as too often “animal welfare” only comprises animal behaviour, missing out the importance of health in the concept of welfare. The comprehensiveness is reflected in the fact that a multidisciplinary approach is taken. Other strengths at the Department are that several species are studied and that there is an extensive cooperation with other groups within the Faculty. The several clinical/practical achievements regarding improvement of animal welfare and health are presented, which are all judged as highly relevant in the field. The research results from this Department also influence – in a very successful way – policies for animal welfare in Finland and the EU. The scientific novelty in the Department is that good quality clinical, physiological and behavioural research are combined and thus generate results of high relevance for a range of stakeholders.

The Department of Veterinary Biosciences complements the three other departments at the Faculty by providing basic science. Microbiology has been, and is, a strong area with high profile publications on metagenomic analyses of the human gut microbiome and on Zika virus infection linked to foetal brain abnormalities. In the field of genetics and physiology, the most significant findings are in neuroscience-linked research, like the identification of a gene defect causing epilepsy in dogs and the discovery of a mechanism important for “critical period plasticity” in the brain. The above-mentioned results are published in high impact journals. Despite this indicated high scientific quality, the significance and relevance of these findings are hard to

judge if one is not an expert in this particular field.

The Department of Equine and Small Animal Medicine is like the Department of Production Animal Medicine strongly committed to improving animal health and welfare. The Department finds the well-equipped animal hospital to be an excellent research environment. Some successful research lines delivering important results are pain detection and alleviation and novel treatments for diseases in dogs thanks to etiological discoveries. One very important result is the groundbreaking evidence of the benefit of shorter antibiotic treatments in some infections in dogs. Perhaps the most interesting results – or potential for interesting results – are those relating to translational medicine generated by studying diseases that occur spontaneously in companion animals. The significance and relevance of the results of the Department is obvious and is to some extent similar to that of the Department of Production Animal Medicine.

The Department of Food Hygiene and Environmental Health focuses on food and environmental risks for human health. Examples of highly successful research paths are the unravelling of several aspects of *Clostridium botulinum* toxin production, and of genome epidemiology on foodborne pathogens that led to the identification of novel virulence mechanism, host-pathogen interaction and pathogenic potential for several bacteria. A third, novel area, is the multi-disciplinary research on food control where the impact and efficacy of food control is evaluated. The Department also presents very systematically a set of other research results most of them of high originality and all of good quality. Needless to say, all the research results listed in the SAR from this Department are of the highest societal relevance and the overall performance is world class.

Analysis on research outputs

The publication outputs are mainly in the fields of Veterinary Science, Microbiology and Food Science and Technology, with the highest impact/quality indicator score in the latter category. Overall, the field-adjusted impact traits are higher than the world average during the assessment period (notably, the few papers in cell biology and gastroenterology and hepatology are published in very high impact journals). Interestingly, the papers including international collaboration are those that achieve the highest scores. The Faculty publishes about 300 reports per year in the assessment period according to the SAR (all JUFO classifications) and 150 by the stricter criteria in the CWTS report. There are fluctuations over the years, but no obvious trend regarding increase/decrease in numbers. Two quality/impact traits, MNCS and PP10%, do decrease rather consistently during the period considered by the Faculty. As always at academic institutions, the number of PhD degrees and licentiate degrees varies between years. However, the numbers are on average close to 20 and 70 respectively per year over the assessment period with no

obvious downward or upward trend. A proxy for the quality of the research at the Faculty are the prestigious grants awarded to the Faculty: one Academy of Finland professorship, three ERC grants and one Academy of Finland Centre of Excellence.

The Faculty's goal to focus on a long-term research commitment on food safety, translational animal models, and animal health and welfare, is well justified given past and current achievements. Similarly, it is a wise ambition to strengthen the existing fruitful co-operation with the Faculty's key international partners, as this cooperation seems to generate the most high-quality papers. The amount of postgraduate training and the number of degrees is well in line with the Faculty's set goal. The Faculty's ambition to be "one of the strongest international players in One Health-related research by the year 2025" is achievable given the past and current achievements and the forward-aiming strategy. There is, however, a word of caution regarding the slight decline in the bibliometric traits for quality/impact of the scientific publications. This was explained at the interview as being due to "retirement";

senior expertise was being lost and younger researchers needed to build up their fields, which is now happening.

International benchmark(s)

Ghent University is the primary benchmark in Europe followed by Wageningen University (life science) and the University of Zurich (medicine). The Faculty also wishes to be compared with the Utrecht University and Leibniz University Hannover. Globally, the Faculty regards the University of California, Davis (UC Davis) as being the strongest One health university.

These benchmarks are good choices, and Ghent, Utrecht and UC Davis are all profiling themselves as strong in One health. Ghent University is ranked top in the Shanghai ranking, both for veterinary medicine and life science. However, both Utrecht University and UC Davis have a peer reputation of being successful in running research and education on the theme of One health, and might thus be the best benchmark for the Faculty. The Unit should clarify/set clear goals for their benchmarking with these Universities.

2.2 Societal impact

The Faculty clearly articulates its ambition to influence the health of humans and animals in the society in its overall One Health strategy in the areas of safe food, control of zoonoses and antimicrobial resistance, animal health and welfare and translational medicine.

Strengths

- Very explicit and well described identification of stakeholders.
- Well thought through activities to continue and enhance societal impact

- Excellent track record in providing scientific support to legislators and authorities.
- Very successful cooperation with industrial partners, CSOs and NGOs

Development areas

- Animal health and welfare as an area of societal impact is not particularly emphasised
- Societal justification for translational medicine is poorly articulated

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

For the four expressed target areas, 1) safe food, 2) control of zoonoses and antimicrobial resistance, 3) animal health and welfare and 4) translational medicine, there is a very obvious audience (legislators, authorities, industry and clinically active veterinarians). For the fourth area, the audience is reached indirectly via further research, but it has considerable potential for improving human health and well-being. The goals for each of the areas are well expressed and the corresponding research questions are thereby understood (i.e. they are at a higher degree of resolution and are expressed as questions to reach these goals). Thus, the overall goal for the Faculty is to improve the health and welfare of humans and animals. To reach this goal, the Faculty aims to contribute with scientific advice for (i) safe food through high integrity of the food production systems and official control; (ii) control of zoonotic and transmissible diseases and antimicrobial resistance; (iii) animal health and welfare; and (iv) translation of disease information between animal and human populations.

The Faculty's rationale for the selection of the choices

The Faculty states that there are expectations from society that Finnish veterinarians should contribute strongly to food

safety and environmental health, since they traditionally have done so. This tradition is acknowledged and the Faculty lists several justifications to continue and develop its contribution to the different areas of food safety. The ones judged to be the most contemporary are the emerging risks from increasing antimicrobial resistance, the growing vulnerable (elderly) populations and increasing international mobility of humans and foods. The Faculty also states that the increasing number of companion animals calls for more knowledge about how human well-being can be enhanced through mental and anti-allergic effects (by contact with companion animals) and at the same time warning about the risk of transmission of antimicrobial resistance and zoonotic diseases. Finally, the Faculty justifies its choices by the fact that domestic animals and humans have shared the same environment for a long time and have experienced a convergent social evolution, resulting in highly uniform genomes. This has a very exciting research potential for modern translational medicine (which the Faculty has successfully exploited).

The description for choosing animal health and welfare as an area of societal impact is vague and the justification for translational medicine is very indirect. The latter seems more to be written for the scientific community. However, the choices are very relevant and there is no doubt that the Faculty has the capacity to contribute in these areas. Thus, the writing of the rationale for the choices could be improved, as the justification for the choices is obvious when considering the Faculty's research capacity, and the public and political agendas in Finland and elsewhere.

Activities and outcomes

The Faculty describes a range of activities for executing

its societal impact: the Faculty's researchers are members of national and EU-level working groups, expert committees and panels, and cooperate with public-private organisations. The close cooperation with the food, feed and pharmaceutical industry is shown by substantial industrial funding to the Faculty. In addition to these tight cooperation activities, the Faculty disseminates and communicates its competence via conventional outreach activities, like lectures for stakeholders and the general public as well as publishing in vocational and popular science forums. It is worthwhile to note that the Faculty highlights its contribution to the continuing education of veterinary clinicians through engagement in the European Board of Veterinary Specialisation (EBVS) colleges.

There are clear indications of the Faculty's societal impacts. In the first place, just to be present in the governmental and inter-governmental bodies as an expert is an achievement. Then, to be able to influence the food safety and animal welfare legalisation and policies is evidence of very successful societal impact. One may also count the patents and created spin-off companies as evidence for successful cooperation with the industrial sectors of society. Also, the fact that three professorships at the Faculty are funded by stakeholders is an acknowledgement of the appreciation of the Faculty in society. Also, the Finnish "Veterinarian of the Year" awards given repeatedly to Faculty members over the years also expresses a similar appreciation. One possible way to further enhance this excellence is to create structures at the Faculty level to support colleagues in their outreach activities

These outcomes match very well the Faculty's goals for its societal impact.

2.3 Research environment and Unit viability

The Faculty has a long-term strategic vision to support the research environment by alignment along one common theme, the One health approach, which is widely shared at the Faculty. This, together with the ongoing recruitment of several level 2-4 positions in the field and the access to very adequate infrastructures makes the Faculty excellently positioned for the future.

Strengths

- The Faculty's researchers are linked together through one common vision/approach (One health)
- The Faculty is well positioned thanks to the PROFI grant and the new incoming positions.
- The Faculty is extremely well connected to the research environment in Finland and to substantial international collaboration.
- Substantial and very diverse external funding.
- Good cross-talk/cooperation between different groups in the Faculty.
- Adequate infrastructure: labs, a teaching hospital, a research farm

Development areas

- Reduced governmental funding and number of professorships (-25%)
- Few positions for post docs
- Relatively low proportion of international employees, especially on level 1

GRADING: EXCELLENT

Leadership, goal setting and follow-up

The SAR clearly describes the formal path for goal setting: a research committee of 10 professors representing the different areas within the Faculty makes the initial goal setting, then it is taken to the Faculty board for scrutiny and finally the Faculty Council makes the final decision. In addition, all members of the Faculty are informed and involved at PI meetings, Faculty meetings or at research forums. These formal and informal procedures seem sound and adequate.

The current goal setting is based on the previous assessment of research and doctoral training. From this assessment it became evident that a more focused research approach at the Faculty level would be needed. Hence, the One health approach was applied. This is strategically a very wise response to the previous assessment. In the SAR, it is stated that the Faculty is preparing meetings to discuss the One health approach with all PIs and researchers with the obvious ambition to get "everyone on board" – this is good leadership.

The Faculty has established several means to support its researchers: PIs are provided tools to support their research leadership, such as grant writing research innovation, meetings with donors, information about international calls for funding, etc. Also, other research units at the UH visit PI meetings seeking collaborations. Since 2013 the Faculty has arranged a "Research Forum" for all researchers at the Faculty and there is a particular chance for younger researchers to interact. Taken together, all these activities reflect a strong ambition from the Faculty

management to support their most valuable resource – the staff. However, there is not yet evidence of the impact of these activities. Having said that, linking the whole Faculty with one theme during a period of financial hardship reflects a good collegial atmosphere at the Faculty.

Human resources, careers and recruitment

The number of doctoral students and associate professors (level 3 staff) has been stable over the years, whereas postdocs and full professors has been substantially reduced. The reduction in the number of post docs is attributable to the termination of the Centre of Excellence grant and the reduced numbers of professors owing to a cut of 5M€ in governmental funding. Thus, the current staff structure is far from the ideal pyramidal structure. The post docs constitute just 5% of the Faculty's staff; this provides a very narrow recruitment basis for higher positions – which has also been identified as a weakness by the Faculty itself. However, the Faculty foresees that this unfavourable situation will improve thanks to the large profiling grant it has just received. Such an improvement seems realistic.

The Faculty reports on the loss of international staff recruited as professors or associate professors a few years after their appointment. The reasons mentioned are distant location in the north, harsh climate, challenging local language and poor employment possibilities for spouse/family. The only factor that the Faculty can influence is the employment possibilities for the spouse – which in turn is a common issue for international recruitments around the world. Generally, the proportion of international research

and teaching staff is relatively low (16%), despite the fact that positions are open internationally. The proportion of international staff is surprisingly low among the doctoral students (17%). The Faculty should put effort into a plan to recruit more international staff, especially doctoral students.

The Faculty has the means to support the career development for its research staff: some chance to increase salaries; regular personal development discussions with follow-up; opportunities to attend courses; and meetings relevant for personal development.

Researcher education

The Faculty issues two doctoral degrees, DVM/PhD and PhD, and has 16 degrees per year as a target. The majority of these degrees are reached by two paths: the doctoral programme in Clinical Veterinary Medicine and another one in Food Chain and Health.

Both programmes provide doctoral students with grants to attend scientific conferences and international seminars, which is an important step in integration into the research community.

Another type of research training is that provided in the residency programmes for becoming a European Diplomate (Specialist) in a clinical specialty. It is not clear from the SAR how many residents there are at the Faculty.

The positions for doctoral training are mainly opened as international calls. Some positions originate from successful grant applications by dynamic research groups. In these cases, it is understood that the research topic is predefined. Other positions are provided by the UH research schools (see the “paths” mentioned above). It is quite likely that the research topic is less defined, but of course it has to be in the domain of the school.

The above described structure of research education

is similar to what one finds in other Northern European countries. The structuring of the education into the research school is a resource efficient way to run the education and the number of courses provided by the schools is commendable.

Research infrastructure

The most important research facility for the Faculty is the Veterinary Teaching Hospital (with different facilities for companion animals, horses and production animals). There is also the Viikki Research Farm including a dairy research herd and a central clinical laboratory. The core infrastructure also comprises a Laboratory Animal Centre, a Histotechnology and Laboratory Animal Pathology (HiLAPS) service, a Comprehensive Model Organisms Platform (CoMO), and the Helsinki In Vivo Animal Imaging Platform (HAIP) and the Flow Cytometry Unit. Notably, the Faculty partly hosts the largest canine biobank in the world. Also, the SAR mentioned the state-of-the art equipment for most aspects of food safety and food quality research. The hosting, maintenance and renewal of the infrastructure is taken care of by a set of bodies within the Faculty and the UH as well as through external research/structure grants.

The Faculty seems, rightly, satisfied with the infrastructure available. It is judged that the Faculty has an adequate research infrastructure to fully implement its One health strategy and to continue carrying out high quality research.

Funding

With reference to the research goals set within the One health approach, the majority of grants has been received in the areas of food safety and control and translational medicine, and to a lesser extent in the emerging animal health and welfare area. The external funding includes

several very prestigious grants: 2 professorships (Academy of Finland and FIDiPro), 3 ERC grants and 3 Centre of Excellence grants as well as a large profiling grant (for the One health approach) from the Academy of Finland. In addition, researchers at the Faculty regularly receive grants based on competition from several national donors as well as from different kinds of EU funding. The Faculty’s “fundamental” research is funded by the Academy of Finland and the EU, whereas clinical or applied research is to a large extent funded by other bodies including private companies. The fear of additional cuts in the governmental budget has driven the Faculty to make efforts to generate more funding from the private sector and international sources like the EU. Hence, support from the grant coaching office at the UH is widely used by the Faculty’s PIs. Even so, the international funding has not increased over the evaluation period, which is why the Faculty’s management is advised to sharpen the strategy for increasing international funding.

Overall, the external funding to the research at the Faculty is almost 50%. Given that this is an average of the Faculty across Departments, this share is substantial. The allocation of the funding sources to fundamental, applied and clinical research is commonly seen at vet or animal science Faculties. The risk diversification process of approaching several and different donors is wise and the active coaching of developing grant applications is further encouraged. One way to further nourish this culture of actively search for funding is to distribute a share of the governmental core funding to the Departments based on achieved external grants, publications and doctoral degrees.

Collaboration

Within the UH, the Faculty cooperates with 4 other faculties in the Helsinki One Health (HOH) initiative, and groups working

in the wet laboratory field use several core facilities such as the Institute for Molecular Medicine Finland (FIMM) and the Institute of Biotechnology. This seems rational and justifiable.

At the national level, there is a particularly strong connection with the Finnish Food Safety Authority with several joint projects and positions. Other important governmentally funded research partners with which the Faculty has vital collaborations are the National Institute for Health and Welfare Finland (e.g. zoonoses), the Natural Resources Institute Finland (co-located), the hospital district of Helsinki (the human side of HOH), and the Finnish Medicines Agency Fimea (statistics on the use of animal medicines). Overall, the Faculty seems to be extremely well connected to, and is an appreciated partner by, other governmental research organisations. The links to the private sector are also strong: for instance, there is cooperation with Orion Pharmaceuticals Ltd on research and development of veterinary drugs; VetCare is another cooperation company; Evidensia Oy share a joint diagnosis register with the UH; and Animal Health ETT runs health records for production animals in Finland and is committed to participating in the One health project.

The international collaboration is substantial: the Faculty presents a list of some 90 universities/research

institutes where there is collaboration, the vast majority in Europe, a dozen in North America and two in low/middle income countries. This impressive list may reflect the Faculty's attractiveness as a research partner as well as its commitment to seeking international cooperation. Both these aspects are very positive and required in order to create a good research environment. In addition to this, the SAR emphasised the importance of the European veterinary specialisation (EBVS) activities as a means to network with colleagues in Europe and build collaborations.

The Faculty's plans to develop collaboration on the national level comprise the universities of Turku and Oulu and the Arctic Council. These plans are well justified in the SAR and include extended collaboration with the Finnish Food Authority EVIRA. The planned activities relate to the One health activities at the Faculty. The Faculty aims to strengthen International and EU collaboration (e.g. EBVS, European Food Safety Authority EFSA, Horizon 2020, and NOVA) in general terms with the specific aim of increasing funding for research. This is a laudable direction taken by the Faculty.

Connections with 'other constellations'

At the UH, the Faculty participate in HiLIFE activities via research fellows and by sharing infrastructure. The Faculty

is also considering involvement with the HELSUS activities. Most significant though, the Faculty is heading the One health activities at UH in which the Faculties of Medicine, Agriculture and Forestry, Pharmacy and Social Sciences participate. These connections are all regarded as very adequate, rational and admirable. A word of caution though is to be aware of the risk of high transaction costs and complex administration.

The main strengths are proven academic leadership; the provision of options for good multidisciplinary research and scientific synergies, and the effective use of infrastructure.

Societal and contextual factors

Obviously, the governmental cut in funding has hit the Faculty hard; recruitments have been put on hold and the number of full professorships has been reduced by 25%. The large profiling grant for the Faculty and an ongoing individual ERC grant, however, are promising for future development.

The Faculty foresees a positive development based on career advancement for younger tenure-track researchers in food safety, translational medicine and animal health and welfare. This foresight is very realistic.

Life Sciences Panel

FINNISH MUSEUM OF NATURAL HISTORY LUOMUS (LS UNIT 20)

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The Finnish Museum of Natural History LUOMUS (hereafter Luomus) is an effective 'museum unit' with excellent societal impact and presence within the museum/ botanical gardens

and through contributions by staff to society, quality research facilities and innovation-oriented staff producing valuable research.

The scientific quality of the Unit is very good. One major example of their key achievements is the establishment of Finnish Biodiversity Information Facility,

FinBIF. Likewise, research on the effects of climate change on bird populations has generated influential work. These are examples of a movement of the Unit distinctly away from national work towards internationally recognised research. The challenge will be to achieve this across all specialist fields. Currently, too many publications are at JUFO level 1. Bringing more publications up to higher JUFO levels would further strengthen the Unit. Considerable investment in this direction has already been made.

The societal impact of the Unit is excellent. Luomus is a national authority in biodiversity issues. An impressive 250,000 people visit the Natural History Museum and the two Botanic Gardens per annum. Key research findings are communicated creatively through displays within the museum. FinBIF is attracting a lot of interest and societal buy-in. Expert contribution to panels is extensive and communication of research findings through popular science articles and news outlets is frequent. There is a risk that financial concerns will force Luomus to prioritise its business role over its contributions to society. The Unit's ability to maintaining and expand its societal and institutional footprint will in part depend on the level of UH support.

The management of the Unit is highly professional, strategic and forward looking, with the result that the Unit has very good viability. There is a strong perception, however, that University of Helsinki (UH) senior management does not recognise the Unit as a valuable research environment; the associated perceived top-down control and lack of support is holding the Unit back. Despite this, the Unit maintains a good social fabric, positive outlook and a clear sense of purpose.

We concur with the Unit that its contributions deserve more recognition. In terms of societal impact of research, it should be viewed as one of the University's flagship units. A first -and most critical - step, is to build mutual respect between UH and the Unit, to foster understanding of respective goals and constraints. The Unit has unique challenges and requirements, and as it is in many respects the public face of the University and its research achievements, greater recognition will benefit both parties. We also recommend that the Unit's special status be taken into account with regard to rent (to UH), since the rent requirements place an exceptional burden on this facility.

Strengths

- Unique biological research collections that are increasingly made accessible for research through digitalisation.
- Collection-based research and long-term monitoring data sets, notably FinBIF.
- Outstanding facilities for and the conducting of influential research-based education.
- Critical biodiversity expertise provision at national and international level.

Development areas

- Relationship with UH management.
- Research profile Natural Sciences Unit: further capitalise research-wise on the formation of this financially highly successful unit.
- High impact papers flowing from 'national scientific

tasks': capitalise on the considerable efforts of red-listing and similar national relevant scientific tasks by standing back and asking what generic questions, of international importance, can be addressed.

- Synergy between staff working in different (and in part highly specialised) fields should increase.
- Supporting mechanisms to turn 'inspiring each other' into 'different ways of working, publishing and obtaining funds' should be sought.
- Internationalisation should be invested in yet more, ensuring Luomus becomes widely recognised.

Recommendations

- Invite UH management to strengthen mutual respect and foster understanding of respective goals.
- Consider forming an international steering committee to share experience and advice from other 'university/ research based museum set-ups' in terms of research, research impact and underpinning modes of operation.
- Minimise investment in the publication of low impact papers and encourage the sharing of drafts/mentoring to increase quality of the published work.
- Invest in communication and follow-up flexible support mechanisms to unleash further creativity, new ways of working and thinking, and to support the pursuit of additional sources of funding to undertake high quality work that extends beyond the respective specialist areas.
- Develop a strong online research profile to increase visibility and benefit from the large number of online visitors.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The scientific quality of the Unit is very good, with clear evidence of producing internationally recognised research, breaking new ground and the regular occurrence of discoveries.

Because of Luomus' nature and specific role in Finland (e.g. the production of Red Listing report), a considerable part of the output is 'good research of mainly national interest'. Continued investment in lower JUFO level type publications holds part of the Unit back scientifically. Currently, too many publications are at JUFO level 1; bringing more up to JUFO level 2 - or beyond, by strategically looking at national responsibilities - would further strengthen the Unit. It is clear, however, that considerable investment has been made to produce high quality papers.

An impressive selection of key achievements is provided in the documentation. Of those, the establishment of FinBIF (in Jan 2017) is a particularly notable and major achievement, and one that will serve Finland and the Unit very well if resources continue to be found to keep running and developing it. Evidence of its impact is clear in that FinBIF has enabled Unit staff to take the lead on a Horizon 2020 project and to be partner in others. Likewise, research on the effects of climate change on bird populations is topical and already has generated influential work. These are good examples of a general movement of a large part of the Unit away from specialist national work towards broad

internationally recognised, and sometimes frontier, research. The real challenge will be to achieve this across all specialist fields (with those specialisms required for maintaining, further developing and functionally capitalising on the respective collections).

GRADING: VERY GOOD

Research goals

Quality-oriented goals in research development have been set, some with quantitative targets, namely: 1) build larger PI-led research groups supported by external funding; 2) target publishing in high-profile journals; 3) emphasise research cooperation within the Unit; and 4) seek broader national and international collaboration in research and funding.

Assisted by two previous rounds of appraisals, which have helped to develop the above outlined goals, Luomus has evolved from a traditional Museum to a productive unit with modern-day engagement and research. This is a major achievement for which Luomus should be congratulated. The current research goals are strongly publication focussed, and aim to produce high quality work in good quantity. Explicit publication targets (number of papers, number of top quality publication and mean impact factor) are therefore sensible, as long as this does not hinder creativity. Also, rather than being blinded by the mean

journal impact factor over their top 50 publications, it might be worth considering broader influence including how well respective works have been taken up and by whom. Competitive international research funding targets are also set (ambitiously), as is the ratio of external to total funding.

It could be argued that now, with the Unit demonstrably research productive and increasingly impactful academically, research goals could become more holistic, with a desire to strive for quality on numerous fronts (i.e. research-related teaching, education and non-academic impact). It is clear that excellence has already been achieved with respect to the latter, but explicitly aspiring to be such a holistic unit may help all members of staff (including the large percentage of non-academic) feel valued and contribute to the success of Luomus.

Research results

There is no doubt that the selected results are important and of high quality; what is also clear, however, is that part is highly specialised. The question to ask, in this respect, is whether the science done locks individuals into a highly specialised niche. If so, producing high calibre and profile publications may become increasingly difficult (there are e.g. only so many 'in depth taxonomic monographs of a family' that can be published as high calibre output, no matter how useful and important the work or family). A key step would be for both management and individual staff to

consider approaches through which specialists can continue to break fundamentally new ground rather than digging deeper into smaller issues. It is clear that part of the Unit's portfolio addresses topical and strategic challenges, e.g. bird population change, which result in high impact publications. Other groups may be able to adopt similar approaches. Learning from highly successful university museum units elsewhere would help too.

Another key strategic challenge is fostering cross-fertilisation between the wide ranging specialisms. Finding common ground between those working in fields as different as e.g. magmatic rocks, basidiomycetes, *Betula pendula* genetics, and bird declines may not be straightforward, but good communication within the Unit will be inspirational and will promote sharing of methodological advances and other approaches that will open up new funding opportunities and could result in highly creative international science and research impact.

Analysis on research outputs

In terms of bibliographic analysis, there is quite a gap between P and P', in other words evidence of extensive collaboration. This is in line with e.g. museum-collection based work, much of which is inherently collaborative. Whilst a positive feature in principle (as expanding networks and horizons), ideally such papers are led by staff from

the Unit, written as high impact products and submitted to journals where their influence will be greatest. Normalised impact of journal papers seems to be dropping, whilst the volume of publications remains relatively constant. In line with that, PP(top10%) has been dropping from a very high value (1.5), i.e. 50% more publications in the top 10% than expected/above world average), to 0.09, i.e. below what can be expected. The authors of the Unit SAR make a reasonable case for this to be a temporary blip. On the basis of material providing data over a longer time scale than that of the bibliographic analysis and discussion with the team we are confident that there is no genuine drop of quality in the top-tier of work produced. Indeed, there may well be an increase in the quality of the top 50 publications as a key indicator (but see earlier comment about the usefulness of such a measure). However, it would be good to keep in mind that with the total number of publications going up, the average impact factor over the top 50 would increase even with no change in frequency distribution across impact factor classes. Hence changes in such a mean value may be spurious.

Whilst descriptive, low impact papers have their place (e.g. Red Listing reporting), considering how work of that kind could be looked at more broadly and write cross-cutting or overarching papers could help the Unit's reputation. Also, ensuring that those descriptive papers

are otherwise as strong as possible, and hence have most impact further down the line (i.e. through longevity; though this may not be all that easy in practice), is a strategy worth following. To try and not publish in journals without an impact factor is setting the bar too low for a Unit of this quality.

There is a good match between what has been achieved and the goals set. We share the Unit's view that Luomus is on the right track regarding the development of its research. We did not clarify whether most of the Unit is now indeed composed of 'larger PI-based research groups' (goal 1), but there is now a clear targeting of high-profile journals for the most promising work (goal 2). Evidence for research cooperation within the Unit (goal 3) has not been convincingly evidenced yet. Broader national and international collaboration (goal 4) is increasingly taking place.

International benchmark(s)

The University of Oslo's Natural History Museum and Stockholm's Naturhistoriska riksmuseet seem natural choices. Investigating how some of the most successful, possibly more (geographically) distant, research-based museums balance objectives and deliver high calibre research would likely be valuable, and could make benchmarking more aspirational.

2.2 Societal impact

The societal impact flowing from the research of the Unit is excellent; a requested site visit to the museum confirmed this appraisal. An impressive 250,000 people visit the Natural History Museum (and the two Botanic Gardens) of Luomus per annum, half of which are children and young people. FinBIF is still young but already attracting a lot of interest and societal buy-in. Expert contributions to panels, including several high profile ones, is extensive. Direct communication of research findings through popular science articles and various news outlets is frequent, and key understandings obtained through research are communicated creatively through research-led outreach displays within the museum. It is clear that Luomus is a national authority in biodiversity issues. There is a risk that concerns about the UH imposed cuts will rationalise societal impact such that Luomus prioritises its business role over its contributions as a creative force within society. Maintaining, and indeed further expanding, its societal and institutional footprint will in part depend on the level of UH support.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The Unit has clear awareness of its target audiences and stakeholders, and how to tailor engagement. This is in line with the Museum and its gardens being major visitor attractions and the need to run them as such. A self-declared growing stakeholder group are immigrants, and it would be interesting to investigate possible tailoring of strategies to engage with this (likely highly diverse) group.

Choices made in terms of target audiences are sensible and importantly concern wider public (e.g. visitors, ‘citizen science participants’) and professional sectors (expert committees). Contact with businesses is financially rewarding and increasingly invested in. It would be of interest to learn how engagement forms with some stakeholder groupings are integrated (e.g. is species identification guide development linked with citizen science capacity building), and whether further online development would enhance user experience.

Although understandable, rationalisation of societal impact seems to be at the expense of Luomus’ operations in the public sphere. For example, self-declared reductions in expert roles and in popular publication activities, alongside

an increase in industrial engagement (and possibly selective uptake of expert roles depending on economic compensation) may help offset austerity, but could ultimately weaken Luomus through reduced visibility and societal purpose of its research.

Activities and outcomes

The quality of research-based public engagement material in the museum is excellent; increasing revenue from visitors – though in part likely due to fee changes – is in line with this. The establishment of FinBIF is a major advance but needs continued (non-trivial) investment. Ongoing contributions to working groups, committees and task forces are important, and in line with Luomus’ nature and role in society. Ideally, Luomus makes itself ‘unmissable’ at regional and national level, which in part could be achieved by addressing Finland’s national and international obligations. It seems that this is what Luomus already does (e.g. national biodiversity strategy, Red Listings, INNS, FinBIF). The Laboratory of Chronology appears to contain potentially powerful societal impact too, but the panel did not manage to establish the exact nature of this.

2.3 Research environment and Unit viability

The management of the Unit is highly professional, strategic and forward looking, with the result that the Unit is well positioned for the future. The levels of understanding of the financial operations, decision-making scenarios and possible trade-offs as communicated in the self-assessment are very high. Plans to increase key responsibilities and resources for these are well thought out, leading already to early successes.

It is clear that there is discontent about how the Unit is viewed and treated by UH; this includes criticism regarding the lack of monitoring against management goals, absence of financial support staff, the University wide centralisation of the University Services, disregard of concerns of the Unit, absence of justification of budget cuts in the context of the Units' strategic goals and results, and lack of transparency about unequal distribution of cuts across the University. These criticisms were reported as demoralising and causing indifference in some employees.

The existence of such an open critique – shared broadly by staff, as confirmed during the interview – could easily have a considerable negative impact on the quality of the science, public engagement and social fabric of the Unit. Fortunately, the interview and site visit made clear to us the great passion and positive energy of staff, and their desire to contribute to the success of Luomus as an UH unit. Given the situation, and the great value of the Unit, it is pertinent for both UH and Luomus to work on their relationship. Given the balance of power, we hope that UH will take the lead in the process of developing trust and genuine support. Working towards a strong and positive relationship is to the benefit of both Luomus and UH as a whole.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The relatively hierarchical management structure, combined with an indicator-focussed quantitative recording system, could have resulted in a top-down run unit. Based on the interview and site visit, however, we are confident that this is not the case. Leadership appears strong and positive, and staff feel that they are listened to, empowered, and are committed to the success of the Unit. Indices of wellbeing are at a good level and have gone up further during the last few years. Staff have opportunities to contribute to goal setting.

Information on outputs and achievements (papers, funding, prizes) is shared among staff through monthly newsletters on an electronic notice board. It might be worth asking whether a wide enough set of achievements is flagged up here (so that the signal is not that 'writing more high quality papers and getting big grants' are the only ways to contribute strongly to Luomus). This may be particularly important given that two thirds of the 150 staff are not 'academic' (research and teaching) staff. It may well be that a strong set of other traditions are in place but we have not investigated this.

Human resources, careers and recruitment

Personnel structure and roles seem well worked out and match the requirements of Luomus (which differ in several respects from those of other units). The self-identified need for more early career scientists is key, and arguably the same holds for rejuvenation of 'other personnel' to ensure dynamism. It is very

valuable that retired staff can continue to contribute, and a further indicator of good social fabric and sense of belonging. It is noted that the Unit reports to be under-staffed and that the 2015 budget cuts led to disproportionate losses of tier 3 staff, undermining the desire of the Unit to be more pyramid-shaped (in terms of 'pay bands').

Career support systems seem good but career progression is strongly curtailed (if at all present) – something that was clearly flagged up as an unsatisfactory position. Whilst commonplace, the need for certain specialist curator or related skills mean that a departure from this situation would be very valuable for the Unit.

Researcher education

A very positive feature is that PhD positions are open for international candidates, as this provides access to a quality-base as wide as possible and maximises flows of ideas and cultural richness. PhD students are clearly key to the Unit and seem well integrated and looked after; the annual appraisal of progress sits well with the wider system of care.

Research infrastructure

Appropriate (often state-of-the-art) and well-maintained technological resources are available in-house. These resources are needed for archiving and expanding the collections, and offer substantial opportunities for research by both research staff and visitors (currently an estimated 70 international visitors per year and twice as many national research visitors, which is considerable). Greater awareness of Luomus' infrastructure (in situ and on line) could help

attract more post-docs through inclusion on bids led by scientists outside Luomus, and further increase international networking.

It is noted that the UH 2005 assessment and Academy of Finland 2012 recommendations to bring together Luomus in a single location, rather than the current scattered locations, were described in the SAR as not having been acted upon by UH despite repeated pleas. The issue was raised in conversation but did not appear particularly prominent (and was dwarfed by much deeper concerns of staff about cuts and lack of recognition as a science unit).

Funding

It is clear that the Unit feels hard done by, describing the –in total – 20% cut during 2015-18 as ‘a shock’, and efforts to handle it as means to minimise negative impact on core functions. It was also communicated (within this unit and throughout Life sciences) that those cuts are unevenly distributed across the University, with units outside the life sciences not receiving cuts. It would be worth UH reflecting on this narrative and how to address this perception.

The self-assessment reveals a strong grip on and understanding of the finance of Luomus, and the development of a clear and diverse external funding strategy has already paid off. To have achieved a considerable increase in income from visitors is impressive. Further commercialisation of the Laboratory of Chronology is envisaged, though it may be worth asking what possible externalities this may bring. EU funding is now coming in and therewith further internationalisation and likely subsequent (funding and research, perhaps also social impact) opportunities.

Luomus recognises the increasing work load that comes with chasing income – a reality for many but one that if not handled well can undermine success, and trade scientific and societal impact for survival-oriented income generation. The employees interviewed believe the future for Luomus is bright; the panel shares this view were the relationship between Luomus and UH restored.

Collaboration

Strong national and international collaboration, as is

witnessed from research papers. Nationally, having taken the lead in ‘collections IT management system development’ is impressive, as is Laboratory of Chronology’s collaboration with most other national universities and governmental research institutes.

The self-declared growth area of ‘more internal collaboration within UH’ is wise, not only to produce more high impact research but also because it may help shape the image of Luomus in the eyes of the wider UH environment, including UH management, as also a place for high quality research.

Connections with ‘other constellations’

HiLIFE is of considerable relevance to Luomus and portrayed as a force for good, bringing clear opportunities in terms of research facilities.

Societal and contextual factors

Management of the Unit hold rich insights into the wider societal and contextual factors and trends therein, and has used this understanding to future-proof its funding, research and societal engagement strategies.

Life Sciences Panel

HILIFE JOINT ACTIVITIES AND INFRASTRUCTURE (LS UNIT 21)

HiLIFE Helsinki Institute of Life Science

1 SUMMARY

1.1 Description of the use of criteria

The panel decided not to grade the activities of HiLIFE Joint Activities and Infrastructures.

1.2 Assessment summary

HiLIFE Helsinki Institute of Life Science was implemented as a top-down strategy on the basis of existing institutions (the Institute for Molecular Medicine Finland - FIMM, Institute of Biotechnology - BI, and Neuroscience Center - NC) with an ambitious plan to reorganize the life science research *“to form a major Nordic life science hub for cutting-edge research and providing solutions to grand challenges in health, food, and environment”*.

HiLIFE Joint Activities and Infrastructures form a large part of HiLIFE and had developed rapidly during the initiation phase, where the Director and small administrative core have had very significant responsibilities and work load. The HiLIFE management team is composed of the HiLIFE Director, Deputy Directors, Unit Directors, 1-4 experts on HiLIFE’s joint activities, and Head of Administration has been preparing, implementing and monitoring HiLIFE activities.

HiLIFE Joint Activities and Infrastructures are organised as six streams:

- HiLIFE Tenure Track – High-level PI recruitment program
- HiLIFE Fellows – competitive excellence-based funding to Principal Investigators across UH
- HiLIFE Grand Challenges – collaboration across disciplines and institutions – led by Fellows
- HiLIFE Edu – education from Bachelors to PhDs integrating the UH life science strengths
- HiLIFE Inno & Partners– enhancing technology transfer and partnerships
- HiLIFE Infra – coordination and support to state-of-the-art shared use facilities

HiLIFE Joint Activities and Infrastructure was implemented in 2017 as part of the HiLIFE virtual centre with a focus on coordination and support for shared life science research

infrastructures. These include 18 HiLIFE-platforms with 65 facilities and over 150 staff across University of Helsinki (UH) units and faculties, merged from 70 previous core facilities. The aggregated HiLIFE virtual centre also has high-level PI recruits and PI-based support for top life science research at UH (64 PIs) and Integrative Grand Challenges in health, food, and environment with partners (223 PIs). However, most of these PIs have other primary appointments and their scientific activities are also reported elsewhere. For this reason the panel concluded that the Unit should not be reviewed as an academic unit per se. HiLIFE came together as 3 research intensive units (reviewed in separate assessment reports for FIMM, BI, and NC) with the added value of focusing on research infrastructure platforms. Because most of the academic members of staff in HiLIFE Joint Activities and Infrastructure Unit also appears elsewhere in the Life Sciences submission, we chose to focus

this evaluation and discussion on research infrastructures and wider issues relating to HiLIFE, its interaction with Life Science Faculties and co-ordination of UH Life Sciences activity. We undertook this assessment bearing in mind that HiLIFE is a new organisation (established 2017) and set expectation accordingly.

To implement a virtual matrix organization for Life Science like HiLIFE is naturally a project which would take time. However, at present it is not clear how the HiLIFE organization is adding real value and helping nor how it can function as a vehicle for ensuring the function of the Flagship Units it hosts. HiLIFE now organizes three previously independent Institutes, FIMM, BI and NC. While BI and FIMM are performing excellently and stand out as true Flagships, the NC appears to be on a downward trajectory.

The HiLIFE organization appears to have introduced challenging and conflicting HR structures and differences in the educational expectations of academic staff. The fact that two Flagship Units within HiLIFE are heavily reliant on external funding might require attention and a different funding model from that within the Faculties. However, it was not evident to the panel how the HiLIFE leadership and University leadership related to this issue. At present HiLIFE does not seem to be an accepted vehicle to project the life sciences in a unifying way. Units and some Life sciences faculties described HiLIFE mainly as additional administrative layer and being “amorphous”. There was certainly a lack of “buy in” from the faculties with no current level of engagement across HiLIFE Director, Directors of BI, FIMM and Faculty Deans.

Strengths

- The move to 18 targeted and supported research infrastructure platforms was seen a positive step forward

and are embraced and strongly supported by the wider community. Many are truly integrative across Faculties, some have wider National outreach, and there were emerging examples of innovative industry/ commercial partnerships (e.g. animal in vivo imaging, iPS, single cell sequencing) that will help future sustainability. The platforms are providing an excellent environment for high quality training of doctoral students, but the mechanisms for supporting post-doctoral scientists varied across HiLIFE units.

- With over 150 technical staff HiLIFE offers the opportunity for the University to agree on new HR pathways for supporting career structures for “research technology experts”, many of whom are very attractive to external industry/ commercial organisations and that would be important to retain. There are examples of best practice elsewhere across Europe in achieving this.
- The plan for infrastructure and core facilities is a consequence of an intensive analysis of existing infrastructure together with international experts and analysis and comparison with benchmarking institutions (VIB Belgium, Centre for Genomic Regulation Barcelona).
- Successful recruitment of international “life science stars” to HiLIFE Tenure Track Jobs through an open, excellence only tenure-track group leader recruitment programme with open calls using the FIMM/BI experiences as blueprint (but seems under-dimensioned with only 5 tenure track hires in 2018 across the whole UH LS/Health sector).
- The combination of “big or biggest” player in Finland with the functionality of a scientific hub to international research institutions (ERC, international orientation of HiLIFE Grand Challenge Program) and EU research infrastructure (e.g. European research infrastructure for biobanking (BBMRI-ERIC), Euro-Biolmaging (EuBI)

Finland) could form a good basis for national and international funding.

- Current development is based on already outstanding predecessors/parts (Biocentrum Helsinki, BI, FIMM) which seem to be used as a blueprint for ongoing developments.
- The reported increase in total and high level publications and external funding to PIs indicates that the aggregated activities in the Life sciences area that covered by HiLIFE are increasing.

Development areas

- The funding underpinning HiLIFE is complex and its origin relate to new funding via the PROFI initiative. However as a structure it has contributed to challenges that include different processes for managing doctoral students (Faculties and doctoral student centres), different HR practices for managing academic staff (compared to Life Science Faculties) and somewhat opaque decisions on changes to core funding. The unintended consequences of this is to drive “internal competition” for resources across Faculties and HiLIFE; neuroscience is a current example where these tensions are preventing an alignment of critical mass and scientific direction across clinical and biomedical domains.
- There appears to have been funding opportunities missed beyond the first grant which now creates friction and budget deficits and where there is unclear how the UH and its Faculties would step up to support HiLIFE from 2020.
- The panel was concerned that the significant external funding underpinning UH research flagships – FIMM and BI would require greater internal support to retain their global ranking, strategic latitude and maximise upon new opportunities (e.g. Digital Pathology).

- The panel was not convinced that HiLIFE is the overarching structure through which all Life Sciences at UH should be coordinated. There were obvious conflicts between HiLIFE and Faculties. We heard about numerous “grand challenges” with inconsistent messaging across both HiLIFE and its 3 units and the Faculties. Grand challenges in HiLIFE do not appear to be coordinated with those in FIMM or BI, nor in the faculties. It was unclear where strategy was set and agreed and the vehicle by which it would be implemented. Furthermore, the grand challenges in HiLIFE do not appear to have the right resourcing to really address true societal grand challenges.
- With the 18 platforms, the Unit provides services in many and different areas. Reorganization and usability within HiLIFE must be accompanied with a strategic plan for data integration/ access coordination in form of research data repositories and an access and collaboration platform.
- The lack of a comprehensive transfer strategy including measurement of success of different instruments and strategies.
- The lack of a sustainable way to communicate with society. Given the size and impact of the HiLIFE operation, a more complete societal impact strategy

with respect to goals, stakeholder involvement and outputs would have been expected / is not described. Responsible research and innovation (RRI) aspects could with benefit have been included.

Recommendations

- Ensure support, strategic leadership and resourcing for BI and FIMM to continue to excel.
- If other ways are required to truly unite Life Sciences across the University, and accepting current strong leadership and strategic direction with BI and FIMM, it is possible that HiLIFE could operate as an administrative oversight structure and strategic mechanism rather than an academic unit.
- Independently of whether HiLIFE is used as an administrative oversight structure (for flagships and core facilities) and strategic mechanism or is invigorated and strengthened along the original vision, the UH would benefit from putting in place a unifying governance structure across the Life Sciences area connected to the top level and with measures to position the strong UH Life Sciences sector internationally.
- Reorganization of the 18 platforms within HiLIFE may be

accompanied with a strategic plan for data integration/ access coordination in form of research data repositories and an access and collaboration platform.

- Technology is advancing at pace and it will be important to ensure that these established research platforms continue to evolve. The panel noted that further work is required to further align biomedical data/ informatics capabilities with HUS Helsinki University Hospital clinical electronic health records and wider Finnish health data. This will be essential to main flagship activities notably in Genomics-Epidemiology research. A comprehensive strategy for the use and further development of artificial intelligence as an upcoming technology layer should be developed in a strong cooperation with relevant UH partners outside of life sciences.
- Organization of HiLIFE internal twinning grants combining different research themes to support cross-border interdisciplinary cooperation (reducing imbalance, exchange of knowledge and experiences) could be a mechanism for more cohesion depending on the future organisation of HiLIFE.

Life Sciences Panel

INSTITUTE FOR MOLECULAR MEDICINE FINLAND (FIMM) (LS UNIT 22)

HiLIFE Helsinki Institute of Life Science

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the Unit, the design of decision-making and strategy processes, can be influenced directly by the Unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

The Institute for Molecular Medicine Finland (hereafter FIMM) is well structured around three diverse major grand challenges (GCs). CG1 and CG3 provide internationally

competitive and outstanding research with major societal impact, implications and benefit for improved individualised cancer therapy (GC1) and genomics and improved

diagnostics for complex multifactorial diseases by making optimal use of the unique Finnish population history (GC3). GC2 offers important new improvements in implementing

digital pathology and diagnostics with innovative artificial intelligence (AI)/machine learning-based bioinformatics. Research output has been excellent ranking among the high-end spectrum of international research institutes. The Unit provides excellent leadership with a strong new Director linked to GC3 and with excellent international collaborations and connections, such as with the Broad Institute. GC1 first focused on acute myeloid leukaemia (AML) and multiple myeloma (MM), is now extending to many other cancers with relatively small research groups, which has some risk with regard to international competitiveness. FIMM offers excellent training opportunities for postdocs and students and benefits from high-end facilities and infrastructure. FIMM has recently joined the HiLIFE together with HiLIFE Joint Activities and Infrastructure, Institute of Biotechnology (BI) and Neuroscience Center (NC), which should lead to more efficient use of joined facilities and administration, although better integration and justification/demonstration of the added value of this embedding still is needed, also with the aim of hopefully attracting extra core funding in the future.

Strengths

- High international profile.
- Well-structured goals and program around three grand challenges with major medical impact.
- Optimal use of the unique Finnish population history for genomics of complex diseases with great international impact and collaborations.
- Good implementation of forefront bioinformatics based on AI/machine learning.
- Good interactions with pharma and international consortia, with new translational opportunities
- Very strong outreach and dissemination activities.
- Excellent facilities and infrastructure.
- Great training opportunities for students and postdocs.
- Stands out as a proven and powerful tool to implement new cutting-edge research strategies.
- History as show-case for international recruitment with the implementation of the EMBL model from the start in 2006.

Development areas

- Better integration and embedding within HiLIFE needed.
- For GC1/ISM: risk of losing momentum after the departure of Dr Kallioniemi and others.
- In moving to many diverse cancers, need to take promising predictions in precision medicine to validation and implementation.
- For GC2: better international bench marking, collaborations and competitiveness with internationally rapidly developing digital pathology and diagnostics.

Recommendations

- It would be helpful to provide self-criticism (SWOT analyses).
- Need for better links to clinic and demonstration of how translational efforts can be promoted.
- Improve integration and advertisement of advantages of embedding within HiLIFE.
- Set out plans for hiring of new research staff.
- Obtain more ERC grants and build industry-commercial income streams around infrastructure platforms/ tech transfer to mitigate cuts in core-funding.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

FIMM is well structured around three diverse major grant challenges. GC1 and GC3 are best developed and provide internationally competitive outstanding research. GC2 is more recent but also offers great potential to propel digital pathology forward. The Unit had outstanding performance by all indicators. Renewal of research strategy and strategy to recruit and develop as key FIMM PIs rotate out would be important development aspects of FIMM going forward.

Strengths:

- Well-structured program around three diverse grand challenges.
- Optimal use of unique Finnish population history for large scale genomics of complex diseases with great international impact and collaborations.
- Exceptional genomics/ genetics/ epidemiology MNCS score 2.64.
- High level of external funding (50% of all HiLIFE) and growth in industry income.

Development areas:

- Need for self-criticism (SWOT analyses) as part of benchmarking and continuous strategic development.
- Within individualised systems medicine (ISM) program: risk of 'spreading thin' on too many diverse cancers, need more insight in how develop optimal clinical translation.
- In ISM: Risk of losing some momentum with the

departure of Dr. Kallioniemi.

- For digital pathology development: better international bench marking.
- High level of external funding also a longer-term challenge as University cuts hit

GRADING: EXCELLENT

Research goals

Research in FIMM is divided over 3 main grand-challenge areas that are separately discussed. In general, the rather limited details provided on the progress and outlook in combination with the not very self-critical analyses (for instance there is not clear SWOT analysis) makes the detailed evaluation of past progress and future plans based on the written self-assessment alone a challenge. Fortunately more clear details are provided through the excellent website.

The Grand challenge 1: Individualised Systems Medicine in Cancer programme (GC1). Main goal here is to provide state-of-the-art individualised systems medicine (ISM) strategies to offer better tailored personalized cancer (combination) therapies and try to understand drug resistance mechanisms. While initially focussed on AML and MM this has now been extended to other cancers including ovarian and urological cancers, prostate cancer, non-small cell lung cancer, pancreatic ductal adenocarcinoma and

melanoma. While initially driven by the strong Kallioniemi group, it is good to see that other senior and junior group leaders (such as for instance Wennerberg - now rotated out to BRIC in Copenhagen, Heckmann, Aitokallio, Tang and Verschuren) have taken a lead. Main ambitious goals are to use the developed screening platforms to learn about cancer-driving mechanisms as well as use it in real-time to fresh patient samples, for drug sensitivity studies and immediate personalized translation to individual patients. While these are very important and commendable goals, it is not entirely clear how far these can be met for this diverse set of cancers and where the individual progress currently stands. Are there already examples of individualized real-time therapy decisions? While a very strong point is the superb integration of forefront bioinformatics and optimal use of genomic technologies and state-of-the-art biobanking, a potential risk may be that on each of the cancer types a limited set of researchers is working - a risk of 'spreading too thin', also when assessed in international competition. An outstanding question here is how well the connections are with clinicians/hospital that work on each of these cancers.

Grand challenge 2: Digital Diagnostics for Precision Medicine (GC2). There is a clear need for moving clinical parameters and pathology from analog to digital, to improve diagnostics and more automate tissue-based disease outcome prediction. The goal is to generate in the next 3

years a fully automated digital diagnostic platform guided by AI, for three major diseases (breast cancer, prostate cancer and IBD). Again a very important ambitious aim that makes optimal use of the excellent technology, computing and biobanking facilities. This is a more recent addition to FIMM and an excellent research director (Lundin, who now splits his time with Karolinska at Stockholm). On the panel site visit clinical infusion into this area and global outreach to Africa was impressive.

Grand Challenge 3: Genomics and Epidemiology to Understand and Predict Disease (GC3). Due to the unique Finnish population history, this challenge on using state-of-the-art genomics with epidemiology and health data to better understand and predict complex diseases has been a long-standing excellent focus of FIMM. In this challenge FIMM is at the world-leading forefront. The goals are to further build a platform integrating all these data for a large Finnish cohort and then to use this using newly developed analyses methods to steer clinical predictions and generate new targets for therapies. A great asset has been the recent appointment of Mark Daly as new Director. He is an international top researcher in this area and also holds an appointment at the Broad which will ensure ample opportunity for optimal collaborations and making the most optimal success out of the unique Finnish data. However, FIMM Assistant Director Janna Saarela has now moved to Oslo.

Research results

The GC1 programme has been highly successful with setting out a number of strategies for personalised cancer medicine and has set standards in Europe and more widely, has resulted in key publication outputs, and in new precision medicine strategies that have been transformative for parts of the development of the field. While much of the precision

medicine translational research is still ongoing and is not yet implemented in clinical practice in Europe it is true that FIMM has established itself as a global leader and in the top tier in this area with the strategies that were set out 2009-2010 for this area.

Important achievements include setting up and running extensive biobanking and to use this resource to perform large scale genomic and molecular profiling as well as ex vivo cancer drug sensitivity and resistance testing on individual patient samples. Most progress has been on MM and AML in this regard. The platform is now used also for other solid cancers as indicated above. A strong asset is the focus on developing new AI and machine-learning bioinformatic tools to predict drug targets and drug responses in individual patients. Several of these models appear to act superior to many others and have been published in high-ranking journals, deserving the indication of “most important results”. As indicated above, an inherent risk is that the expansion to many new types of cancers may also have associated risks. This not so much holds for the profiling studies, but does hold for the validation and functional follow up studies. However, the lung cancer work of Nagaraj 2017 which is also selected as one of the most important results, illustrates the point, as the Verschuren group is one of the few working with state-of-the-art mouse models in preclinical testing. It is unclear how this can or will be extended for the many other cancer types. Also the IMI-PREDECT consortium that was coordinated by FIMM researchers ended in 2016. No plans are being presented on how this can be extended upon and how much effort is being conducted in tumor explants or organoids, for first line functional testing of drug combinations and responses. Without these, optimal translation of the screening findings may be hampered. To set up such models for different

types of solid cancers is not a trivial task, a prime example here being prostate cancer which has been very difficult to model. Related to this, it remains not well described how the links are to the relevant clinicians working in these cancer treatment areas. This is of key importance for ultimate translational purposes as well as for fresh materials for explants/organoid derivations. Based on information in the interview, some of the clinical validation and translation seems to be working in the wider context of new HiLife GC projects. A potential threat is the move of former FIMM Director Olli Kallioniemi to SciLifeLab in Sweden, although he for now keeps a partial appointment at FIMM. This as he has been the main driver in setting up this GC. On the positive side here is the effort of Dr. Wennerberg (also rotated out), who has already contributed several of the top 10 highlighted publications pertaining to the research topic on drug resistance modelling.

GC2 has also been successful at FIMM with early implementation of digital pathology and implementation of machine learning and AI technologies going for deep-learning outcome predictions. Again, the results from a strategy set out at FIMM early on has been cutting-edge and transformative and has yielded very significant research outputs as well as important technologies to serve the field. The latest directions and developments seem to position FIMM to stay abreast with where the field is going with high-resolution, laser microcapture microscopy and single cell analyses.

Setting up digital diagnostics is clearly now of utmost importance to improve diagnostic and treatment decisions, by making and moving it beyond solely relying on human assessments. Given the wide spectrum forefront cross-disciplinary technical and biobanking/bioinformatic approaches developed in FIMM, this provides an ideal

seeding ground on which to build such efforts. With the effort of Dr Lundin as Director, an optimal ground has been laid for this GC. While under development, exciting results have been already been obtained such as using machine learning and AI to develop a new tool that was able to predict colorectal cancer outcomes based on image analyses, that outperformed 3 human experts (Bychkov 2018). Another highlight consists of a new tool to analyse single cells, combining microscopy, laser capture and image analysis combined with machine learning (Brasko 2018). This GC has high potential, provided that enough groups/researchers can be attracted. It would be important to learn how internationally competitive this work can be, given the large interest world-wide in these new developments. No real bench marking was provided in this regard.

GC3 is based on and integrates with a very strong tradition in genetic epidemiology in the wider environment in Helsinki and Finland at large, spans widely in terms of exceptional materials and techniques and continues to be outstanding with respect to strategy and performance. More recent highlights include Finish SUPER study, the FinnGen project and GeneRISK headed by key FIMM PIs as well as an Academy of Finland Center of Excellence inside FIMM on complex disease genetics.

More specifically, this GC makes optimal use of the unique Finnish population history in using large scale genetic profiling combined with epidemiology to find connections to environmental determinants and risk factors, as well

as find new GWAS and genes associated with a large and diverse number of both common and rare diseases. Examples are the twin studies on addiction/substance use, obesity, mental health and cognition spear headed by the FIMM interim Director Jaakko Kaprio. Another prime example is the identification of migraine susceptibility loci revealing new links to genes acting in vascular and neural tissues by Dr. Palotie. This GC has been among the most productive, in publishing many high-ranking internationally well recognized papers. In addition, the large scale data gathered in the Finnish SUPER study and in the FinnGen project directed by Dr. Palotie are of unique and internationally fore-front, as are the GeneRISK project lead by Dr. Ripatti. It is therefore gratifying to see that this GC team has been awarded a Centre of Excellence in complex disease genetics. A great achievement has also been the appointment of Dr. Daly as the new FIMM director, who is a top ranking researcher in the genetics of diabetes, inflammatory and autoimmune as well as neuropsychiatric diseases. A major advantage are his good connections to the Broad Institute where he also still holds a position. While such a double appointment could also involve some diversion, the other strong PI's involved in this CoE and the world-wide unique opportunities of connecting to the Broad researchers will largely outweigh this.

Analysis on research outputs

FIMM performs at a very high level with a high productivity and gearing with >25% of the production in top-tier (JUFO

level 3) and 25% of papers at a leading level (JUFO level 2). This is an exceptional performance. Also the output versus staff is high and the analyses of metrics indicates that the FIMM production is highly collaborative both nationally and internationally and that FIMM publication outputs and the journals in which FIMM publishes is 40 to 50% about the mean of the field. Again, this is an outstanding performance.

Importantly the level of publication outputs has been steadily increasing with each consecutive year, despite governmental financial reforms and cut backs. Also the supervised PhD degrees have been steadily increasing. Rather than requesting 10 top publications of the whole FIMM, it would have been more instructive to list separately the top publications of the individual GCs. Nevertheless, it is evident that all three GCs, though very different in size and number of researchers have been performing at an outstanding level.

It is a bit surprising, given the high productivity, that FIMM so far has only attracted one ERC grant.

International benchmark(s)

The chosen bench marks are overall OK, although both CeMM and The Netherlands Cancer Institute are much larger and with primarily a cancer focus. More specific benchmarking with regard to the FIMM-specific topics (GCs) would potentially have been more useful and instructive.

2.2 Societal impact

FIMM is well structured in three diverse grand challenges that are each very well positioned to bring great societal benefit to large groups of stakeholders with potential world-wide impact. FIMM has truly provided patient benefit as well as society benefits and with its individualised systems medicine programme. The ISM programme also impacts on drug development and has been highly successful with its industry collaborations. The other FIMM grand challenges programmes have also delivered very significantly.

Strengths

- Unique integration of extensive molecular and genomic data and excellent integration of unique patient materials/subsets.
- Optimal interactions with pharma and international consortia to promote translation.
- Very strong outreach and dissemination.
- Commercialisation strategies are in place and function.

Development areas

- Plans for extension of translational efforts towards future implementation.
- Need more insights into how ISM leads to new breakthroughs in patient treatments.
- While there are numerous outstanding ad-hoc examples of societal impact, no overall strategy/ co-ordination is presented.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

Research at FIMM, as formulated in the three grand challenges, has far-reaching and major societal impact as it focuses on key aspects of health care and improvements. It brings opportunities for better individual patient diagnostics with new digital and AI-based computational approaches. In addition it provides new opportunities for better individualised therapeutic choices in cancer as well as a major contribution to better diagnostics in rare and complex multifactorial diseases driven by forefront large-scale genomics on unique patient cohorts. Furthermore, the strong integrated educational programs benefit both the Finnish and international research community as well as the Finnish population at large. The three diverse grand challenges provide a wide-ranging and well equipped and rationalized infrastructure that will help to provide more effective cancer therapies and drug combinations; new digital pathology tools and microscopy benefitting health care globally; and providing unique insights through wide scale genomics on rare and complex diseases.

Activities and outcomes

The individualised systems medicine program has provided ample collaborations with major pharma companies which has resulted in substantial extra preclinical project funding. While this has to be commended, it is often difficult to arrange productive collaborations involving essentially competing pharma companies. It would be helpful therefore to obtain more detailed insight how these collaborations are structured and what respective IP rights are, especially

as large parts of the data are based on unique patient materials and cohorts. Important participations in the innovative medicine initiative PREDECT and big data analysis in the HARMONY program offer further developments of dissemination and valorisation. It would be important, as PREDECT ended in 2016, to learn if future follow up programs are being developed to carry this forward in the coming years. It will also be important to see the basic findings of the ISM program being translated more towards clinical benefit. In this regard it is encouraging that early-phase clinical studies are being planned on Myeloma and AML. While the studies on other solid cancer are less advanced, the expectation is that these may also be developed towards clinical testing in the coming years, for which good relations with the respective pharma companies are crucial. New drug reposition strategies and deep molecular profiling will also be important in providing new drug combinations.

Digital pathology strategies are clearly the way forward and the group led by Dr Lundin sets a strong example already leading to a new portable microscope that is of great benefit also for third world countries. The long-standing focus on large scale genomics within the unique Finnish population has great potential to get new insights in complex diseases and the influence by environmental factors. A clear example is the KardioKompassi initiative and the GeneRISK study driven by Dr Ripatti and Widen, providing new life style risk factors and stratification options for special risk groups. The strong engagement of a wider public to multiple levels of communication, such as a strong website and social media presence are very important and strong outreach instruments.

2.3 Research environment and Unit viability

FIMM is well positioned for the future as a new Director has been appointed and there are good structures for leadership and management. Better integration with the other Units in HiLIFE is recommended. The flagship must remain population genomics. Personalised medicine research is potentially at risk. There is a risk of losing the EMBL and EU-Life partnerships if these are moved to the level of HiLIFE which dilute the focus into a wider and more diverse environment.

Leadership seems to be very well-functioning at the level of the FIMM Grand Challenges research programmes, quite well functioning at the level of FIMM and possibly lacking parts at the level of the more newly implemented HiLIFE institute. Strategy is needed for new recruitments / overview of PI rotations and how to relate to threats with respect to loss of competence is not evident from the report, but a number of PIs have left or are coming towards the end of their appointment periods. However, three new hires of EMBL group leaders have been accomplished and Lundin, Horvath and Verschuren extended/retained. Extramural funding is great, but low intramural funding poses a threat with respect to future strategies and recruitments as PIs rotate.

The overall grading is Very Good; from Good on leadership and HR, to Excellent on other aspects.

Strengths

- Promising new leadership within FIMM.
- Great that funding has been raised externally and three new EMBL-group leaders recruited since the evaluation material was prepared as explained in the interviews.

- Excellent training opportunities for postdocs and graduate students
- Excellent facilities and infrastructure
- Strong International partnerships/collaborations

Development areas:

- Funding cuts have been very severe (5/6ths of core funding as evident from the provided material).
- FIMM-EMBL group leaders recruited 2006-2012 are now rotating out and University of Helsinki (UH) seems at risk of losing the cutting-edge FIMM has provided unless resources for new recruitments are provided.
- Better advertisement of advantages of embedding in HiLIFE needed.
- Career development programmes for young PIs and key technical expertise /core facility staff appears to be lacking.
- Work to do on harnessing data flow from and to clinical priorities.
- Interactions with the University/medical school and hospital partnerships could be improved.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

Based on the provided discussion, leadership and goal-setting seems to be well-functioning at the level of the Grand Challenge research areas. It is less well set out how these are coordinated inside FIMM, but overall the FIMM leadership structure seems to be well functioning.

Benchmarking with the SAB also seems to function well. However, the transition from a permanent FIMM Director to the next has involved an extended interim period that has not necessarily been good for FIMM. Leadership at the HiLIFE level involve FIMM but here it is less clear how the structure adds value, nurtures excellence and generates synergy in the wider environment. It is good that Emmy Verschuren has been recruited to a combined role as group leader and strategic advisory/support to the Director.

The FIMM steering and management committee holding both monthly meetings as well as an annual retreat appears well positioned to decide on the scientific agenda and deal with operational challenges, which is especially important with the new integration within HiLIFE. A worry here is how well this integration process is taking place, what the cross institute interactions and added values are between the HiLIFE partners and the UH. Issues with insufficient UH support are briefly mentioned but not detailed further. It appears that each HiLIFE operative unit (FIMM, BI, NC) largely maintains their own institute set-up: for instance, why is the administrative team not dedicated to the whole of HiLIFE? This seems more cost effective and might help promote integration. Scientifically the main goals are set within the three grand challenges programs, which seems a logical and efficient process, that is well stimulated and overseen by an excellent SAB. Also individual group leader meetings or grand challenges groups with the new FIMM director are in place and are important to steer and keep the scientific focus.

Human resources, careers and recruitment

FIMM reports 186 FTEs in 2017, a number that has been increasing nicely from 2013. The structure and distribution of scientific staff between levels 1-4 seems good and depicts that of an EMBL Partnership institute where a larger fraction of the staff in non-tenured or tenure-track.

For 2018 number of contracts are reported rather than FTEs. This shows that FIMM has 237 affiliated employees as of March 1, 2018. Furthermore, now the number of level 4 and 3 staff are 9 and 53 as opposed to 4 and 38 FTEs in 2017. This indicates that a relatively high proportion of FIMM PIs (22 group leaders) and senior staff have an affiliate status / part-time contracts. Looking at the list of group leaders, it is clear that several of these have rotated out and have their main affiliation elsewhere. Given that FIMM in part follows an EMBL rotation model, a list of all FIMM PI recruitments since 2006, where they have rotated out to and who are still on contract could help FIMM to follow the outcome of their HR strategy, as well as getting an overview of openings for new young PIs recruited according to the EMBL Model and FIMM strategic plans for future recruitment.

FIMM HR practises and mentorship for PHD students and postdocs seems set out. It is less well set out how FIMM strategies for young PI career development are implemented or how FIMM supports development of key technical expertise and core facility staff. FIMM appears not to be active in support to these categories of staff.

Researcher education

FIMM has an excellent training program for both PhD students and postdocs, although it is not immediately obvious from the provided written document how these relate to the overall life sciences within the University programs. Both PhD students and postdocs are well

supported by dedicated councils and the FIMM's DTC and courses for both technical and career development are in place, while there is also the opportunity to participate in further courses offered by the University. This sets a firm basis for very strong educational training, although again the integration both within HiLIFE and the University is not immediately obvious. New doctoral and postdoctoral coordinators for research training have been hired.

Research infrastructure

FIMM has very strong technical support that is well organized within FIMM Technology Centre and is now integrating within HiLIFE. As mentioned, it would be commendable that there are dedicated user committees for each of the activities overseen by main users (such as microscopy, sequencing, single cell analyses, etc.) which works well in other institutes. A strong point is also the national embedding within Biocenter Finland as well as within several key European for a linked to the research infrastructure roadmap. Maintaining the technical support and further developing the ever evolving large scale genomic techniques is crucial for FIMM and HiLIFE and should be strongly supported also by the University and by government funding, which is currently rather modest when compared to investments in other European countries such as Germany and the UK.

Funding

FIMM has a relatively low core funding (<20%, half that of HiLIFE as a whole) that has been cut during the period 2013-2018 from >6 mEUR in 2013-14 to approx. half in 2017. Despite this FIMM income has increased and the total budget has gone from 16.4 to 20.6 mEUR from 2013 to 2017. In 2018 the budget is expected to be at 29.6 mEUR due to the introduction of the FinnGen project.

FIMM has raised very impressive amounts of competitive funding from a wide range of sources and now seems to have a well-diversified set of income streams. EU funding may, given the excellence of FIMM, be on the low side and there may be additional opportunities there. Other than that FIMM appears to have optimized most sources of income in an impressive way.

One threat may be that with the low core funding and high project-based funding, FIMM will have less room for new strategic initiatives and less room for new recruitments as PIs rotate.

While FIMM has been very successful in attracting competitive grants and funding, cuts to University funding remains a serious threat, especially with regard to the key importance of maintaining high-end technical support for both FIMM and HiLIFE. With the formation of HiLIFE, there is a clear drive to integrate more the facilities of the partner institutes out of cost effectiveness, but also there should be a clear incentive from the University and government to provide adequate core funding to be able to maintain this top institute at the forefront of life science. While very successful at attracting grants, it is a bit surprising to see that within FIMM only one ERC grant so far have been obtained. With the given level of scientific excellence it should be possible to expand on this for several of the high ranking researchers.

Collaboration

While collaborations with the HUS Helsinki University Hospital are listed, it would have been instructive to provide more details on how new research findings, such as in ISM, can be translated back to the clinic. Beyond rather general descriptions, no clear examples were provided in the documents. Strong international collaborations are in place and secured in part also by cross-country appointments of

key driving senior researchers, such as with the Karolinska, DKFZ, Norway, Hungary and the Broad Institute. This provides an optimal structure for high-end international collaborations and is one of the strong holds of FIMM and HiLIFE. In addition there are excellent collaborations with several large pharma companies that are key for driving new findings to clinical testing.

Connections with 'other constellations'

Although HiLIFE seems a logical and good development, better integration of the partner institutes appears to be necessary, especially between FIMM and BI and with parts of HiLIFE Joint Activities and Infrastructure and NC. Not well described is so far how this can and will be achieved,

beyond integrating administrative departments. A potential threat here is the (very) diverse and wide spread research being conducted in each of these units. The idea of setting up an HiLIFE tenure track systems is highly commendable, with the aim to attract scientists and group leaders who operate in a cross-unit fashion.

Societal and contextual factors

FIMM has been a very successful endeavour for UH in the past decade, much due to earlier visionary leadership and a strong culture for excellence and cutting-edge strategies that was built early on. It is important that the FIMM brand and flagship position internationally is not lost in local reorganisations, that may dilute both excellence and

focus. The new FIMM Director should thus have sufficient latitude internally and drawing on HiLIFE mechanisms to develop new strategies and grand challenge programmes and conduct recruitments as FIMM PIs rotate, to keep FIMM abreast with the international developments.

With the new Director in place, there is now a good starting point to further foster collaborations within FIMM and beyond. It will be crucial for both the Unit directors as well as for the HiLIFE director, to set a strong leadership example and to demonstrate the added value and synergy of bringing these units together in HiLIFE. This also would bring the clear incentive towards the University, of the need to reverse cuts in funding and support HiLIFE as a leading flagship for life sciences in Finland.

Life Sciences Panel

INSTITUTE OF BIOTECHNOLOGY (BI) (LS UNIT 23)

HiLIFE Helsinki Institute of Life Science

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

Strengths

Scientific quality

Institute of Biotechnology (BI) is well resourced and has secured impressive extramural funding as documented by the number of prestigious national and international research grants. BI's level of scientific productivity is world-class with clear evidence of originality in several areas of the biosciences and biotechnology. Maintaining the institute's vibrant research environment, its outstanding research quality and its international standing are key goals. Continuous renewal by recruiting and investing in the best international talent from a broad range of research fields through regular open calls and evaluation by BI's Scientific Advisory Board are critical prerequisites if BI is to achieve these aims.

Societal impact

This activity was of high quality with tangible evidence for valorisation in the biotech sector, documented by a high number of patents and spin-out companies based on basic research. BI has identified appropriate targets and invested considerable effort in reaching out to the public.

Research environment and Unit viability

The research environment is outstanding, with a superb research infrastructure, a well-thought-through leadership structure and an extensive network of national and international collaborations. BI has a strong PhD and post-doctoral training programme and provides an excellent environment for junior PIs.

Development areas

Scientific quality

Whereas large parts of BI's research in the biosciences are of a very high quality with seminal contributions that have resulted in fundamentally novel insights into biological processes, there is still some headway to be made regarding the establishment of networks of academic and industry partners. One factor that has hampered BI in achieving this objective is the somewhat underdeveloped biotech landscape in the Helsinki area.

Societal impact

While BI is doing very well on this front, an overall strategy for organising outreach is needed, perhaps with support from the University of Helsinki (UH).

Research environment and Unit viability

Although the perspectives for the viability of the Unit are largely excellent, the cuts in core budget pose significant threats to the Unit's overall performance. The potential need to adjust BI's governance in light of the establishment and developments in HiLIFE is a concern.

Recommendations

BI's overall autonomy and control over its resources is vital for its viability and its flagship role for UH should not be constrained by developments at HiLIFE.

The establishment of networks of academic and industry partners will need an international perspective to overcome local and national constraints of Finland's biotech landscape. This requires a cautious strategic approach as better partnering with biotech industries for valorisation of scientific discoveries cannot be made at the expense of BI's scientific quality.

The panel recommends that the BI-initiated post-doctoral association networking scheme be more widely adopted across all UH Life Sciences as good practice.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The present assessment of scientific quality is based on the nature of the research areas embraced by the Unit, the publication records of the PIs, the level of competitive funding, numbers of students and postdocs and the extent to which the PIs have obtained external recognition. The Unit has succeeded in maintaining its research momentum over a sustained period of time with world-class basic research in the biosciences and biotechnology. The Unit has also pioneered infrastructure activities in Finland and is highly international with an excellent or outstanding record of research productivity.

GRADING: EXCELLENT

Research goals

BI's mission is to conduct research and develop infrastructures in biotechnology and biosciences at the highest international level and apply the results for the benefit of society. Rather than focusing on one or a few thematic areas in the life sciences, BI instead has chosen to cover a broad range of themes, including plants, microbes, snakes and seals, as well as molecular pathogenesis and treatment of human diseases. Thus, scientific excellence rather than programme-oriented research is key criterion by which to assess the Unit and its viability. An inherent consequence of this mission is the need for constant renewal by recruiting and investing in the best talent from

a relatively broad range of research fields through regular international open calls and evaluation by a Scientific Advisory Board (SAB). The Unit has accomplished substantial parts of its research mission with world-class basic research in the biosciences and biotechnology. A highlight have been innovative approaches to integrate experimental, quantitative, and computational biology to infer construction principles of organs.

Research results

We consider it important to state from the outset that BI is a flagship Unit of scientific excellence at the University of Helsinki. It has succeeded in maintaining its research momentum over a sustained period of time with world-class basic research in the biosciences and biotechnology is an admirable achievement. This is documented by the quality of publications rather than the overall number of papers and there is no indication that BI falters in this respect. In fact, it is remarkable that BI has been able to maintain its quality research output despite cuts in its core budget and annual rent increases at UH.

BI has pioneered infrastructure activities in Finland and was the founding member in the national life science infrastructure organisation Biocenter Finland, which is responsible for coordinating the technology platform activities within and between Universities. BI accommodates several high-end core Units that serve researchers locally,

nationally and within ESFRI infrastructure networks. BI core facilities define also key parts of the HiLIFE research infrastructure platforms. A substantial part of the added value of BI comes through its infrastructure platforms whose development is driven by scientific needs and the expertise of BI's researchers.

The majority of the PIs in BI have excellent or outstanding records of research productivity, with a disproportionate rate of publications in leading specialist and high-profile general journals. Several PIs have succeeded in publishing very highly-cited papers, which is widely regarded as an indicator of a notable impact in a given research field. Further notable numerical indicators of BI's research competitiveness and recognition during the reporting period are that 13 research groups participate in eight Centres of Excellence of the Academy of Finland and that the Institute hosts seven Academy professors and eight Finnish EMBO members. Seven PIs have attracted ERC grants and Irma Thesleff has been elected as a foreign associate of the National Academy of Medicine and National Academy of Sciences. Bibliometric indices show that the quality of BI's research output excels by far the world average in the areas Cell Biology and Biochemistry & Molecular Biology, and that this trend has been fairly stable during the reporting period. A large proportion of output involves international collaboration with very high impact.

Analysis on research outputs

The self-assessment report lists five key advances between 2012 and 2018. These include the discovery of cerebral dopamine neurotrophic factor (CDNF), which has neuroprotective and neurorestorative properties. Its translational potential as a drug candidate for Parkinson's disease is being exploited by a new spin-off company, Herantis Pharma. The research programme in genome biology has succeeded in sequencing and annotating a number of complex eukaryotic genomes, including silver birch and the Saimaa ringed seal.

A lighthouse project is the coordinated effort of five BI research groups to integrate experimental, quantitative, and computational biology to infer construction principles of organs as part of a Centre of Excellence of the Academy of Finland. This is a superb example of how interdisciplinary science can lead to a leap forward in a given research field, in this case developmental biology. Recent evidence for sustained, outstanding quality research in plant biology are two back-to-back Nature publications from two BI groups, published after the submission of the self-assessment report, which explain how stem cells in the root are specified and regulated in the so-called cambium region to form vascular tissues needed for the long-distance transport

of water and nutrients. These are excellent examples for how curiosity-driven science based on a fascination with understanding the molecular logic of organ development can generate fundamental knowledge of intrinsic value.

Despite its broad scientific scope in the biosciences, BI considers structural biology as a focus area that will hold a central position in future developments of the Institute. Seminal publications during the reporting period have been generated using a suite of structural biology technologies, including electron microscopy, Cryo-EM, NMR, conventional protein crystallization and modelling. In identifying structural biology as a future focal area, BI does not aim to develop fundamentally novel methods for structural biology. Instead, this prioritization rather reflects BI's ambition to work at the forefront of an emerging research field that can be best described as structural cell biology. Finally, BI has maintained its cutting-edge and internationally competitive research on cytoskeletal dynamics.

With a total of 269 staff, the BI hosts approximately 40% of the number of staff of HiLIFE (657). BI's 'research incubator' philosophy is perhaps best illustrated by a high number of tenure-track group leaders (presently 27). Eight senior staff are affiliated with the Unit. The numbers of PhD students and postdocs seem appropriate for a research

institute of this size and in this area of science. The report states that on average 13 PhD theses per year have been completed in BI during the assessment period. A clear indicator of BI's capability to attract international talent and to contribute to research internationalization at the University of Helsinki is that over 50% of the Institute's academics come from outside Finland.

International benchmark

BI has chosen the Biozentrum in University of Basel, Switzerland, as its benchmark institution, on the basis that the primary focus of this interdisciplinary institute is basic molecular and biomedical research and teaching, and it also provides state-of-the-art technology platforms. The reasoning for this choice is plausible and appears appropriate. Although the total number of publications of the Biozentrum is higher, the overall quality of scientific output is comparable to BI. However, when comparing established networks of academic and industry partners at both institutions, there is still some headway to be made by BI. This is likely due to a more differentiated biotech landscape in the Basel area compared to Helsinki.

2.2 Societal impact

The assessment of societal impact was based on the extent to which the self-assessment revealed a high level of activity aimed at appropriate target audiences and valorisation of research outputs. BI appears to have identified appropriate audiences and devoted significant effort to reaching out to them. However, the panel recommends a more structured approach concerning societal impact activities in the Unit to reach its full potential.

GRADING: VERY GOOD

The research at BI explores fundamental global and life-science challenges that have wider implications in society, including sustainable environment and adaptation of crop plants to climate change, molecular principles of evolution of life and health and disease in humans and

other organisms. Consequently, BI's wide scope in basic science and biotechnology has led them to target a wide audience of citizens, including politicians, those interested in the environment and youth. BI aims to interact with industries and to find sustainable solutions in ever-changing ecosystems.

Tangible outputs of societal impact are documented at various levels. For instance, BI's graduate students organize annually a practical science course for high school students from the Helsinki Viikki Normaalilyseo (UH's Teacher Training School) in collaboration with the Doctoral programme in Integrative Life Science. The course raises awareness of modern bioscience research in teachers and high school students, but also enables BI's PhD students to gain educational skills by teaching in these courses.

Given that valorisation is considered a relevant

parameter for the current assessment, it is impressive that BI has filed around 150 patent applications, and ten spin-out companies were founded on the basis of these discoveries. The establishment of Biotech plaza activity to support exploitation of early-stage research findings is another notable achievement in this context. This offers opportunities for wider economic growth and external funding.

Nevertheless, BI's societal impact has not yet reached its full potential. While the visiting group appreciates the many individual activities, there appears to be a need for a more structured approach to target its audiences and development of engagement strategies with tangible impact. A process to manage this across BI is needed with academic rather than administrative ownership.

2.3 Research environment and Unit viability

BI's mission has a clear career development scheme for its staff, especially at the level of PIs to ensure renewal. The Panel was pleased to learn that the career track of BI has recently been revised to better meet the University tenure track criteria.

GRADING: EXCELLENT

BI has a clear and efficient leadership structure. BI's executive team includes the director, deputy director, and four other group leaders representing all key activities at BI and has an active role in evaluating and preparing decisions. The newly appointed BI director has clearly articulated a vision as well as the strengths of the Unit and the challenges

it faces. The director has a clear strategy with respect to maintaining scientific excellence and using resources as effectively as possible.

BI had implemented the first tenure-track system within UH. Group leaders are evaluated every four years on the basis of their scientific performance for progression

in BI's tenure system. Those who pass the evaluation will advance to the next level of the scheme for a further six years. Rigorous evaluation has been the basis for the selection and promotion of the research groups, research directors, and the director. The SAB has played a critical role in the strategic development of the institute and the importance of the SAB in safeguarding continuous renewal and providing advice on BI's research activities in the future cannot be overestimated.

The visiting groups was particularly pleased with the post-doctoral association networking that has been initiated in BI. The visiting group suggests that this be more widely adopted across all UH Life Sciences as good practice. Overall, the training platforms for PhD students and post-doctoral scientists appear to be in excellent shape.

Despite largely excellent perspectives for the viability of BI's flagship role at UH, the cuts in core budget pose significant threats to the overall performance of the Unit as

BI external funding has reached 68% in 2018. Consequently, this renders BI's future research output dependent on steady external grant income. In addition, the visiting group expresses concerns regarding the need to adjust the governance of BI in light of the establishment of HiLIFE (Unit 21). The visiting group strongly supports BI's overall autonomy and control over its resources independent from future developments in HiLIFE.

Life Sciences Panel

NEUROSCIENCE CENTER (NC) (LS UNIT 24)

HiLIFE Helsinki Institute of Life Science

1 SUMMARY

1.1 Description of the use of criteria

The RAUH criteria for the quality of research, the societal impact and viability were understood as follows. For the evaluation of the research outputs, evidence was scrutinized for outputs that were world leading or internationally excellent in terms of originality, significance and rigour. Indicative metrics were taken from the numbers of papers published overall together with those published in internationally recognized top discipline journals across the unit when compared to peer group. The research approaches should take up new questions and open up new fields of research, ideally in multidisciplinary teams with evidence of cooperation (for example, industry, internationally). Areas that are rated excellent should lead over a longer period of time to publications with a high degree of international recognition and should also establish a visible scientific leadership role in the respective

research area. Examples of markers of success are reflected in underlying peer reviewed research grant income and leadership roles in international research consortia.

The grade of "Good" in the RAUH criteria was noted to refer to National activity only with evidence of potential for International work. In international context we would regard this as below average performance (thus not "good"). Within our panel, "Good" research refers quality that is recognised internationally in terms of originality, significance and rigour.

The impact of scientific activity can be broad and diffuse, with societal, policy, economic benefit alongside health benefit to patients and populations. It addresses relevant and well defined target groups and uses suitable formats and/or formats that have been tested by the unit. Strategic oversight, management of activity and ownership

by individual academics were additional factors that were considered. Excellence is achieved when the activities are realized and the output of the science flows, for example, into high-ranking national and international boards, government policy, new patents/ start-ups, or are decisive for official decisions and practice changing clinical guidelines.

The criterion research environment and viability does not allow a uniform assessment in some cases, since some factors are influenced by external circumstances (staff cutbacks, budget cuts, reshuffling of open professorships, etc.), while the organisation of the unit, the design of decision-making and strategy processes, can be influenced directly by the unit. Evidence of leadership, sustainability, effective team working and partnerships to harness cross University opportunities were explored across the Unit assessments and interviews.

1.2 Assessment summary

Research at the Neuroscience Centre (NC) has the aim to study basic and translational mechanisms on the development and function of healthy and diseased nervous

systems. The ambitious aim of the NC is to be among the leading neuroscience institutes in Europe. However, the setting seems not to provide a strong attractive prospective

for foreign postdoc and group-leaders, thus limiting the international visibility of the Unit. There is some cooperation among groups but there is room for improvement in order

to increase the scientific impact of the research output. The impact of the scientific production of the Unit was very good up until 2014/2015. Indeed the scientific production of most of the research groups at the Unit is very good. However based on bibliometric analysis of the Unit (but also Neuroscience elsewhere in Molecular and Integrative Biosciences Research Programme and what we can derive from the Faculty of Medicine) there has been a dramatic fall in publication quality over the last 4 years. This together with the current external funding of just €2M (5% of HiLIFE total) is worrying because there was a concomitant reduction in core funding in parallel with reduced number of PIs, even though the external funding has steadily remained between 50-52%.

The Unit has defined a clear interest in brain disorders and the target areas for dissemination activities. The identification of potential stakeholders and audiences beyond academia for each target area is clear and well described in the SAR. NC performed and organized several activities in order to fully achieve the valorization, dissemination, and communication of research outputs. If we consider only the written SAR, it is evident that the NC was able to develop projects with high society impact and translational output. The written SAR text was excellent with many relevant examples but this failed to come through at interview where there was confusion over collective ownership of the importance of impact, its priority audiences or strategy for how this should be taken forward.

The overall organization of NC is well defined and

structured. Recently NC has been enclosed as an operative unit of HiLIFE. NC is by far the smallest Institute within HiLIFE and its longer sustainability within this structure based on current trajectory is uncertain. The move of the NC to the hospital campus (Meilahti Campus) offers the opportunity to look at critical mass and appropriate oversight. In our understanding the Brain and Mind “grand challenge” is to bring together neuroscience across the UH with other partners (e.g. Aalto University) but the challenges described in HiLIFE Joint Activities and Infrastructures (Unit 21) were seen as potential hindering this. Finally and importantly NC seems to be fully involved in the reorganization of the neuroscience in Finland.

A new director has been recently nominated. Thus the chain of direction is well defined and structured. Also, the organism and methodology that evaluates the productivity of every single PI are clear and well organized. There is a plan to enroll external Visiting Group Leaders and co-affiliation to the NC of researchers from the University of Helsinki (UH), allowing international and national collaborations. HiLIFE has a tenure-track program for young scientist, but each tenure track position needs approval from faculties, making the system complex and less appealing. New PIs to the unit are recruited by regular calls every second year and whenever funding is available.

NC has good infrastructure platforms but there is a danger that these become the focus of future strategy rather than strategy being driven by outstanding sciences, addressing key challenges.

Strengths

- The scientific production of most research groups is very good
- Clearly identified societal impact target areas, stakeholders and audiences in SAR
- Well organised leadership
- Good infrastructure platforms

Development areas

- Fall in publication quality based on bibliometric analysis
- The tenure track system at HiLIFE and UH level

Recommendations

- Improvement of the scientific quality is now a fundamental issue and ultimately will be driven by scientific quality
- The greatest focus areas of the future strategy of NC requires clarification.
- The NC also needs a clear strategy on how to organize dissemination and promote social impact of the research achievements.
- Make a clear planned tenure-track system to increase the appeal for young researcher at Faculty/HiLIFE and UH level
- The pathways for supporting post-doctoral fellows needs development, particularly mentorship

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

Research at the Neuroscience Centre (NC) has the aim to study basic and translational mechanisms on the development and function of healthy and diseased nervous systems. The ambitious aim of the NC is to be among the leading neuroscience institutes in Europe. However, NC is not a strong attractive prospective for foreign post-docs and group-leaders (PI), thus limiting the international visibility of the Unit.

The SAR of NC describes the most important results reported by 13 groups. The scientific production of most of the groups is very good with only a few that are not extremely productive. There is some cooperation among groups but there is room for improvement in order to increase the scientific impact of the research output. However most of the PI has double affiliations and probably some of them are working in the NC laboratories for a minority of the time.

The number of paper published was very good considering that 24.3% of NC publications were in the top publication quality class (JUFO3) well in line with the HiLIFE average of 22% publications in the top class. Other parameters that measure the international impact of NC publications indicate that NC research quality in terms of journal quality is clearly higher than the global average. However, there has been a dramatic fall in publication quality over the last 4 years. This together with the current funding situation is worrying. Our rating of Very Good is

largely based on past performance. A more accurate current rating would be **good**.

Strengths

- Scientific production is very good in most research groups
- Well defined research themes in research groups

Development areas

- The impact of scientific production has decreased over the last 4 years
- Cooperation among research groups needs to develop

GRADING: VERY GOOD

Research goals

The mission of the Neuroscience Centre is “to carry out top-level basic research on development and functions of healthy and diseased nervous systems”. Thus the research goals described span from basic research, such as understanding basic mechanisms controlling synaptic plasticity, to more disease related research that aims to the identification of new pharmacological targets for the treatment of neuropsychiatric and neurodegenerative diseases, to study human brain electrophysiology and imaging alteration in neurological diseases and to genetic screening for the identification of novel mutations

associated to epilepsy. The ambitious aim of the NC is to be among the leading neuroscience institutes in Europe. The main goal of the Unit is to understand human brain function in health and disease. The Unit is using a combination of approaches that include molecular and cellular biology, electrophysiology, pharmacology, behavioral analysis on animal models plus non-invasive human electrophysiological measurements and genetic studies in human. For the next 5-10 years while the main research goals of the Unit will remain essentially the same, new technologies will be implemented such as in vivo imaging, electrophysiology and EEG/MEG in both humans and mice, iPSCs differentiated to brain cells and organoids. These will help to better understand the function of the human brain integrating the knowledge obtained with experimental animal models to data obtained on human samples. It's positive that Unit will increase the collaboration with Aalto University to strengthen the possibility to use new technologies for computational neuroscience and human brain imaging and stimulation. Translational research for novel diagnostic and treatment approaches in patient cohorts will be improved by increasing interactions with HUS and with the neuroscience and neurology researchers of the medical school at the Meilahti medical campus.

The rationale for the selection of the goals in the Unit is based on the necessity to understand the multi-scale neuronal mechanisms of neurophysiological and -cognitive

functions to clarify the molecular basis of brain disorders. A multi-technological approach is proposed, but only some brain disorders are indeed studied.

Research results

The SAR of NC describes the most important results reported by 13 groups. Altogether the research groups are working in a variety of well-defined basic research themes and neurological diseases. For these purposes, the NC groups are using a complementary set of methods that cover most of the possible technological approach available with the possibility to use “state of art” technological platform available at HiLIFE. The scientific production of most of the groups is very good with only a few that are not extremely productive. There is some cooperation among groups but there is room for improvement in order to increase the scientific impact of the research output. However most of the PI has double affiliations and probably some of them are working in the NC laboratories for a minority of the time.

The top five achievements in the Unit in 2012–2018 are related to the major brain diseases studied by the laboratories of the Unit. The first achievement is the demonstration of the possibility to inhibit CNS extracellular matrix in order to allow the regeneration in CNS injuries, such as spinal cord injury. The second is the discovery of the possibility to use histamine H3 receptor antagonists to block alcohol consumption and alcohol-induced place preference in rodent models. The third is the discovery that antidepressant drugs activate BDNF signaling in the brain and thereby reactivate a form of plasticity in the adult brain. The fourth is related to the work that aims to study novel

mitochondrial stress response in primary affected tissues in different neurodegenerative diseases. Finally the last is the demonstration, in animal models, of the role of arginine vasopressin (AVP) signaling in protecting the brain from the energetically expensive overactivation during reduced oxygen supply at birth.

All these achievements have a good scientific and societal impact and possible translational application for the treatment of related neurological diseases.

Analysis on research outputs

The Unit published 429 publications in total, of which the large majority are peer-reviewed original research results. Indeed NC published a total of 395 A-level publications at an annual average production rate of 66 and each PI/group produced annually an average of 5.5 papers. The number of paper published is good considering that 24.3% of NC publications were in the top publication quality class (JUFO 3) well in line with the HiLIFE average of 22% publications in the top class. Other parameters that measure the international impact of NC publications indicate that NC research quality in terms of journal quality is clearly higher than the global average. However, while NC groups have not published in very-top journals in the neuroscience field such as *Neuron* or *Nature Neuroscience*, there are several publications in journals of equal quality, including *Nature Reviews Neuroscience*, *Proc. Natl. Acad. Sci. USA*, *Nature Genetics*, *Molecular Psychiatry*, and *Elife*. The overall impact in terms of article and journal impact has not improved but rather stayed the same or even slightly reduced probably because of the reduction of the number of PIs and total funding. This is worrying and need to

be corrected in the following coming years.

On the other hand the scientific production in terms of return-on-investment, is good with an average of 11.5 peer-reviewed (A level) publications per million of Euro of funding, considering than the overall HiLIFE level of approximately 6.4 publications per million of Euro (data based on the 2018 budget). Importantly NC PIs have supervised 46 doctoral theses and 50 master’s theses and participated to develop neuroscience curricula at the University level.

The research topics carried out in NC have a good impact in terms of clinically significant discoveries, interactions with the healthcare system and patients, and output of spinoff companies. The ambition is to be among the leading European neuroscience institutes, however, it has been recognized that some improvements in NC structure need to be completed in order to reach the ambitious goal.

The Panel wishes to encourage the Unit to continue development of the research activities by designing strategies to drive outstanding sciences and addressing key challenges.

International benchmark(s)

These two institutions have been selected for comparison: Institute of Neuroscience and Psychology (INP) the University of Glasgow and University of California (UC) DAVIS Center for Neuroscience where selected for comparison with NC. The comparison with the two institutions is reasonable however cannot be considered European and world top neuroscience institutions.

2.2 Societal impact

Key interests of the NC cover a majority brain disorders and involve the potential collaboration among NC groups. The Unit has defined in the written SAR a clear target areas for dissemination activities. The targets include understanding brain disease mechanisms, diagnostic and prognostic methods, new treatment possibilities and public awareness and outreach. The identification of potential stakeholders and audiences beyond academia for each target area is clear and well described. The Unit performed and organized several activities in order to fully achieve the valorization, dissemination, and communication of research outputs. Some PIs are involved in the development of Spin-off and some research output reach the interest for a pre-commercialization state. However the excellent with many relevant examples failed to come through at interview where there was confusion over collective ownership of the importance of impact, its priority audiences or strategy for how this should be taken forward. For this reason our rating is Very Good and not Excellent.

Strengths

- The target areas for NC actions are well defined and in line with the goal of the Unit

Development areas

- Lack of strategy on how to organize dissemination
- Lack of understanding of the importance of social impact by the PIs

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

The Unit has defined 9 key interest brain disorders, 8 of which are studied by three or more different groups. The 9 brain disorders are Alzheimer's and Parkinson's diseases, major depressive disorder and anxiety, schizophrenia, central-nervous-system injuries, early-life stress and birth asphyxia, epilepsy, and mitochondrial and neurodegenerative disorders. Thus key interests of the NC cover several brain disorders and involve the potential collaboration among NC research groups.

The target areas for NC actions are well defined and in line with the goals of the Unit. The targets include understanding brain disease mechanisms, diagnostic and prognostic methods, new treatment possibilities and public awareness and outreach.

The identification of potential stakeholders and audiences beyond academia for each target area is clear and

well described in the written SAR.

The rationale, described in the SAR, behind the selection is clear and well in line with the goals of the Unit.

Activities and outcomes

The Unit performed several activities in order to fully achieve the valorization, dissemination, and communication of research outputs. These include the participation of the PI to dissemination activity through media and participation to specific educational activities like Brain week, Science days and Mitochondrial disease awareness. Three patents applications have been submitted by three PIs. One PI has been elected Secretary general of the Federation of European Neuroscience Societies, and another was elected member of the EMBO. Some PIs are involved in the development of Spin-off and some research output reach the interest for a pre-commercialization state. In conclusion, the Unit seems very active in actions essential to disseminate the societal impact of the research output.

In conclusion the NC was able to develop projects with high society impact and translational output. However the excellent with many relevant examples failed to come through at interview where there was confusion over collective ownership of the importance of impact, its priority audiences or strategy for how this should be taken forward.

2.3 Research environment and Unit viability

The overall organization of NC is well defined and structured. Recently NC has been enclosed as an operative unit of HiLIFE, and a new director has been recently nominated. Thus the chain of direction is well defined and structured. Importantly the Scientific Advisory Board is responsible to evaluate and recommend recruitment of new groups and funding support for the NC's research program or infrastructures.

Also, the methodology that evaluates the productivity of every single PI is clear and well organized and some positions are open to external Visiting Group Leaders and co-affiliation to the NC of researchers from the University of Helsinki, allowing international and national collaborations.

The NC was able to collect almost 6 M Euro in the period 2013-2017, a little bit more than half from external funding such as the Academy of Finland, EU (including some ERC grants) and foundations. Thus the ability to collect research grants is good in general but not exceptional.

National and international collaboration is well demonstrated by the fact that 62% of NC output involves international collaboration and 77% national collaboration. Finally and importantly NC is fully involved in the reorganization of the neuroscience in Finland.

Good infrastructure platforms are available to the groups. However there is a danger that infrastructure platforms become the focus of future strategy rather than strategy being driven by outstanding sciences, addressing key challenges. Our understanding of the Brain and Mind "grand challenge" is that it attempt to bring together neuroscience across the UH with other partners (e.g. Aalto

University) but the challenges described in Unit 21 were seen as potential hindering this. The new Director has been in post for a short time and the future strategy is taking its form. NC is by far the smallest Institute within HiLIFE and its longer sustainability within this structure based on current trajectory seems uncertain to the Panel. The move of the NC to the hospital campus offers the opportunity to look at critical mass and appropriate oversight.

Strengths

- The overall organization of NC is well defined and structured,
- The methodology that evaluates the productivity of each single PI is clear and well organized,
- NC is fully involved in the reorganization of the neuroscience in Finland,
- Good infrastructure platforms

Development areas

- Danger that infrastructure platforms become the focus of future strategy instead of outstanding sciences
- Integration of neuroscience at the UH and Faculty of Medicine has not been achieved yet
- Focus areas for future strategy needs clarification

GRADING: GOOD

Leadership, goal setting and follow-up

The NC is led by a Director with the support of the Vice-director and currently also by the previous director. A new

director has been recently nominated; he will have full-time engagement by the end of 2019. The director is responsible for recruitment, strategy, personnel, and financial plans and follow-ups, representing the Unit in HiLIFE's directors' meetings. Indeed NC is now an operative unit of HiLIFE, for which the strategy is discussed with Unit directors and decided at HiLIFE level. The Scientific Advisory Board is responsible to evaluate and recommend recruitment of new groups and funding support for NC's research program or infrastructures. The chain of direction is well defined and structured. There is some complaint about the absence tenure-track system that does not ensure a clear career prospective to the PIs. The position is evaluated every 5 years and every year the progress and goals of the laboratory is discussed openly with the Director. The NC is internally evaluated for several parameters that include the quality and number of publications, national and international cooperation, the ability to collect national and international grants, the services offered to HiLIFE, University and national neuroscience community.

The administrative support is insufficient because the three full-time administrative personnel were reduced to a single part-time secretary.

Human resources, careers and recruitment

Personnel at the NC is well structured with 77% research (and teaching) and 23% of other personnel. Interestingly NC opens the possibility to external Visiting Group Leaders who spend more than 12 months in the Unit and full-time Associate Group Leaders who have acquired

their own funding for their personal position and group members. Also, the competitive Neuroscience Center Associate Member (NCA Member) program aims to provide researchers at the University of Helsinki a co-affiliation to the NC with substantial strategic research support for collaboration between the NC and other neuroscience research present in the life-science campuses. The Panel wants to point out that the complicated tenure track systems (Faculties/HiLIFE and UH level) could be reducing the appeal for young researchers to become an NC Group leader.

Researcher education

The doctoral students in the NC account for over 50% of all personnel indicating that PhD students are essential for research activities. Some PhD position can switch to a postdoctoral position depending on specific requirements of laboratories and projects. Most of the PhD students are enrolled in the Doctoral Programme Brain & Mind but the PhD projects are financially supported by the PIs (unclear if also the salary is paid by PI grants). Thus post-degree education is organized like in the majority of European and International organization. Even if the scientific environment seems good for both PhD and Post-doc the pathways for supporting post-doctoral fellows were unclear. Mentorship in particular needs development.

Research infrastructure

A number of core facilities are available to the NC laboratories. Among them the in Vivo Brain Microscopy Unit is probably the most advanced. However the Mouse

Behavioral Phenotyping Facility, The Neuronal Cell Culture Unit and the Zebrafish Unit complete a state-of-art research infrastructure in the NC. Clearly there are excellent infrastructure platforms but a danger that these become the focus of future strategy rather than strategy being driven by outstanding sciences, addressing key challenges.

Funding

The NC was able to attract almost 6 M Euro in research funding in the period 2013-2017, half of which was from external funding, from the Academy of Finland, EU (including some ERC grants) and foundations. Thus the ability to collect research grants is good in general but not exceptional. However there has been a dramatic reduction of financial support from UH and on the ability to collect external over the last 4 years.

Collaboration

National and international collaboration is well developed among NC groups as demonstrated by the fact that 62% of NC output involves international collaboration and 77% national collaboration. Also, 5% of publications also included industry collaborations. There are plans for expanding the national and international collaborations, targeting funding specific to inter-group co-operation, the inclusion of external collaborators, and the opening of new platforms for currently missing and group-bridging areas. Importantly NC has the mandate to coordinate the scattered Helsinki-region neuroscience activities under a joint neuroscience community (Helsinki Network Brain & Mind, HNBM) together with Aalto University, HUS Helsinki University Hospital, and

other UH groups. NC also works actively in the national Neuro center Finland coordinated by the University of Eastern Finland (UEF) and functions as the Helsinki region node of this center. This is an ambitious goal for the Unit. However the coordination of the other neuroscience research center should be based mainly on leadership on common scientific projects and not mainly on the providing excellent infrastructure platforms.

Connections with 'other constellations'

NC is fully involved in the reorganization of the neuroscience in Finland. The NC has initiated the Helsinki Network Brain & Mind. The relocation of NC from the Viikki Campus to the Meilahti Campus has led to a substantial and concrete reorganization of neuroscience research and teaching in the UH during the last few years. Thus the move of the NC to the Meilahti Campus offers the opportunity to look at critical mass and appropriate oversight. However the integration with the neuroscience at the Faculty of Medicine has not been achieved yet.

Societal and contextual factors

Two possible factors can potentially improve the 25% reduction in the government budget. One is the recruitment for 2019 of 5 full-time and 2 visiting group leaders with expertise complementary to NC research capability. Second the NC key role as a hub linking the Helsinki-region and national neuroscience communities. However this is by far the smallest Institute within HiLIFE and its longer sustainability within this structure based on current trajectory is uncertain.

Natural Sciences Panel

PANEL SUMMARY REPORT

1 OVERALL ASSESSMENT

The Panel received excellent materials before the meeting in Helsinki in from of a self-assessment. The interviews and campus walks took place in an open and friendly atmosphere. We appreciated the possibility to have a lunch with students alone. Students are the glue of a University and we learned about examples of student-initiated collaborations among Faculty which was well received.

The Faculty of Science has 1200 employees, 11 ERC Grants today (20 during the evaluation period), 8 Centres of Excellence (CoE), 6 profiling hubs and one Finnish Flagship in Artificial Intelligence together with Aalto University. The Faculty is well organized and the Panel felt that the collaboration between the Dean and the Departments functions well.

All Departments are also strongly embedded in the international science community.

Several National Tasks are linked through research collaborations with the Faculty such as in the Department of Chemistry the Finnish Institute for Verification of the Chemical Weapons Convention, in the Department of Geosciences and Geography, the Institute of Seismology (nuclear weapons explosions, geothermic) and in the Helsinki Institute of Physics the coordination of the Finnish contribution to the experiments at CERN and FAIR. In addition, a collaboration with the National Radiation Safety Authority exists. This is mutually beneficial to stay at the front of knowledge and to share infrastructure.

The Societal Impact is excellent across all Departments. It includes teacher education, special events for children to motivate them for science, outreach in TV and

press and lobbying in politics.

In the **Department of Mathematics and Statistics**, we observed a nice bridge from fundamental to applied mathematics. Through collaborations with other Departments inside and outside the Faculty of Science they contribute to solutions of complex problems. Impressive are the activities related to teacher education and research in education.

The **Department of Physics and Helsinki Institute of Physics (HIP)** have an open culture in which young scientists can succeed. They have world-class contributions to large scale international collaborations and to the materials science program.

In the **Department of Computer Science**, we observed a strong collaboration with industry. They successfully took the initiative to apply for the Finnish Flagship of artificial intelligence together with the neighbouring Aalto University. We see the slight danger that

due to this flagship other fields like software development may not receive the necessary attention.

The Institute for Atmospheric and Earth Systems Research INAR is a role model for basic research combined with strong translational science into society and input to politics.

In addition, the **Department of Chemistry** has a large research engagement with industry and receives a large amount of funding from this collaboration. It is the only radio pharmacy education on MSc level in Finland.

The **Department of Geosciences and Geography** enjoys a large research span from social to natural sciences. The Unit has maybe too many projects and too much teaching in relation to the size.

We found in all Units at least partially excellent science. Our ratings reflect the average over the Units and are as follows:

Unit	Scientific quality	Societal impact	Viability
Department of Chemistry	very good	excellent	very good
Department of Computer Science	very good	excellent	very good
Department of Geosciences and Geography	very good	excellent	good
Department of Mathematics and Statistics	excellent	excellent	excellent
Department of Physics and Helsinki Institute of Physics (HIP)	excellent	excellent	excellent
Institute for Atmospheric and Earth System Research (INAR)	excellent	excellent	excellent

2 STRENGTHS AND DEVELOPMENT AREAS

2.1 Key strengths and highlights

Department of Mathematics and Statistics

The Unit has an excellent research record in all the fields they work on. At the national and the international level, they have high visibility, due to high quality, and an excellent scientific and HR strategy. In almost all the groups, the research work goes from the most theoretical studies to the most practical applications. And that seems to be done in a natural and very efficient way. The Unit has strong involvement in areas of potential and actual application of their research. The corresponding societal impact is remarkable. The amount and level of the interactions with other scientific fields is really impressive. The members of the Unit are open to collaborate with other scientists in the University, in the country and abroad. And this not only at the level of research, but also at the level of education and training, since they are involved in several very interesting and innovative interdisciplinary Masters programs.

The Unit has very interesting and innovative programs concerning new methodology for teaching Mathematics, both at the university level and at the elementary and high school levels. The research carried on in this area is really innovative.

The policy and methodology for the recruitment of academic staff are excellent, with both open and targeted, very well advertised calls, and also a good strategy for the choice of the topics.

Department of Physics and Helsinki Institute of Physics (HIP)

This Unit contains two entities, the Department of Physics and Helsinki Institute of Physics (HIP) which are administratively separate, but which are rather seamlessly integrated. About half of the Department professors have an adjunct scientist status at HIP, and HIP researchers participate actively in teaching programmes. Sharing of cost for salaries, etc. also exists, and several research programmes cut across the two entities. The Unit successfully participates in world leading, large international projects, like CERN's CMS detector at LHC and the Planck cosmic microwave background satellite and provide excellent contributions to other space-based science such as analysis of formation and mergers of cosmic structures including black holes, and the sustainability utilisation of space. In addition, they have a strong materials-physics program based on-going development of the Unit's experimental infrastructure and a world-leading research effort in computational materials physics.

More than 90% of publications involve international collaboration, and a unique complement of state-of-the-art experimental facilities. The Unit has several examples of successful research commercialisation (i.e. spin-off companies). They enjoy a healthy age structure, and we observed a successful renewal of research topics during the reviewed period.

It is encouraging to note that the traditionally

very important use of physics in many sectors of society, through innovations and inventions of, for example, imaging techniques and various sensors and detectors is kept at a high level by this Unit, with the usefulness for biological and medical areas being emphasized through the important presence of the Unit in HiLIFE.

Department of Computer Science

The examples of excellent research selected by the Department in its self-assessment report include papers on advances in text indexing, modelling of evolution, other bioinformatics research, exact algorithms for Bayesian network structure inference, constraint reasoning, probabilistic methods for unsupervised deep learning, information retrieval, brain-computer interfaces, stemmatology, information centric networking, sensing, advances in energy efficiency, security, haptics, continuous experimentation in software engineering, and liquid software. These are impressive given the relatively small size of the Department. Also impressive is the wide range of the results. All areas of the Department have contributed to these results. The results are publications, tools, methods and standardizations.

Institute for Atmospheric and Earth Systems Research (INAR)

INAR as an institution is significantly strengthened by the close relationship with the Finnish Meteorological Institute

next door, with joint strategic goal setting, significant exchange of personnel, joint projects, mutual dependence on each others research infrastructure and data curation. For the viability of the research infrastructures, the Finnish Meteorological Institute seems particularly well placed nationally to share the commitments and the benefits of the research infrastructure. It is recommended to formalise the mutual dependence and benefits as much as possible to secure sustainability of the research infrastructure and its use.

Department of Chemistry

The results presented to the Panel includes highly diverse topics, ranging from basic to applied science. ALD is a high profile area, covering basic development as well as industrial applications. Catalysis, for example using frustrated Lewis pairs, is another strong profile of the Unit. A list of publications, in most cases in prestigious journals, reporting results from the various research topics mentioned above underlines the high quality of the research.

The selection of research programmes and functions reflects the ambition to serve society. Several projects at the Unit aim at industrial applications and have in several

cases resulted in industrial production. The high service to industry is evidenced by comparatively high proportion of funding from industry. Labs for spin-off companies are found within the University, to the mutual benefit of the Unit and the companies. The Unit also offers research instrument time and measurement services to external users.

A laboratory for Chemistry teacher education is a part of the Unit; within this laboratory research on teaching methods is performed. The Unit also has ambitious outreach activities, for children as well as for a general audience, and performs activities aiming at increasing the interest for chemistry, in particular among young persons.

The Unit has collaborative links with the Department of Physics, INAR, the Faculty of Pharmacy, the Faculty of Agriculture and Forestry and the Helsinki Institute of Life Sciences (HiLIFE). The level of engagement varies; the links with Physics are very strong and include a common doctoral program, while that with HiLIFE largely involves shared infrastructure. The joint doctoral program with the Department of Physics has the potential to strengthen cross-disciplinary research in areas such as Matter and Materials.

Department of Geosciences and Geography

The academic staff in the Unit have interests ranging from the natural through to the social sciences, covering the broad areas of geography (both human and physical), earth sciences, and environmental sciences especially related to the bio-geosphere and planning. As such, they have the scope to tackle and bring critical mass to bear on some of the outstanding issues facing the planet to-day, such as grand/global challenges like climate change and the UNESCO Sustainable Development Goals.

The Unit recognises and embraces its societal relevance over a very broad spectrum, both in terms of the research it brings to bear on societal issues, from planning and urban studies through to mining, water and energy, the scale at which it operates, from local to global, and the researchers it involves, from research students to senior professors. This is a natural fit to the research conducted, and the target areas, stakeholders and audiences, research questions and goals follow from it almost automatically, though this is not intended to imply that the impact happens effortlessly or without commitment.

2.2 Development areas

Department of Computer Science

PhD student recruitment is a challenge for most European universities even though there is strong market demand for computer science PhDs. The Department faces an additional

challenge because of the changing model of PhD education funding in Finland. The Department needs PhD students to maintain its research activities and additionally planned new faculty staff will also need additional PhD students. In short,

PhD students are a resource in short supply in computer science. The Department needs more support in its effort to fund and recruit PhD students.

We propose to look for standard international

recognitions such as Fellowship in ACM, IEEE, and AAAI. Europeans typically ignore these because of cultural issues but they are important in raising the visibility of a Department and its researchers. Through the help of increasing internationalization, the professors can ask their international colleagues to nominate or endorse them. An other path is to participate in international PhD programs supported by the EU. This leads to more PhD level research and interaction with international colleagues.

Department of Physics and Helsinki Institute of Physics (HIP)

The Unit should attempt to increase its level of EU funding.

The number of high-level publications with high impact factor, although already quite large, could increase further. Gender equality should be a consideration in appointment processes. It should be noted, however, that two of the four female professors have important leading positions (director at HIP and vice-Rector for research of UH, respectively). Consideration could be given to the concept of a supervisory panel for PhD students (e.g. a primary supervision and one or more supervisors/advisors).

Institute for Atmospheric and Earth Systems Research (INAR)

It is recommended to establish more positions for infrastructure scientists (staff scientists with a different career path) and to improve and even diversify the base funding of the infrastructure efforts. INAR is an example

of translational science organization of importance for the strategic transformation of UH.

To succeed in the ambitious science for service goals, a clearer strategy is needed for Seamless Earth System Modelling. Seamless modelling and prediction, means to consider all compartments of the Earth system as well as disciplines of the weather-climate-water-environment enterprise value cycle (monitoring and observation, models, forecasting, dissemination and communication, perception and interpretation, decision-making, end-user products) to deliver tailor made weather, climate, water and environmental information covering minutes to centuries and local to global scales.

A Value chain analysis should be made, which can be characterized by a backend system developed and supported by research, of observations, data assimilation, operational Earth system model forecasting and ensemble predictions including verification. Post processing models and specific observations are developed and put into operation for the public as well as for specialized applications. In this perspective, the big-data revolution will be a game changer, dramatically changing the value chain approach and its interaction with users.

In the long-term future, an institutional collaboration with FMI may be advisable. In addition, the health issues in the atmospheric gases is important and is treated very well at the University of Eastern Finland (UEF). An institute like HIP with INAR, FMI and UEF could be a possible solution.

Department of Chemistry

The Unit is today largely dependent on funding from industry. While the achievements resulting in industrial applications are remarkable and should be appreciated, it is important to also maintain basic research. Young scientists, in particular, should be encouraged to apply for ERC grants.

Review the structure of the Unit to ensure that it is achieving the desired level of interaction between groups. Increase joint activities between the programmes (seminars, journal clubs etc). Consider open calls for recruitment in order to allow renewal of research. Provide support to help young scientists gain independence.

Department of Geosciences and Geography

Whilst the broad spectrum of research interests is a strength, it means that the Unit has to teach many subjects, each dependent primarily on only one or two academics, and has responsibility for infrastructure and activity distant from UH (as well as internally). The Panel is concerned that the Unit is trying to do too much with too few resources. It notes previous concerns around well-being and overwork; even with new appointments, the Unit is not resilient.

The Unit needs now organizational stability, an analysis of the large portfolio of responsibilities and a chance for more (external) funding. Collaboration possibilities across the University, especially the Social Sciences, need to be maximised.

3 GOOD PRACTICES AND RECOMMENDATIONS

3.1 Good practices

People from the central administration should and are mostly physically located in the science Units, which helps to mutually understand the problems arising during the year. Several Units raised a strong wish that fewer rotations of people would bring more stability.

3.2 Recommendations

We studied carefully the Tenure Track System and discussed it with all Units. The system allows in an extreme case, that a candidate stays during 10 years without tenure and will be dismissed afterwards. Negative tenure decisions should be made after 5-6 years. In this respect, it may be helpful to allow tenured associate professors at UH as is done at the competing Aalto University.

Controversially discussed was the rule among the

Panel members, that a PhD thesis can start only at fixed times four times a year. Positive is, that in this way the selection of the best candidates is easier. However, for an industry project a delay may not be desirable. A flexibility in special cases should be possible.

The decline of basic funding in recent years is a risk. The Units compensated part of it with external funding which per se is positive. However, if the external funding

does not cover the real overhead of administration and infrastructure, the basic funding will serve even less the science. In Natural Sciences, the overhead is typically of the order of 60%. Lobby for restoration of basic funding further is important or lobby for an increase of the overhead.

The funding for medium size infrastructures is weak. It resulted already in a loss of promising candidates in the recruitment process.

Natural Sciences Panel

DEPARTMENT OF CHEMISTRY (NS UNIT 25)

Faculty of Science

1 SUMMARY

1.1 Description of the use of criteria

The Panel has carefully followed the criteria given for RAUH. The use of criteria was discussed throughout the assessment and cross-calibrated between the Units. The Panel was unanimous in the grading of the Units.

1.2 Assessment summary

The Unit has three research programs: materials chemistry, synthesis and analysis, and molecular science. Research in these areas ranges from fundamental to applied, with the latter involving significant engagement with industry. The research is supported by a broad range of equipment and facilities.

Research conducted in the Unit is generally of high quality and impact, with around 60% of published papers involving international collaboration. The Unit has some high profile groups with excellent publication records, but the fraction of papers in top ranking journals is somewhat lower than the Faculty average. The Unit's publications are, however, generally very well cited. This is true for single institution publications, as well as for those involving national or international collaboration.

Strengths

- The Unit has some high profile groups with excellent publication records
- The research is supported by a broad range of equipment and facilities
- The Unit is able to recruit new researchers at different levels
- The Unit has been successful with international recruitment for faculty positions
- The Unit has strong societal impact through industry engagement, teacher training, and outreach activities

Development areas

- Succession planning to account for retirements in future years is needed

- The Unit needs to maintain technical and maintenance support for equipment and infrastructure
- The dependence on industry funding should not compromise the viability of the Unit's fundamental research; measures are needed to attract additional funding for basic research
- Interactions between the research groups need to be strengthened

Recommendations

- The Panel recommends the Unit to
- Review the structure of the Unit to ensure that it is achieving the desired level of interaction between groups
- Consider open calls for recruitment in order to allow renewal of research

- Make efforts to increase funding for basic research. Young scientists, in particular, should be encouraged to apply for ERC grants

- Provide support to help young scientists gain independence

- Increase joint activities between the programmes (seminars, journal clubs etc.)

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The research performed within the Unit ranges from basic research to research with direct industrial applications. The new organization of the Unit fits well the present strategic goals of the Unit. The links between individual groups within the individual programmes are, however, not always obvious.

The research activities within each programme cover broad fields and range from basic curiosity-driven to applied projects, in several cases performed in collaboration with industry. Basic research at the international frontline, resulting in high-level publications, in many cases with high scientific impact, is performed within the Unit, which hosts some high profile groups with excellent publication records. The Unit has been involved in several Academy of Finland Centres of Excellence during the assessment period. At the same time, applications of commercial interest are developed. The Unit currently receives about 51% of its funding from external sources, out of which about 20% comes from industry.

The fact that VERIFIN is included in the organization and thus has access to qualified scientists and modern equipment has led to a high quality and wide international

interest in its activities.

The Unit has several PIs with excellent scientific track records. The scientific activities cover high impact fundamental discoveries as well as industrial applications; the Unit's strong base in fundamental science bodes well for a high quality of the applied research. The Unit's radiochemistry research, supported by a tenure track position, has particular national significance as it offers the only master- and doctoral-level training in radiochemistry in Finland.

The new programme structure may lead to fruitful cross-fertilization and inspire to new ideas and collaborations, thereby strengthening the quality of the research activities.

At the same time as the new organization may favour interactions between research groups, attention should be made to ensure that the present programme structure does not hamper flexibility, scientific renewal and introduction of new research topics, e.g. covered by young researchers to be recruited.

GRADING: VERY GOOD (IN PART EXCELLENT)

Research goals

A new organization of the Chemistry Department was introduced in 2017 with the aim of strengthening interactions between research topics. From having been organized in small and independent units according to disciplines (analytical, inorganic, organic etc), the Department is now divided into three Research Programmes. This new organization fits well the present strategic goals of the Unit. The links between individual groups within the individual programmes are, however, not always obvious.

The overall, and highly ambitious, goal of the Unit is to "Develop the Department among the best institutes in Europe through high quality basic research, by combining experimental and theoretical studies complemented with scientific computing."

Materials Chemistry and Sustainability are the strategic focus areas of the Unit; these areas fit well into one focus area of the Faculty (set already in 2010): Materials and Natural Resources, and into the focus area of the University: Structure of Matter and Material Science. The goals set by

the Unit are a reflection of the new Research Programme structure of the Unit. A goal is also to strengthen interactions between the research groups. So far, this latter goal has not been completely reached, although joint exchanges and activities are common at the PhD student level.

The goals are selected based on the expertise and present activities of the Unit. They are also consistent with the goals of the University and the Faculty. Materials Chemistry is a logical selection as there are presently high profile activities within the area (ALD, biomaterials, polymers, supported by theoretical computations), although techniques and goals in many cases are expected to be quite diverse. Sustainability has been selected due to current activities in catalysis, green chemistry, environmental and bioanalytical research, and its potential for societal impact.

Research results

The Unit has selected a number of results which are timely and which illustrate its expertise and research diversity. The examples highlight results from Atomic Layer Deposition

(ALD), homogeneous catalysis, polymer synthesis, theoretical chemistry, analytical techniques for sampling and characterization of atmospheric particles, preparation of novel ionic liquids and ion exchangers, radiopharmaceutical chemistry and recommended operating procedures for analysis in the verification of chemical disarmament.

The list of results presented includes highly diverse topics, ranging from basic to applied science. The Unit has received international recognition from several of its activities. ALD is a high profile area, covering basic development as well as industrial applications. Catalysis, for example using frustrated Lewis pairs, is another strong profile of the Unit. A list of publications, in most cases in prestigious journals, reporting results from the various research topics mentioned above underlines the high quality of the research.

Analysis on research outputs

The high quality of the research is reflected in the scientific output in the form of research articles, mostly published

in prestigious journals, as well as in bibliometric data. The percentage of publications in JUFO levels 2 and 3 is, however, somewhat lower than that for the entire Faculty.

The Unit has a slightly higher proportion of publications in lower ranked journals than the Faculty. On the other hand, as a consequence of the special tasks (warfare analysis and teacher education) of the Unit it also has a higher proportion of “other staff” than the Faculty. The trend towards higher proportion of publications in higher ranked journals is promising.

International benchmark(s)

The Chemistry Department is characterized by a quite unconventional organization, in relation to its structure and activities, the latter spanning from basic sciences to applications. The selection of benchmark is therefore not obvious; the Unit has selected the University of Oslo and the Royal Institute of Technology, Stockholm, as benchmarks.

The benchmarks have been selected based on their similar research and educational activities and their similar size.

2.2 Societal impact

The selection of research programmes and functions reflects the ambition to serve society. Several projects at the Unit aim at industrial applications and have in several cases resulted in industrial production. The high service to industry is evidenced by comparatively high proportion of funding

from industry. The Unit also provides service to authorities (including VERIFIN). Labs for spin-off companies are found within the University, to the mutual benefit of the Unit and the companies. The Unit also offers research instrument time and measurement services to external users.

A laboratory for Chemistry teacher education is a part of the Unit; within this laboratory research on teaching methods is performed. These activities are seen by the Panel as instrumental for the high quality of teacher education in Finland. The Unit also has ambitious outreach activities,

for children as well as for a general audience, and performs activities aiming at increasing the interest for chemistry, in particular among young persons. In the Panel's opinion, the Unit provides a strong service to society.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The Unit has identified two principal target areas: collaboration with industry, authorities and research

institutions, and the education of qualified specialists. It also participates in a range of outreach activities, including its role as a sub-node of LUMA Centre Finland that aims to inspire and motivate children and youth in mathematics, science, and technology. The Unit's target areas build on its strengths.

Activities and outcomes

In addition to its stated target areas listed above, the Unit plays a critical role in the training of chemistry teachers, as well as in research in teaching methods.

The Unit has close and fruitful contacts with society e.g. via industry-funded projects and industry usage of facilities. Outreach activities aiming at improving the image of chemistry are valuable for the recruitment of students. The Unit hosts the LUMA ChemistryLab-Gadolin which attracts over 4000 school children annually. The Gadolin activities are supported by Finnish chemical companies.

The societal impact outcomes match the activities and the expertise of the Unit, and are to the benefit of the core activities of the Unit.

2.3 Research environment and Unit viability

The Unit is today largely dependent on funding from industry. While the achievements resulting in industrial applications are remarkable and should be appreciated, it is important to also maintain basic research at a high scientific level also in the future.

The Department, like other Departments at University of Helsinki, is no longer an independent economic entity, and has therefore no Department board. New ways of interaction between programmes and individual research groups need to be established, and this is an ongoing process. The effects of the reorganization, with the introduction of research programmes, are as yet unclear.

Administrative staff are no longer located within the Department, but in a separate area. This has led to more administrative duties for research and teaching

personnel. This is a trend at many universities, which aims at administrative processes working smoothly, but often without ample consideration to the consequences for research and teaching personnel. The effects of these changes on the activities in the Unit seem, however, to be largely positive.

All in all, the Unit has an efficient organization with well-defined tasks.

As a development area the Panel recognizes it is difficult for teaching and research staff to influence their situation as there is higher administrative burden for these categories.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The Unit and University have undergone significant

organisational changes in recent years, moving from a more local collegiate decision making structure to a more central corporate model. This has caused some disruption and it appears that the Unit is still grappling with how best to manage budgets and ensure effective and inclusive decision making and information transfer.

Goal setting is undertaken by the research teams, consistent with overarching strategic directions of the University and Faculty.

Human resources, careers and recruitment

The Unit currently has 12 professors, including a visiting professor until March 2020, and two research directors (the directors of VERIFIN and the teacher training unit). Of these six are women. This is complemented by 36 other academic staff,

33 postdoctoral researchers and 64 doctoral students. Of these 23 persons work on research grants or as visiting scientists and 36 have principal investigator (PI) status. Several PIs approach the age of retirement (a large part of the professors are of the age of 60 or above) and recruitment of new, and younger, faculty will be needed within the next few years in order to fill the vacancies which will appear as a result of the retirements. The Unit has established a plan for this, and has recently also been able to recruit at different levels. The Panel recommends open calls, which are not limited to narrow research fields, in order for the Unit to be able to attract the best talents.

There is a high proportion of “other staff”, which is due to VERIFIN and teacher education being localized within the Unit.

The Unit aims to financially support its researchers regardless of their career phase, and seeks broad input into research infrastructure choices. Good mentorship has been developed at the Unit.

The Panel notes with appreciation that the Unit, in order to favour diversity, aims for international recruitment, and has on several occasions been successful in this regard. Like in many universities, the recruitment process is slow, with a risk to lose the best candidates.

Researcher education

The Unit teaches a Master of Science degree in English which helps attract international graduate students and provides a basis for selecting strong PhD candidates.

Topics of thesis work may be modified according to available project funding and research focus of the team. There is a risk that this may hamper a positive development and renewal of the research within the Unit.

The doctoral students are well integrated into the Department.

Research infrastructure

The Unit is presently well equipped and has access to all needed infrastructure. There are, however, worries for the future since the “medium expensive” equipment needed for chemistry will be more difficult to fund. Actions are presently taken, together with other Chemistry Departments in Finland, aiming at demonstrating the needs for chemistry infrastructure. These efforts should be continued in order to secure future relevant research infrastructure.

More staff will be needed for adequate maintenance of research infrastructure.

Funding

The Unit currently attracts 51% of its funding from external sources, which is slightly below the Faculty average. However, its income from domestic and international companies amounts to 56% of the Faculty’s industry income, as compared to 19% of the Faculty’s total funding. This reflects the Unit’s strong industry links but further highlights the fact that income from other competitive programs is relatively low. The Unit acknowledged this point in their self-assessment and identified the EU and ERC as potential sources of increased funding.

Reflection/ Question: An increased reliance on short-term and discontinuous funding can have a detrimental effect on strategic planning, the ability to explore new initiative and the career paths of early-career researchers. What does the Faculty/University see as an optimum level of external support and what does it offer to address the above shortcomings.

Four Academy of Finland Centres of Excellence have terminated during the assessment period. At the same time, less Faculty funding is foreseen. On the other hand, the Unit has extensive funding from industry. New sources of funding are required in order to maintain basic research

of high quality, particularly from ERC (presently there is no ERC grant awarded to the Unit) and Academy of Finland, but also from other EU programmes. Funding for two new professorships, as well as major infrastructure, has been secured from the Academy of Finland.

Collaboration

The Unit is involved in national and international collaborations, and also extensive collaborations within the University. This is reflected in the bibliometric analysis, which shows that the fraction of papers involving collaborators increased from about 77% to 82% over the period from 2012/13 to 2015/16, and that the fraction of papers involving international collaborators increased from 57% to 66%. [Interestingly, the normalized citation score (MNCS) is similar for papers having national or international collaborators].

Connections with ‘other constellations’

The Unit has collaborative links with the Department of Physics, INAR, the Faculty of Pharmacy, the Faculty of Agriculture and Forestry and the Helsinki Institute of Life Sciences (HiLIFE). The level of engagement varies; the links with Physics are very strong and include common master and doctoral programs, while that with HiLIFE largely involves shared infrastructure. The joint doctoral program with the Department of Physics has the potential to strengthen cross-disciplinary research in areas such as Matter and Materials

Societal and contextual factors

Recruitment of students, both at undergraduate and graduate levels, is crucial. The Unit performs activities aiming at increasing the interest for chemistry among children as well as the general public.

Natural Sciences Panel

DEPARTMENT OF COMPUTER SCIENCE (NS UNIT 26)

Faculty of Science

1 SUMMARY

1.1 Description of the use of criteria

The Panel has carefully followed the criteria given for RAUH. The use of criteria was discussed throughout the assessment and cross-calibrated between the Units. The Panel was unanimous in the grading of the Units.

1.2 Assessment summary

The Department of Computer Science has set the goal of being “architects of the digital world”, which fits well with the vision of the University and globally. The Department has established a rich set of collaborations with other institutes and also collaborations within different areas of computer science. It has selected four research areas to focus on: algorithms, artificial intelligence, networks, and software. These four areas are fundamental to future development of computer science and its application in society. The research output is competitive with international standards with some points of excellence. The academic staff is represented in Finnish academies. The Department is also involved in editorial activities and has received a number of prizes and best paper awards.

The Department has a good model of producing

impact on society by engaging with companies and directly reaching out to media and society. One metric of research success in computer science can be measured by how well companies receive the results of the research. The Department has a good record in this area and is actively working with local and international companies. It also works with public organizations. It is also influencing society by educating students in a research-based study program and directly by producing online courses for the general public. This is especially important in both artificial intelligence and security which are among the Department’s focus research areas.

The research environment has been stable and evolving by reacting to external changes such as changes in the funding model. The Faculty of Science has introduced

a tenure track model for new faculty recruitment. The PhD production has been low and the Department expects fewer funded positions from the University because the University does not distribute positions based on market demand. On the positive side, there is strong prospects for PhD graduates. Recruiting PhD students, which is necessary for sustained research at the Department, is difficult Europe-wide and the Department needs to face this issue soon. The number of professors has remained stable. The software group had been too small relative to the needs and to the other groups but the Department has decided to remedy this by recruiting top talent for the area. There is an internalization trend in the Department and this should continue. Also, the Department should increase its effort in recruiting female researchers. In doing this, it should be

willing to extend some of its research areas. The Department has moved into education research and this has allowed it to play a key role in enhancing the University's educational infrastructure. This should help the Department in its own outreach efforts.

A weakness that we observed is the minimal level of EU funding, including lack of ERC awards, either advanced or starting. At the site visit, the Panel was pleased to hear that there has already been improvement in this area by the acquisition of five new EU projects.

Strengths

- Well-chosen research focus areas. Good success in the chosen areas with good publication results.
- Some of the scientific results are excellent.

- Good model of working with companies and public organizations. Successful development of tools that are used by society and companies.
- Ability to adapt to emerging topics such as machine learning and security.
- Increasing internationalization.
- Interdisciplinary work.
- New research centers in data science, artificial intelligence, life sciences, security.

Development areas

- Emphasis in EU and ERC funding.
- Obtain more research coordination support to enable more focused research proposals.
- More PhD students.

Recommendations

- Look for standard international recognitions such as Fellowship in ACM, IEEE, and AAAI. These are typically ignored by Europeans because of cultural issues but they are important in raising the visibility of a Department and its researchers. Through the help of increasing internationalization, the professors can ask their international colleagues to nominate or endorse them.
- Participate in international PhD programs supported by the EU. This leads to more PhD level research and interaction with international colleagues.
- The Department has recently become a member of important research centers. This has given it much more resources than in the past. The Department should take this opportunity to emphasize original research and develop new methods.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Department has chosen as its mission to be the "architects of the digital world." This is an excellent idea, it supports the University's global goal of leadership in digital technologies, and it fits the range of skills in the Department.

The recent Flagship award for the establishment of the Finnish Centre for Artificial Intelligence is a recognition

of the quality of the work and ideas of the artificial intelligence group and their timely reaction to the research opportunities.

The choice of four areas (Algorithms, Artificial Intelligence, Networks, and Software) is excellent. The areas are complementary and the Department has strength in these areas. The areas are fundamental to successful

execution of the mission chosen by the Department. And the areas can be used to develop applications with visible impact in society. For example, artificial intelligence and network security. The Department works well with other Departments in multidisciplinary work and also works in combining different areas of computer science. The software area is being strengthened and this is a good decision. The

increasing interdisciplinary research may give the group an opportunity to produce original work and emphasise the development of new methods.

The Unit works well with industry. This gives the researchers an opportunity to learn about the current problems in industry; it also creates the challenge of how to ensure development of fundamental solutions, rather than short-term solutions. One positive aspect of the industrial involvement is that the Department has been successful in spinning off start-up companies. However, the Panel recommends the Department pays attention to how to ensure the scientific benefits of the collaboration.

GRADING: VERY GOOD

Research goals

The Department of Computer Science was founded in 1967. In the first two decades compiler theory and data communication were the main research areas. In the 1990s, the Department introduced research in algorithm and artificial intelligence, with a special focus on algorithmic bioinformatics and data mining. During this decade Linux was invented at the Department.

Today, the research is organized into four areas: Algorithms, Artificial Intelligence, Networks, and Software. These areas constitute a continuation and adaptation of the research topics of the past, and are basic pillars for the achievement of the mission of the Department, that is to be 'Architects of the Digital World'.

Algorithms form the foundations of all software solutions. Artificial intelligence aims to automate processes that require more than standard algorithmic approaches. Networks connect computational units and try to extend the capabilities of standalone computational units. Software is

the glue that enables computing entities to provide human accessible, reliable, services.

The Algorithms research area covers topics such as exact algorithms for NP-hard problems, string processing, and sequence analysis algorithms, succinct data structures, and modelling of biological systems. The Artificial Intelligence research area develops methods of artificial intelligence, machine learning, and data mining, with the aim of creating computationally efficient, theoretically justified, and reliable methods. This research area is by far the largest in the number of researchers and research output. The Networks research area focuses on networked systems and their enablers: protocols, distribution of state and functionality, interoperability, trust, security and privacy, mobility, information networks, context awareness, and ubiquitous computing. The Software research area topics are the development of software, database and interactive systems, and research related to teaching of programming and learning systems.

The Unit has recognised the needs of society and industry, in particular towards artificial intelligence, data science, data communication, Internet of Things, and cybersecurity. The recommendation of the Panel is to concentrate a high percentage of the Department's research effort in these five previous topics.

The research goals are well chosen and match the strengths of the Department. Given the current goals, the Department is well positioned for the future to exploit the developments of computer science.

Computer science is in the fortunate position of being able to influence many other disciplines and society as a whole by creating techniques and methods that enable new ways of solving problems and providing tools that enable new problem-solving approaches. The four areas chosen by

the Department can well support these activities. "Architects of the digital world" is an appropriate description of the potential impact that computer science can have. The Department has demonstrated that it can contribute to the digitalization of society effort by developing not only new approaches but also new tools that concretely help in this effort. Educational software and bioinformatics tools are good examples of these.

Research results

The examples of excellent research selected by the Department in its self-assessment report include papers on advances in text indexing, modelling of evolution, other bioinformatics research, exact algorithms for Bayesian network structure inference, constraint reasoning, probabilistic methods for unsupervised deep learning, information retrieval, brain-computer interfaces, stemmatology, information centric networking, sensing, advances in energy efficiency, security, haptics, continuous experimentation in software engineering, and liquid software.

These are impressive given the relatively small size of the Department. Also impressive is the wide range of the results. All areas of the Department have contributed to these results. The results are publications, tools, methods and standardizations.

Some of the results have been published in highly rated venues (Nature Communication, STOC). Some publications have been recognized with awards. Some have established new avenues of research. There have been some notable research results, such as the bioinformatics work with a publication in *Nature*, and development of tools. The increasing international collaboration of the Unit has paid off in producing more important results.

The security work is significant in having discovered a potential flaw in the standard LTE communication protocol with significant impact on society. The mobile application to detect sources of energy inefficiency also has direct societal impact. The bioinformatics computational tools have potential impact on many other bioinformatics researchers. The information centric networking work is pioneering and will create new directions for this area of research.

Analysis on research outputs

Publication numbers are stable. In computer science, many prestigious venues are conferences rather than journals, and this skews the publication metrics that do not rate conference publications highly. But looking at the publications of the Department, they are quite respectable.

The library analysis of the publication of the Department for 2012-2017 included 734 research papers, 220 in peer-reviewed journal articles (A1). The evolution of the number of A1 publications, during the analysed six years, shows an increase in 2014 and 2015, with decreasing numbers during the last two years (2016-2017). On the contrary, the total number of refereed review articles (A2), book chapters (A3) and conference articles (A4) has shown an increase during the last year, and is almost double the A1 publications (726 versus 397).

The analysis of the average number of citations by type of publication shows that A2 is the most cited (67.67 citations on average), followed by A1 (23.85), A4 (12.49) and A3 (7.15). Papers with international collaborators tend to have higher number of citations in all four publication types. Also the average number of citations by JUFO level shows a very clear increasing tendency with respect to this categorization, from 4.48 citations in level 0, until 41.08 citations in level 3. The number of JUFO publications labelled as 3 and 1 have increased during the period of study.

From a more qualitative perspective, the members of the Department of Computer Science have been able to publish in some of the most prestigious journals of the field (Journal of Machine Learning Research, Machine Learning, Neural Computation, IEEE Transactions on Mobile Computing, IEEE Transactions on Pattern Analysis and Machine Intelligence), in multidisciplinary journals (Bioinformatics, Cell Reports, Neurocomputing, Neuroimage), as well as in very high level generalist journals (Nature, Nature Communications).

Indicators on the number of doctoral degrees show that the Unit produced 7 PhDs during 2018, and 53 PhDs since 2012. These figures seem to be very low. The Unit should try to increase the number of PhD graduations.

The Unit declares that its main mission is to be

'Architects of the digital world'. Generic research goals supporting this mission are: (i) to collaborate with other disciplines of the Helsinki University; (ii) to solve problems of societal relevance; and (iii) to promote openness and open science. From the "Key achievements during the assessment period" it seems that the three generic research goals have been achieved. The Unit is developing multidisciplinary work with linguists, artists, biomedical engineers, physicists and paleontologists. The Unit has also provided solutions to problems of societal relevance as energy savings (Carat project), massive-scale pollution and environmental sensing (MegaSense project), and the display of power generation potential from sun and wind (BCDC energy project). It has been an effort to check and promote new modes of industrial collaboration, including the production of MOOC courses on artificial intelligence and cybersecurity.

International benchmark(s)

The Department has chosen as benchmark goal Katholieke Universiteit (KU) Leuven for most of its work and Chalmers University of Technology for its software group. These are both appropriate. They are well known places and good models to aim for in the future.

Both benchmarks selected are larger than UH, and higher ranked, but provide good role models.

2.2 Societal impact

The Unit has clearly identified its target audience and stakeholders. They have targeted:

1. Companies, which is quite appropriate for computer science, because academia-industry collaboration has been shown to be beneficial and effective for both parties in many contexts.
2. Public organizations, which are increasingly dependent on robust computing services and for whom advanced computing infra-structure is fundamental to their providing services to their citizens.
3. Students and the general public, who are increasingly reliant on fundamental and basic knowledge about computing, its capabilities, and its limitations, uses and potential abuses.

These targets have been clearly identified and both short-term and long-term efforts have been conducted and many tangible results already achieved. Moreover, the Unit is poised to further enhance the relationships they have established.

For many computer science departments it is difficult to establish close collaboration with industrial companies, even though such collaboration can be mutually beneficial. The computer science Department at UH seems to have been quite successful in establishing such long-term collaborations with demonstrable beneficial results. The Department has chosen an experimental approach to much of its research and this helps it in collaborating with industry. The work on standards with Internet Engineering Task Force (IETF) is quite impactful as it will affect future

products globally. The Department has established and is a member of several joint institutes which are and will be quite important in developing applications and impacting society. The centers on Security, Data Science, and AI are sure to contribute long-term effects to the Department's societal impact. The work with public organizations (country and city) not only has immediate benefits to the organizations and society but also long-term impact on developing policies that are informed by research. The Department's active engagement in the MOOC effort to develop on-line courses has helped it reach a large segment of society. This work is timely and will likely continue to establish UH as a leader. The experience gained in developing such courses and the experience in deploying them gives the Department an opportunity to be a leader in the area and disseminate such technologies throughout the University for different disciplines.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The identification of the target audiences for the activities of Unit 26 is appropriate. They have considered three main targets: (i) companies; (ii) public organizations; and (iii) students and general public. The target audience complements the more academic work of the Unit in the form of journal and conference papers, and provides a good balance between theoretical and practical work. There is also a good balance between organization (private and

public) and civil population. For companies, the tech-transfer of the research results is done in topics such as data science and artificial intelligence, data communication and Internet of Things, and cybersecurity. Nokia Bell Labs in one of the companies collaborating with the Unit.

The collaboration with public organizations is mainly done with the City of Helsinki, and with the Finnish Government. In this second case the aim is to increase and explain the role of digitalisation and artificial intelligence in society. The work with these two public organizations can be of high impact and interest for the civil population, which can take advantage of this initiative. The expertise of the Unit in machine learning and data science can be very useful for developing applications in medicine, and the Finnish health system. The Unit can be very helpful in policy development concerning ethical problems and solutions associated with the implementation of artificial intelligence systems.

The initiative of developing computer science (artificial intelligence and cybersecurity) MOOCs for the general public is very interesting.

The rationale for the choices have been articulated persuasively. The choices match the capabilities of the Department and thus increase the chances of success.

Activities and outcomes

The work of the Unit is disseminated and communicated by means of press releases, websites (at the Department and also at the HIIT), newspapers and magazines, and on TV and radio. Several events for industry have been organized

mainly during the last three years. The Prime Minister of the Finnish Government and the Chancellor of the Helsinki University have participated in some of them. All these activities are very useful for popularising science.

The Department has been quite successful with a number of tangible results. Among these we can state: 1) The development of MOOCs that have reached large numbers of citizens. The elements of AI course had the goal

of reaching 1% of the Finnish population and it has exceeded that goal. 2) The development of networking standards that have been adopted by international bodies. 3) Contributions to government policies on AI and collection of research data.

The Unit presents several evidence of the impact in society of its tech-transfer activities. Companies such as Mozilla, Nokia, Elisa, Vaisala have collaborated with the Unit. The start-up enterprising support has resulted in spin-offs

as Etsimo, and Etsimo Healthcare, Moprim, Senego, and Spaceify. The Department has high support from Business Finland. The Department has been very active in the Finnish Government artificial intelligence strategy and programme, and also have initiated collaboration with the City of Helsinki.

These activities match perfectly with the second generic research goal described in the Self-Assessment Report, that is to solve problems of societal relevance.

2.3 Research environment and Unit viability

The Department enjoys an open and transparent model of leadership and goal setting. It has been successful in meeting its goals despite changes to the Finnish economy and the demise of Nokia. University funding has been reduced but the Department has been able to obtain exceptional external funding and support and has established a number of institutes for collaboration on key research themes that provide platforms for future development. It does, however, face challenges due to changes to the funding model and global competition that is affecting universities worldwide.

The Department has successful international collaborations with important partners that lead to good research. It has partnerships with the Hong Kong University of Science and Technology, Alan Turing Institute, and University College London. It has established centers for important research areas that have already shown successful results: data science, AI, security, and software. It has been

successful in recruiting recently including strengthening its software group significantly. The Department is coping with the newly established tenure track model of the Faculty. While this provides a good career path for young researchers, the Unit has recognised that it comes with challenges and requires careful mentoring for new assistant professors. The educational programme is well planned but recruiting of PhD researchers offers a challenge due to funding model changes in Finland. Recruiting of PhD students is difficult in computer science because of competition with industry. In Panel's view the difficulties the Department is facing may have been derived from the high requirements of incorporating computer scientists into the labour market. In general, this issue needs to be addressed.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The Steering Group (SG) of the Unit is composed of the Head of Department (S. Tarkoma), the Deputy Head of Department (V. Niemi) and representatives of each of the four research areas: Algorithms (J. Kivinen), Artificial Intelligence (P. Myllymäki), Networks (V. Niemi), and Software (T. Männistö). Representatives of the HIIT, the educational programmes, and administration are also part of the SG. The SG meets monthly to coordinate the formulation, implementation, and follow-up of the strategy of the Unit.

The Unit has a tradition of excellence in quality management as recognised by the University Audit conducted in 2015. The goal setting and strategy is developed through a continuous and transparent process that is finished in late spring with a seminar open to the whole Department. Informal discussions are also arranged once a month.

The Unit strategy is developed and implemented in collaboration with the strategy of the Faculty of Sciences. The Head of Department is a member of the Faculty's Board of Directors, and one of the professors of the Department (H. Toivonen) is the ViceDean of the Faculty. The University of Helsinki and the Faculty of Sciences provide support to the Department in terms of infrastructure, strategic openings, training and coaching, resourcing and EU project support. The opinion of the Unit is that the University should increase the support in the coordination of large-scale national and international research projects.

The leadership structure appears to be well designed and appreciated by the actors. Goal setting and follow-up appear to be working.

Human resources, careers and recruitment

According to the figures in Table STAFF 2018 in self-assessment (Appendix 1), the staff of the Unit in 2018 is composed of 190 personnel. The distribution of this personnel in the different groups or levels, when compared with the Faculty of Sciences, shows a somewhat lower percentage in levels 2, 3 and 4, with the opposite behaviour in level 1 and other staff. It is also remarkable the higher percentage of other staff, and levels 1 and 2 of international personnel in the Unit than in the Faculty of Sciences. Some characteristics of the Unit personnel are its youth, international origin, and a share of women in the teaching and research of around 20%. The Panel recommends the Unit continues paying attention to the gender balance of the academic staff. There are signs that the Unit is aware of the situation and the female presence can be seen to be improving in the future due to the recent additions to the tenure track.

The career prospects for the researches in the Unit are excellent. Former researchers hold prestigious academic

positions, or are well placed in companies and government.

The recruitment plan of the Unit is based on the annual strategy seminar, and constitutes a collaborative and transparent process. This recruitment is done by direct invitation of top talent or by opening calls for tenure-track positions in strategic areas. During the last year the Artificial Intelligence area has been expanded. For the near future the Unit expects to increase dramatically the number of professors. The Unit has detected the need of more research coordinators, people with a good knowledge of the research carried out in the Department, and if possible with a PhD degree. The Unit should acknowledge that recruitment of top talent in computer science is challenging because of global competition for talent.

Researcher education

The PhD students in Computer Science belong to the Doctoral Programme in Computer Science (DoCS). Their recruitment is achieved through open calls. DoCS students are in a large majority past Master students of the Unit. DoCS has 63 PhD students (September 2018), and has produced 53 PhDs since 2013 (7 PhDs a year on average). The percentage of students with foreign origin is high (more than 40%). The number of PhDs per year is small in comparison with the needs of a modern and technologically developed country. The arguments of the Unit are based on the change of the funding model of PhDs, that was reformed in Finland in 2014. However, these reforms cannot be the cause of this insufficient number of PhD degrees as their consequences will be seen from 2018 since the time needed to develop a doctoral thesis is four years. The change in the model for the assignment of PhD students executed by the Finnish Government has produced an additional challenge in the recruitment of PhD candidates for this Unit.

It appears that a typical PhD student agrees on the research topic with a supervisor before the student starts the PhD.

The Department uses an apprentice model of PhD education. This is a great model of research training because the student can learn closely from the professor. This can complement mandatory courses that give the students a common education and a sense of identity. The apprentice model, when used judiciously, helps customize the education to the needs of the particular student.

PhD student recruitment is a challenge for most European universities even though there is strong market demand for computer science PhDs. The Department faces an additional challenge because of the changing model of PhD education funding in Finland. The Department needs PhD students to maintain its research activities and additionally planned new faculty will also need additional PhD students. In short, PhD students are a resource in short supply in computer science. The Department needs more support in its effort to fund and recruit PhD students.

Funding

The two main sources of funding are coming from the Government and from the Academy of Finland. However the historical data for both institutions are different. The budget from the Government presents a decreasing trend, whereas the tendency of the Academy of Finland is increasing. Both quantities represent together about 75% of the total funding. The percentage provided by companies and from the European Union seems to be low (in both cases between 3% and 6%).

The Department has been successful in attracting external funding from the Academy of Finland and Business Finland to make up for the reduction of internal University

funding. The Department has not been very successful in attracting EU funding but this seems to be changing. More international collaborations will help remedy this situation.

Collaboration

The Department is well-connected with important partners worldwide: Hong Kong University of Science and Technology, Beijing University of Posts and Telecommunications, University College London, Alan Turing Institute, among others.

The collaboration network of the Unit is extensive and diverse and considering its expertise, especially in machine learning and 5G, it seems they will not have any problems to maintain or even increase the network.

Connections with ‘other constellations’

The Unit cooperates with several institutions within University of Helsinki, as HIIT, HiDATA, HiLIFE, HELDIG, INAR and HELSUS, some of them very recently established operational units.

There is successful collaboration with other constellations through the HIIT. This is natural because computer science is an important resource for other disciplines. The HIIT seems to be a good platform for supporting such collaborations.

Societal and contextual factors

Computer science faces several challenges due to its popularity. Industry tries to recruit not only students

during their studies but also faculty and promising young researchers. The demise of Nokia has hurt Finnish computer science departments. Departments need more support to face these challenges.

Several of the research topics of the Unit have a great interest in society and industry, in particular artificial intelligence, data science, data communication, Internet of Things, and cybersecurity. The very successful recent initiatives on MOOCs can be adapted to microdegrees or alike allowing flexibility in the learning process, something that has much appeal today.

Natural Sciences Panel

DEPARTMENT OF GEOSCIENCES AND GEOGRAPHY (NS UNIT 27)

Faculty of Science

1 SUMMARY

1.1 Description of the use of criteria

The Panel has carefully followed the criteria given for RAUH. The use of criteria was discussed throughout the assessment and cross-calibrated between the Units. The Panel was unanimous in the grading of the Units.

1.2 Assessment summary

Scientific quality of the Department of Geosciences and Geography is high, in some cases excellent. The top 10 outputs span the range of science interests of the Unit, rather than being the best papers from the Unit within the review period, demonstrating the breadth of research areas and methodologies. Most of these outputs were led by scientists from within the Unit. The research maps well onto University of Helsinki (UH) and wider priority areas, including grand challenge problems and Sustainable Development Goals. Most of these involve inter-, multi- or trans-disciplinary research. Working across natural and social sciences positions the Unit particularly well to be able to respond to them. Recent hires have excellent research track records. These factors put the science quality of the Unit on a strong upward trajectory.

The panel was very impressed by the breadth and depth of societal impact. Examples were provided across the Unit, from areas where societal relevance is implicitly important (e.g. Institute of Seismology, ISUH) to academic groups for whom the pathways to impact are less obvious. A very broad range of stakeholders are engaged at a variety of levels, and the Unit is having good influence. Forms of engagement are appropriate and well targeted.

The panel believes that the Unit is well managed, and leadership is good, despite their own analysis suggesting that it is not particularly mature. The reason for the lower assessment grade in this category is concern about the breadth and workload versus staffing levels of the Unit, i.e. it attempts to do too much and over too broad a remit with the resources available. Our recommendation is that the Unit

discusses seriously with senior management within UH the possibility of doing less, or at least sharing the burden of some of their activities.

Strengths

- Very broad range of subjects covered across the natural and social sciences
- Profound societal impact with a large variety of stakeholders and methods of engagement
- Good supportive culture from leadership and amongst staff
- New appointments, with rising international stars, strengthening research
- A comparatively small Unit 'punching well above its weight' and making international interventions

Development areas

- After large amounts of change over the last decade, Unit needs time to settle and exploit synergies, consolidate research, target and shape international research agendas
- As identified by the Unit, take advantage of Artificial Intelligence (AI)/Big Data projects to work across the natural – social sciences divide, and in wider collaboration to shape these areas
- Infrastructure (including e-science infrastructure) and equipment investment and updating

Recommendations

Discuss with senior management, the Unit having fewer responsibilities, or possibly sharing the burden of some of them. Whilst the broad spectrum of research interests is a strength, it means that the Unit has to teach many subjects, each dependent primarily on only one or two academics, and has responsibility for infrastructure and activity distant from UH (as well as internally). The panel is concerned that the Unit is stretched - trying to do too much with too few resources. It notes previous concerns around well-being and

overwork of staff; even with new appointments, the Unit is not resilient and at a critical cross-roads in terms of delivery. The Unit is advised to seek opportunities for increased collaboration with the Rurality Institute to maintain the quality and sustainability of the human geography research, impacts on governance and public discourse, and to improve the chances of research funding success

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

Research of the Unit covers natural and social sciences and aims to tackle on some of the outstanding issues facing the planet to-day. Research at the highest level is being conducted. Research outputs match the Unit's goals very well. All groups within the Unit have good publication statistics. The human geography research on geo-economics and city-region building is impressive in its originality, significance, and rigour.

Strengths

- Very broad range of subjects covered across the natural and social sciences

Development areas

- As identified by the Unit, take advantage of Artificial Intelligence (AI)/Big Data projects to work across the natural – social sciences divide, and in wider collaboration to shape these areas

GRADING: VERY GOOD

Research goals

The academic staff in the Unit have interests ranging from the natural through to the social sciences, covering the broad areas of geography (both human and physical), earth sciences, and environmental sciences especially related to

the bio-geosphere and spatial planning. As such, they have the scope to tackle and bring critical mass to bear on some of the outstanding issues facing the planet to-day, such as grand/global challenges like climate change, the UNESCO Sustainable Development Goals, and key challenges and opportunities facing the cities and regions of Finland and beyond.

The goals selected are a 'natural' choice given the scope of the research the Unit is able to conduct, and alignment with the Faculty of Science priorities. There is a good mapping of their goals onto the Faculty of Science priorities.

Research results

The Unit has a smaller percentage of publications at the top level than the Faculty average. However, there are different publishing styles both within this Unit and within the Faculty. For instance, publications classed as high impact from e.g. particle physics or large facility astronomy that have many, many authors will skew figures. Additionally, some of the human geography publications are slower to pick-up citations that more-immediate natural science interventions. Also, the Institute of Seismology (ISUH), whilst contributing to research, does not have that as one of its primary aims. It is clear that research of the highest level is being conducted, ranging from individual academics, through internal collaboration, to large international groupings. Some are significant primarily for scientific novelty, many for societal impact. A good range from the various research groups have been chosen as the TOP10, most of which are led by members of the Unit. The human geography publications on city-region building debates are particularly impressive. During the site visit, the panel was told that this was the Unit's strategy – to present its breadth, not just the highest impact or best cited papers with which it was associated. The P and P' trends are both positive over the assessment period. A PP value of 0.14 is good (although it fluctuated over the reporting period to below the 'norm' of 0.1), and the values for papers involving national and international collaboration are excellent, at 0.85 and 0.69 respectively. Note that, somewhat unusually (although not uniquely within the Faculty of Science), national collaboration scores more highly than international collaboration; almost 70% of the Unit's publications involve international collaboration. MNJS and MNCS have both decreased over the reporting period, however. There is an indication that the Web of Science is not fully covering the

subject area of the Unit in the Internal Coverage score of 0.75; this likely reflects primarily the social sciences, where the index-linking of journals is more uneven.

The SAR also quotes statistics indicating that Unit members are amongst the most highly cited in their subject areas in Finland, and even internationally. It also has very credible QS World University Rankings in the subject areas it covers. The analysis of publication patterns, trends and statistics is careful and realistic, recognising the different citation styles (reaction, turnaround time) of different types of paper. It also demonstrates that all groups within the Unit have good publication statistics, especially bearing in mind different traditions by subject area.

Analysis on research outputs

There is a good mapping of the research outputs onto the Unit's goals, their ability to achieve societal impact, and their scientific novelty, especially around global/grand challenges. It is interesting that the most important results chosen are not simply the highest cited papers in the highest impact journals – e.g. Computers and Geosciences is relatively low impact (TOP 8 publication). However, the way in which this has been used to achieve societal impact is well articulated. Although not analysed in the self-assessment document in terms of originality, significance and rigour, it is clear how they 'score' well on these aspects. The outputs match the Unit's goals and achievements very well. A large number of publications are cited in the SAR, particularly in relation to their Top 10 Achievements. These also exemplify high standards of originality, significance and rigour. Particularly notable are those associated with the BioGeoScience programme, where a number of them would rank higher on the usual metrics than those amongst those chosen as the TOP10. Different publishing styles within social and natural sciences has to

be acknowledged here, too. Again, the human geography research on geo-economics and city-region building is impressive in its originality, significance, and rigour.

International benchmark(s)

The Unit has chosen the School of GeoSciences at the University of Edinburgh (UoE SoG) as its benchmark. This is the institution of the lead reviewer, who can therefore comment with much knowledge. The similarities in the interdisciplinary range, research goals, and mix of research topics of the academic staff in the two places are strong. Many of the advantages but also issues outlined in the self-assessment document can be recognised at UoE SoG. The differences in publishing patterns outlined in the SAR exist at UoE SoG. There are also differences in the teaching expectation (and practice) in the different areas of UoE SoG that are hinted at in the SAR. Finally, another strong similarity is the vast amount of change over relatively short periods in the Unit and at UoE SoG – for Geosciences and Geography at Helsinki, first the amalgamation between Geography, Geology and the Institute of Seismology in 2010, and the move of Solid Earth Geophysics from Physics in 2018, plus an internal reorganisation. There is no information in the self-assessment document as to the rationale behind these changes, and whether they were imposed (and if so by whom) or proposed internally by the amalgamating groups; we discussed this during the site visit, including the issues around a split-site Department. Although the changes are seen as positive, the impact of such large amounts of disruption should not be under-estimated.

As noted in the self-assessment document, there is a good match in fields of study, research activities and profiles between the Unit and UoE SoG; the Unit has a slightly lower standing in the scientific community (e.g. QS

World University Rankings), although part of this may be simply down to their relative sizes - as commented on in the self-assessment document, the UoE SoG is over four times

the size of the Unit. No comparable University Departments have the additional responsibility of units such as ISUH and the TAITA research station.

Nevertheless, the choice of benchmarking institution seems to be very appropriate, and is a good aspirational choice.

2.2 Societal impact

The societal impact of the Unit is very impressive and indicates that the Unit recognises and embraces its societal relevance over a very broad spectrum. The rationale for the target areas is well-articulated and the Unit clearly understands the importance of partnerships to achieving impact. The actual activities and outcomes demonstrate that the Unit has a large variety of impressive methods of delivery involving a huge number of stakeholders and researchers. This impact could be even stronger through increased collaboration with the Ruralia Institute

Strengths

- Profound societal impact with a large variety of stakeholders and methods of engagement
- Establishment and leadership of the URBARIA programme

Development areas

- Collaboration with Ruralia Institute

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

This entirety of the Unit's societal impact is very impressive. The Unit recognises and embraces its societal relevance over a very broad spectrum, both in terms of the research it brings to bear on societal issues, from planning and urban studies through to mining, water and energy, the scale at which it operates, from local to global, and the researchers it involves, from research students to senior professors. This is a natural fit to the research conducted, and the target areas, stakeholders and audiences, research questions and goals follow from it almost automatically, though this is not intended to imply that the impact happens effortlessly or without commitment. The long-term relationships built up with a number of users of the Unit's research are an important and valuable asset to delivery of the impact agenda. The rationale for the 13 target areas is well-articulated in the self-assessment document. It is telling that the Unit refers to stakeholders as well as/rather than audiences - this implies that the Unit understands that this is a partnership (as explicitly stated later in the section), where achieving societal impact depends on forming good working relationships, understanding the stakeholder's

needs and how they will use the research, and making sure the outputs are targeted appropriately and expressed usefully. The self-assessment document lists 10 categories of potential stakeholders encompassing a very wide range of bodies and organisations. It then explains its aims, and the advantages both to the Unit and the stakeholders, and notes that they match UH strategy. The research goals in this area are well articulated, including how they deliver at both local and global level, how they address societal problems such as loss of biodiversity, natural hazards, competition for water, mineral and energy supplies, global change, urbanisation and urban planning in both Finland and the Global South, and sustainable development, contributing to evidence-based decision making, and understanding the political dimensions and evidence-gathering, communication and dissemination issues around interacting with communities and special interest groups.

Activities and outcomes

The section commented on above demonstrated a refined understanding of the issues of how to use research well to generate societal impact. The actual activities and outcomes documented demonstrate that the Unit can turn theory

into practice, in a large variety of very impressive ways involving a huge number of stakeholders and researchers. Some of this takes the usual forms of media appearances and coverage, where there is extensive evidence of activity. There are also reports contributing to national and international policy, and individuals acting as advisors and offering expert opinion to the Finnish parliament, and to regional and local politicians/political bodies. Substantial effort has gone into open science and open databases, including organising the first open data course for research students at UH and the launch of a spin-out company, and development of a number of digital tools and databases now widely used in urban planning. As noted in the SAR, 'urban geography research has contributed strongly to national and local policies and planning as well as academic, political, and public discussions; especially on the themes of segregation, housing, education, and urban growth and development'. The noticeable impacts on governance and public discourse include debates on housing, boulevard planning, and educational policies, and the development of tools for resource allocation. This impact could be even stronger through increasing the collaborations with the Ruralia Institute at University of Helsinki, which is exceptionally well networked into policy and practice.

Some doctoral theses have had high impact, including being widely noted in national discussions and resulting in invitations to give talks at legislative committees within the Finnish parliament, leading to direct impact on national policies. A major institutional outcome was the establishment of the Helsinki Urban Academy in 2012, and a strategic partnership for city-UH collaboration in 2015, followed shortly thereafter by concrete dissemination

actions, leading eventually to the TOP 5 achievement of the founding and initiation of the first multidisciplinary research unit for urban studies URBARIA in 2017. URBARIA actions have included a variety of events to ensure the working life connections and societal relevance of the new MSC programme. Public visibility of these activities has been very high, and the employability of graduates has been increased, as evidenced by all candidates awarded doctorates in the period 2012-2017 having entered key positions within the public and private sector, further expanding the Unit's societal collaborative networks. Research in spatial policy, politics, and strategic spatial planning has also been highly influential in various aspects of geopolitics, e.g. the knowledge-based economy, the role of the state in the building of city-regions and city-regionalism (a TOP10 publication), with policy impact in the Prime Minister's Office and the Ministries of Economic Affairs and Employment, Education and Culture, and Environment. Related to open databases referred to above, data analytics and big data have been applied to accessibility and mobility analytics, and conservation geography, leading to open access analysis spatial planning tools, evaluation of conservation effectiveness, conservation management and marketing, influencing conservation policies in a number of countries, and providing innovative ways to support conservation marketing, protected area management, and combatting wildlife crime. This is also the subject of a TOP10 publication. Research at the Taita Research Station in Kenya and the TAITA programme has contributed to capacity building of African academia, NGOs, municipal bodies, and national institutes, and, for example, supported climate-change mitigation and adaptation actions of the

local communities. TAITA trains Kenyan researchers in the application of geoinformatics in MSc programmes in Kenya and Eritrea. Research projects involving organisations such as the Kenya Forest Service, Kenya Wildlife Service, Department of Remote Sensing and Resource Surveys, and National Museums of Kenya, have led to more than 60 MSc and 20 PhD theses at the UH and in Kenyan and other European universities. Other activity includes 60 remote sensing and GIS courses for academic and rural stakeholders in 6 African countries. Innovative remote sensing methods to characterise groundwater discharge locations have informed aquifer classification and Environmental Impact Assessment processes, impacting on how water-related issues have been taken into consideration in ore and mining activities, and water supply management. Additionally, hydrogeology researchers have concluded that shallow groundwater could be used to heat many urban Finnish buildings, leading to a pilot project in Helsinki. The Institute of Seismology has contributed to the 24/7 warning system about natural hazards that could affect the Finnish population, a prize-winning TOP 5 achievement that considerably improves the security of people, society and the state, can be utilised in several branches of administration, saves money, and is scalable and innovative. Expertise gained from this initiative and an automatic seismic detection method (a TOP10 publication) have been applied to monitoring seismicity caused by hydraulic fracturing at a deep geothermal drill hole, potentially improving public acceptance of this form of sustainable energy. Seismic hazard assessment of the new nuclear power station has led to an update of the regulations applied to all nuclear power stations and long-term nuclear storage sites.

2.3 Research environment and Unit viability

The panel believes that the Unit is well managed, and leadership is good, despite their own analysis suggesting that it is not particularly mature. The lower assessment grade in this category reflects concern about the breadth and workload versus staffing levels of the Unit, i.e. it attempts to do too much and over too broad a remit with the resources available.

Strengths

- Good supportive culture from leadership and amongst staff
- New appointments, with rising international stars, strengthening research
- Modern, high quality research environment

Development areas

- After large amounts of change over the last decade, Unit needs time to settle and exploit synergies, consolidate research, target and shape international research agendas
- Infrastructure (including e-science infrastructure) and equipment investment and updating
- Process by which requests for new appointments are approved is not clear

GRADING: GOOD

Leadership, goal setting and follow-up

Leadership in a broad Unit such as this is challenging, given the variety of (and sometimes conflicting) ambitions,

needs and priorities of different research groups. The structure appears relatively hierarchical, though with a good deal of consultation. There is limited contact between most academics and Faculty – it is not clear that Faculty understands the Unit's ways of working and needs. The Unit comments that its breadth of research scope should make establishing cases for new appointments at Faculty level easier.

The Unit's Strategic Management Maturity Model™ analysis indicates a moderate level of maturity. That this analysis has been undertaken and conveyed to the panel demonstrates that the Unit is identifying its strengths and weaknesses in this area and taking steps to improve leadership and management.

Human resources, careers and recruitment

Staffing levels – the Unit has a higher percentage at Level 4 and 'other staff' than the Faculty norm, but a considerably lower percentage at level 1. There has been a downward trend in number of FTEs at a time of change and new initiatives, c.f. well-being survey responses concerning overwork. The Unit has been permitted to recruit more recently, both replacement and new positions, but still felt it was growing more slowly than other disciplines. During the site visit, staff appeared positive about their future, after what seems to have been a challenging period. New appointments are more research focussed than some later career scientists, but share the teaching duties and provide all with more time to apply for research funding, thereby creating a 'virtuous circle'.

New professor positions are offered at all levels (assistant, associate and full), enabling the Unit to maximize the talent pool from which it recruits. During the site visit, the panel was informed that several positions are currently open and recruitment is underway.

Researchers appear to be well-supported e.g. there is internal mentoring for those applying for ERC grants. There is also administrative support at Faculty level. There is one recent recipient of an ERC starter grant within the Unit.

The tenure track system appears to be working well and being used flexibly within the Unit. The Unit would support the option for tenure as an associate professor, which gives excellent recruitment opportunities for mid-career rising stars.

Researcher education

There are large numbers of PhD and MSc students, given staffing levels. The Unit has awarded 22-28% of the MSc degrees and 15-20% of the PhD degrees of the Faculty within the review period. PhD degree percentages are increasing. There are some innovative programmes, making a huge difference to impact (see societal impact section). Overseas (e.g. Kenya) students have been educated – a significant contribution to capacity building, especially as this appears to be done in-country so there is not the usual problem as to whether developing country students return home after graduating, or stay in the global north and contribute to the 'brain drain'. The panel notes comments in the SAR that staff have to supervise MSc students with projects outside their core research areas, and sympathizes.

Methods for recruiting doctoral students, agreeing on research topics, monitoring progress and integrating students into the research community appear to be successful. The panel met several doctoral students during the site visit. They all appeared to be well embedded within research groups, properly supported, adequately resourced (e.g. funds to attend conferences), and encouraged to publish in peer-reviewed journals.

Research infrastructure

Researchers in Departments of Geoscience/Geography, especially (but not exclusively) Earth Scientists, often rely on a large suite of expensive analytical instruments. The types of instruments, their sensitivity, and their usage in geosciences and geography have changed markedly over the last few decades; this change is not incremental and needs addressing head-on. For instance, a few decades ago, ion microprobes would be used primarily by igneous petrologists to analyse their rock samples; now they are also used to study palaeoclimates, including CO₂ levels and ocean acidification, potentially hydrocarbon-bearing carbonate rocks, Quaternary environments, etc. Moreover, whereas a few decades ago a research student would concentrate on analyses on a single instrument and become expert in its use, a typical student these days will use multiple instruments to complete their thesis work, never getting particularly proficient with any one of them and often aiming to use the instrument at (or beyond) its limit. This has implications for the kind and amount of technical support needed – whereas we think of facilities becoming more automated and needing less technical support, more is actually required to have the necessary discussions over the aims and methodology of the research and to ensure the instruments are used safely and sensibly. There are also

many new types of equipment that researchers in the Unit will use – for example, unmanned autonomous vehicles and μ CT scanners – as well as processing and analysing remote sensing data. These challenges are where many of the research advances are being made in the subject, and so it is vital that the infrastructure is available and supported adequately. It is extremely hard to find the resource for the necessary analytical instruments (and field equipment), space to locate them, and support to maintain, repair and replace them in a unit the size of UoE SoG – it must be even more challenging for this Unit. Note also that although described as *research* infrastructure, much will necessarily also be used for teaching, especially at Masters level.

The Unit also has the Taita Research Station in Kenya, and a seismic observatory providing data to international data bases for a variety of uses, including monitoring of the comprehensive nuclear test ban treaty, earthquakes and seismicity, and deep Earth structure. There are opportunities for this facility to be commercially offered to European and other partners, especially in the context of the UK's Global Challenges Research Fund (GCRF).

The Unit uses facilities of other Departments within the Faculty, as well those of other Faculties, e.g. LUOMUS, on the Viikki campus, and a network of external research stations run by UH.

The Unit supports shared (a consortium of Finnish Universities and the Geological Survey of Finland) facilities, Finnish Geosciences Research Laboratory (SGL), housed in the Geological Survey of Finland. This provides access to a suite of high quality instruments for analysing geological materials, and also fosters collaboration.

The Unit has agreements with many other organisations, providing access to facilities as well as covering research cooperation. Key amongst these are for

synchrotron facilities in France, advanced computing in Belgium, ion microprobe in Sweden, volcanological studies in Iceland and hominid (and related) research in Kenya.

All the above is in accordance with the expectations of a modern, high quality research environment.

Additional research infrastructure centres around collections of samples (especially LUOMUS geological collections), database maintenance and management, and high performance computing facilities, where reliance on other providers is key. The increasing importance of 'big data', 'citizen science' providing data, and the application of machine learning to research areas of the Unit will mean it is vital to have adequate infrastructure in this area, and the panel was told during the site visit that this is a key investment area.

Renewal and operation of equipment and facilities has been funded by a number of sources, including in collaboration with industry. The Unit is to be highly commended in having upgraded and expanded its laboratories and research stations over the last five years using a variety of funding sources – this is justifiably a top achievement (listed as TOP 3). The Unit is 'on the radar' of various national and European initiatives, and involved with European projects, that provide infrastructure resources; these will be used to continue this upgrading and renewal.

Funding

The Unit obtains a larger portion of its funding than the Faculty average from government core sources and other internal sources. However, this may reflect in part the statutory/regulatory responsibility associated with ISUH. It is also noteworthy that different sections of the Unit have a very different funding balance, e.g. human geography's societal relevance results in more funding from

municipalities and ministries in contrast to geophysics' energy and mining industry funding. There was a significant drop in funding between 2015 and 2016, and little recovery subsequently in the period covered by the SAR. This is associated with the period of overwork that affected well-being, research outputs and efforts to obtain research funding. The Unit notes that the balance of funding has changed recently with the new appointments to include several items of new Academy of Finland funding and an ERC Starting Grant; this is a welcome development, and augurs well for the future. Whilst some of the Unit's research is in areas appropriate for industry funding, this tends to be short-term and very directed. Some of it is also likely to be dependent on commodity prices, and therefore is not predictable or sustainable. A small point to note is that UH regards European Space Agency (ESA) projects as industrial and therefore takes a heavy overhead from them. As these projects are original research and represent a diversification of research funding, the panel recommends a lower taxation rate to provide a stronger incentive. URBARIA has received funding for 6 Post-Doctoral fellowships from Finnish cities, demonstrating its societal relevance; this provides continuity in funding with the end of the RELATE Academy of Finland Centre of Excellence. The Unit will seek a new Centre of Excellence in this area, with the possibility of leading (given the pending retirement of some staff at Oulu University), but notes the stiff competition. Greater collaboration with the Ruralia Institute at Helsinki is recommended to improve the chances of success. There is also long-term external funding for a Professorship. The Unit notes the difficulties associated with external funding for PhD and post-doctoral research from private foundations, in that it requires supervisory time from academic staff, possibly on topics not of primary interest to those concerned, and dilutes research effort

away from the Unit's primary areas. The aim is to secure more funding from European networks for research and infrastructure, as well as from Academy of Finland calls. This would provide a well-balanced portfolio. The Unit's research standing and societal relevance should ensure a sustainable funding future.

Collaboration

Collaboration is an essential part of the Unit's strategy, both in the past and moving forward. This takes place at all levels and in many forms – within the Faculty, with other parts of UH, nationally, internationally and sometimes inter-disciplinary. It is often facilitated through infrastructure agreements and shared research stations, which provide a natural focus; several examples are given in the infrastructure section above. The Unit is a partner in many international efforts and research projects, such as the Comprehensive Nuclear-Test-Ban Treaty and the EU European Plate Observing System, and provides its observational data to appropriate data bases, in some cases, collating them. There are many collaborations with other stakeholders such as industry, local authorities, and regulatory bodies. An interesting new development in the Unit is the collection and use of big data and social media data in partnership with appropriate bodies; such studies are sure to become increasingly important. The mix of natural and social scientists within the Unit helps with the planning and contextual understanding of this type of research. As noted elsewhere, building on the RELATE Academy of Finland Centre of Excellence that is coming to an end and greater collaboration with the Ruralia Institute would be beneficial for advancing the quality and sustainability of the human geography research.

Connections with 'other constellations'

Having a presence on both the Kumpula and City Center Campuses aids cooperation within UH. This cooperation is good, exemplified by the Unit's leadership of URBARIA and running of the Taita Research Station on behalf of many participating groups. ISUH has a number of national and international relationships because of its statutory and regulatory responsibilities. It is unusual to have a body such as ISUH within a University Department; in most western countries it would sit within a geological survey or similar government body, but similar organizations that take care of national seismic monitoring are also found attached to universities in the smaller countries such as Sweden, Norway and Switzerland at Universities of Uppsala, Bergen and ETH, respectively. It provides training and research opportunities as well as societal impact. As noted elsewhere, these leadership roles are an additional burden on an already pressed workforce.

Societal and contextual factors

The Unit conducted a well-being survey of staff and the results were alarming. They have devised a plan to address issues raised, and the Unit's Wellbeing Task Force is active. The SAR also comments that the Unit is grossly understaffed, and the staff profile shows a drop in numbers over the assessment period. The process by which requests for new appointments are approved is not clear. The SAR comments that the scope of the Unit should make new appointments, particularly in areas opened up by the amalgamations that have increased its multi-disciplinary nature, possible.

These issues were explored during the site visit. The Unit does cover a very broad range of topics. It has also been subjected to a large amount of change in recent times.

It is perhaps an overstatement to say that this has left the staff reeling, but it has certainly had a negative impact on well-being and productivity. The panel was informed that there had been a recruitment freeze but replacements and new positions had now been allowed, meaning that 60% of the permanent teaching staff in Geology and Geophysics research programme have been recruited during the last 2 two years or are in the process of being recruited. The previous well-being issues and low staffing levels were intricately linked.

The SAR (and that of the other Units reviewed by the panel) makes no mention of gender, and the information provided does not state the relative numbers of men and women at the various levels within the Unit, including students. Nor is it clear how female academics are supported to enable them to achieve their potential. The panel is aware that employment practices in Finland support gender equity, e.g. parental leave. However, it was dismayed that buildings were dominated by portraits and photographs of men.

The panel believes that the Unit is well managed, and leadership is good, despite their own analysis suggesting

that it is not particularly mature. The reason for the lower assessment grade in this category is concern about the breadth and workload versus staffing levels of the Unit, i.e. it attempts to do too much and over too broad a remit with the resources available. This is notably true in teaching, where they have become in some sense the 'educator of last resort' i.e. they are teaching subjects/degrees which otherwise would no longer be taught in Finland (palaeontology, hydrogeology, solid Earth geophysics). It is laudable that they have taken this on, with enthusiasm, but it means that personnel are continuously stretched and resources are spread very thin. A particular concern is Masters projects, where staff have to supervise projects outside their core areas of expertise. Rather than have a core of staff who can all contribute to a small number of degrees, providing a degree of resilience, the Unit offers many degrees each of which relies heavily on only one of two staff. On top of this the Unit has commitments through the Institute of Seismology, an overseas research station to manage, and leadership of URBARIA. Senior staff appear to have heavy workloads, with multiple leadership roles. Our

recommendation is that the Unit discusses seriously with senior management within UH the possibility of doing less, or at least sharing the burden of some of their activities.

Our other recommendation is that there is a period of little or no change to allow staff time to 'catch their breath' and reap the benefits of the recent appointments (60% of the permanent teaching staff in Geology and Geophysics research programme) – plus others currently being hired – and new structure. Having brought the diverse but complementary groups together over a number of years, we do not see any value in separating the Unit into natural and social scientists. This would sever actual and potential synergies (or at the very least make them harder to manage) and would not reduce the scope of what each of the two smaller units would be expected to cover. It would also require more management than the current single Unit, thereby reducing further time for research, teaching, having societal impact and obtaining grants and other research support. Two smaller units would find it harder to have influence within UH and be less resilient than one larger one. Furthermore, we sensed no appetite for doing this from within the Unit.

Natural Sciences Panel

DEPARTMENT OF MATHEMATICS AND STATISTICS (NS UNIT 28)

Faculty of Science

1 SUMMARY

1.1 Description of the use of criteria

The Panel has carefully followed the criteria given for RAUH. The use of criteria was discussed throughout the assessment and cross-calibrated between the Units. The Panel was unanimous in the grading of the Units.

1.2 Assessment summary

The Department Mathematics and Statistics of the University of Helsinki (UH) is formed by a group of excellent mathematicians and statisticians, working in various fields and excelling in all of them. The quality of the research produced by the Unit is accompanied by a big involvement in activities with high societal impact. The balance between theoretical and applicable or applied research is achieved in a natural way and that makes this Department a remarkable one in the international landscape. The involvement in teachers' education and Mathematics education in general is quite original and interesting. All the indicators show that this Department is a real success story.

Strengths

- The Unit has an excellent research record in all the fields they work on. At the national and the international level, they have high visibility, due to high quality, and an excellent scientific and HR strategy. In almost all the groups, the research work goes from the most theoretical studies to the most practical applications. And that seems to be done in a natural and very efficient way.
- The Unit has strong involvement in areas of potential and actual application of their research. The corresponding societal impact is remarkable.
- The amount and level of the interactions with other scientific fields is really impressive. The members of the Unit are open to collaborate with other scientists

in the University, in the country and abroad. And this not only at the level of research, but also at the level of education and training, since they are involved in several very interesting and innovative interdisciplinary Masters programs.

- The Unit has very interesting and innovative programs concerning new methodology for teaching Mathematics, both at the University level and at the elementary and high school levels. The research carried on in this area is really innovative.
- The policy and methodology for the recruitment of academic staff are excellent, with both open and targeted, very well advertised, calls, and also a good strategy for the choice of the topics.

Development areas

Overall the Mathematics Department is doing very well in all directions and they have an excellent strategy in place. Maybe areas where they could improve could be concerning two topics: hiring more women, making efforts to attract good women mathematicians. And also concerning outreach activities,

Because while some members of the group are very

good in this direction, others could also participate more actively. Indeed, the applied activities of the group make it easy to develop further the outreach in the direction of the general public and also in the direction of the young and the students.

Recommendations

The Panel believes that this Department has had a very

successful strategy that has led to excellence in research, high international visibility and high educational and societal impact. The Panel hopes that they will continue on the same track and that the University will find ways to improve the interaction with them and all Departments concerning all operational activities, recruitment and management of all resources (documentation in particular).

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit is a high-level Department, well-known worldwide for their expertise in some mathematical areas, mainly in analysis and mathematical physics but with very good groups also in logic, mathematical biology and biostatistics. The professors in the Unit are very renowned internationally, and they have worked in important areas, proving excellent results and publishing them in high-level, often top, international mathematical, and non-mathematical, journals. The work of the Unit is very diverse, and covers excellent theoretical work, but also important work linked to applications of Mathematics and Statistics, to health, to imaging, to genetics, to geophysics, to education, and to society in general. This double approach of the group is quite interesting and remarkable. Their quality and attractivity is well recognized by the number of competitive grants that they manage to

attract, like for instance the involvement in several centers of excellence, the important amount of Academy funding and a good number of ERC grants. Several members of the Department have been invited to give talks in the most prestigious congresses of the mathematical community, which is remarkable for such a small Department.

The main strengths are the high expertise in some mathematical areas that position the Department at a very high and visible level within the international mathematical community. For instance, the University of Helsinki is internationally renowned for its analysis group and its inverse problem group. The groups in mathematical physics, mathematical biology, biostatistics and logic contain also very visible researchers of the highest quality. The Department is not very large, but the average level of the scientific work

done there is very high, with some fields in which they concentrate and excel. Another strength is the importance given to the development of Mathematics and Statistics that can help solving practical problems. Going into this direction was a decision made in the Department which apart from being extremely appreciated, is also a source of important societal impact. The Department excels both in the theoretical and in the applied areas of their activity.

The Panel believes that the contribution of this Department to the advancement of Mathematics and Statistics and their applications is of very high quality and is impressed by the variety of topics and by the high level of interdisciplinarity of the projects in which the Department is working.

GRADING: EXCELLENT

Research goals

The general goals of the Unit are to produce high level and high impact research in Statistics and Mathematics; and to continue doing so in the natural development of the topics they work on, in view of the natural evolution in the field and of the needs concerning applications. Those are:

“To become one of the best 50 Mathematics Departments in the world”

“To develop a new culture in Finnish Mathematics that encourages collaboration in pure Mathematics and connects the highest level of pure Mathematics with applications”.

“To renew researcher training by offering PhD students a broad education, including applications, thereby also improving their job opportunities”.

“To participate in an important manner in the training of Mathematics teachers for the future, for the whole country”.

The Unit has also presented in more detail the concrete goals of some of the subunits, but we will abstain from listing them here. Nevertheless, we believe that they correspond very well to the activity and expertise of each of these subunits.

The goals selected by the Unit cover the most important aspects of teaching, research and outreach. Concerning research, they do it not only having in mind the development of new excellent theoretical work, but also the fact that Mathematics and Statistics can be very useful for concrete applications. Next, they care very much about training researchers and teachers in an optimal way. Finally, they want to convey to society the relevance of the work done in the Unit, and the importance of mathematical research for society.

Research results

The list of the main results chosen by the Unit is the following:

“Invisibility cloaking, Sharp estimates for singular integrals, Identifying pitfalls of statistical intuition in human genetics, Axioms for dependence logic, RNA production delays, Scaling limits of the Ising model, Multiplicative chaos, Omitted points of quasiregular maps in high dimensions, Instability of solitary waves, Bacterial population evolution”, and we have chosen to write them here in order to show the extreme variety of the topics, and also the fact that some of them look and sound like Mathematics or Statistics, but others look and sound like physics, biology, genetics, etc. And that is extremely important: the fact that high-level Mathematics is being developed in this Department in order to contribute to the understanding of physical and biological systems relevant for health, for the construction of new materials, new instruments, new technologies etc., is of the utmost importance.

The list of the main results of the Unit is remarkable by its variety, by the novelty and originality of the approaches taken to solve concrete mathematical or technological problems, by the level of the scientific journals where the results have been published (not only top mathematical and statistical journals, but also top generalist scientific publications, like PNAS, Nature Genetics, Nature ecology, etc.) and by the impact (bibliographic but also on the applicative side) that these results have had. The mathematical research that this Unit is producing is excellent from the theoretical mathematical viewpoint but is also useful for applications in very diverse technological and societal areas. This is impressive.

Analysis on research outputs

The success of the Unit can be measured in several ways, and not only through the bibliographic input, which is very good. The fact that a large number of the Unit’s publications have appeared in the best journals in the world, the fact that several members of the Unit have been invited to give talks (sometimes even as plenary speakers) in the most prestigious mathematical conferences and congresses, the fact that in the Shanghai ranking the Unit occupies the 42nd position among all the Mathematics Departments in the world, beyond their expectations and goals; the fact that the applied work of the Unit has been published in the most prestigious generalist scientific publications in the world devoted to the non-mathematical topics dealt with... all these “indicators” show and witness the very high quality of the research performed in this Unit.

The outputs correspond perfectly to the strategy set up by the Unit some years ago. The strategy was very good, the training and the hiring policies have paid well, and the consequence is a highly successful Mathematics and Statistics Department, which is achieving what it planned to achieve, and which maintains for its future development an excellent and ambitious roadmap.

International benchmark(s)

It was not easy to choose benchmarks for this Unit, mainly because it is not easy to find Mathematics Departments that compare to the one of Helsinki University. Why is this so? Because the scope of the Department is limited to some mathematical and statistical topics and it is not concerned with a large set of fields, like algebra, geometry, topology, probability at large, dynamical systems at large, general PDEs (fluid mechanics, material science), etc. The Unit is concentrated around some particular fields in which they

excel. The three benchmarks chosen are the Department of Mathematics of ETH Zürich, the School of Mathematics of the University of Edinburgh and the Mathematical Institute of the University of Bonn, which are three excellent Mathematics Departments. They are more general concerning the set of fields covered, but they also deal with

the fields present at the University of Helsinki.

The Unit has looked for very high-level Mathematics Departments which have a size comparable to them, and which cover the fields present in Helsinki. They are all public institutions with modest or no tuition fees at all. The three chosen ones are excellent choices and fit reasonably

well with the Unit. One of the non-fitting features in these three benchmarks is the fact that in them the number of administrative staff is much larger than in Helsinki. This is probably due to the fact that in Helsinki the decision to centralize many administrative tasks has been done in the last years. We will comment on the bad sides of this decision later.

2.2 Societal impact

The societal impact of a large number of the activities developed in the Unit is really high. There is a very important investment in education, both for mathematicians and for other students also. The impact on some health-related topics, in geophysics and atmospheric science, on some new technologies for the environment, in data protection, etc. are clear and precise ... Also, very important efforts are made concerning outreach and popularization.

We mostly see strengths concerning the societal impact of the work of this Unit. Mathematics is often seen as a very theoretical scientific field which plays a role only in education. This Unit's work and activities show how important Mathematics can also be for the development of new technologies and therefore, for the future and success of the Finnish society and its economy. The only weakness is that the people who are active in outreach activities are very few.

GRADING: EXCELLENT

This Department is very conscious of its possibilities to produce research and services that are very useful for Finnish society. They contribute in an important way to the education of a large number of future important actors in society, but also to the development of methods leading to important technological and societal advances at the level of health/medicine, geosciences, biology, etc.

Target areas, audiences, research questions and goals

The target areas set by the Unit include:

- teaching and education;
- problems in society, health, economy, environment, and welfare; and
- dissemination of research results in Mathematics and Statistics.

On one hand the Unit believes that investing in the education of young students is a source of fundamental impact for the society in the future. And it is the case.

So, educating the future Mathematics teachers, but also educating Mathematics students who will go into different careers, is one of the main goals of the Unit which certainly has, and will have, a very important societal impact.

Some of the subunits are involved in the use of Mathematics to help solving problems coming from different societal areas, like health (imaging, detection of sicknesses, stroke classification and detection, tumors, etc.), geophysics (detection of water and oil sources for instance) and the environment, and nobody can contest that this is of importance and a source of important societal impact. There is also the work around statistics, biostatistics, data and artificial intelligence which is also very important nowadays, and areas in which Mathematics and mathematicians can, and should play, an important role. And this Unit is investing in this direction also.

The investment of some members of the Unit in outreach activities has been incredibly high, with YouTube channels, presence on national TV, etc. This is also of high value, since it is clearly important that the society, the

general public, understand the importance of scientific research, not only *per se*, but also for the important economical and societal implications for the future.

The list of activities concerning social impact in this Unit contains exactly all that has to be done in this direction. Once again, the Unit covers all the fields that a Mathematics and Statistics Department can cover concerning societal impact, and they do it professionally and very efficiently. The selection targets and activities are perfectly adapted to their expertise and to what they can contribute on. And they do it very well. So, nothing negative to say in this area, the strategy and the practice concerning societal impact are excellent.

Activities and outcomes

A member of the Unit has helped on the project on data anonymisation in the Social Affairs and Health Committee of the Finnish Parliament for the proposed law on secondary use of social and health data. Another member is a very well-known and appreciated popularizer of Mathematics and science in general on public Finnish TV. Another two interesting activities related to this area are: the fact that the limited-angle dental X-ray tomography methods developed by the researchers in the Unit have been implemented in the products of the company Palodex. And also, the work performed in order to improve the detection of the fine-scale genetic structure within Finland seems

very interesting. The production of open source software packages and public data bases is remarkable.

We believe that the above mentioned activities speak for themselves about the outcomes and the success of the activities of the Unit concerning their societal impact.

The outcomes of the activities of the Unit with high societal impact correspond to a well-defined strategy matching what the Unit can do, on problems of interest for the society in general, and for Finnish society in particular. The Unit has chosen areas of application where their expertise is clearly useful, where they can really make a difference.

2.3 Research environment and Unit viability

The Unit seems to work in a good environment, they have sufficient resources and also access to excellent students on top of having an excellent network of national and international collaborators. The Unit seems to function well, being part of a Faculty in which they can collaborate with other Units. The organization in sub-units and programs allows for the goals to be defined as well as possible for every sub-group in the Department. The doctoral program seems to be a very good one, with procedures which allow the doctoral students to work and progress well, and to be prepared for the future. The only problem seems to come from outside, from the global environment of the University, where rules and procedures are produced

in a uniformized way which does not necessarily fit the needs of different fields. Some problems can be sensed at the level of the library and of the relation between the centralized administration Unit YPA and the scientific Units. Some flexibility in all this is necessary to improve life in the scientific Units and for scientists to spend less time in administration tasks and in trying to circumvent not well adapted rules and procedures.

The Unit is excellent, is sensibly organized and has a scientific staff which apart from being excellent scientists, feel a big responsibility to maintain and enhance the status of their Department and the environment of its researchers. They want to stay attractive and high quality,

and they organize themselves in order to achieve that. The only weaknesses come from the difficulties to convince the centralized units of their needs and of the traditional practices in their discipline. More dialogue is necessary, so that the administration works for the scientists, and not the opposite.

GRADING: EXCELLENT

The Panel has understood that the Unit would like to see more flexibility concerning recruitment of PhD students, and also concerning the University library's policy and they motivate very well the reasons for these requests. They

also wish to have a more stability in the administrative personnel assigned to support them. In the meantime they are adapting to the existing rules in an optimal way. The Panel supports this Unit's wishes in this direction, and acknowledge that other Departments seem to share the same problems and the same wishes.

Leadership, goal setting and follow-up

The hierarchy chain in the Department and the relations (formal and informal) between the Department and the Faculty are well described, and some examples of persons who act as link between the structures are explicitly given. The tradition of research groups under each professor seems to be a normal practice in the University, and probably in the country, and that is taken into account when defining the relation between the head of the Department and all its members. The inside organization in the Unit and the way it works with other Units inside the Faculty seem to be quite classical and reasonable. A possible difficulty could arise from the fact that a large part of the budget is now managed, and so probably also controlled, by the Faculty. What seems more complicated is the fact that many of the policies concerning hiring, recruitment of students, use of finances, etc., are set up by the University in a global and uniformized way. The members of this Unit seem to be trying to adapt to all this as well as they can, but some of the efforts needed to do so are time consuming and really unnecessary.

The general goal-setting and follow-up seems to be well done, in a very sensible way. There are some general goals decided at the level of the whole Unit, but many of them, are decided by the sub-units, because the needs of each of them is different in nature. The members of the Unit seem to receive feedback about their performances in order to be able to make changes when necessary. The follow-up

seems to function in a normal and classical way.

Probably the best support would be to listen to them and to understand what their needs are, how all procedures concerning teaching, hiring and recruitment could be improved or better adapted to the needs and uses of the discipline. Flexibility in the definition and in the application of the rules would be a very positive way to support the Unit, and all Units reviewed by this panel.

Human resources, careers and recruitment

The Unit has some non-academic staff (in reality only 3 persons) and the academic staff is organized in four categories: doctoral students (35), post-doctoral students (34), senior researchers (35) and professors (12). The pyramid seems of a reasonable shape. There is a problem with the gender balance, which is not bad at the three lower levels, but there is only one woman professor! Something should be done to remedy this situation. The roles of the members of each group are the traditional ones for these levels, with different kinds of tasks and involvement. Nothing special to report here.

There seems to be a good policy within the Unit to support young researchers and help them in the search for jobs: to prepare them for interviews and in the preparation of a reasonable profile when applying for positions. The already established researchers seem to get normal support for the development of their careers in a good and balanced manner.

The policy and methodology for the recruitment of academic staff are excellent, with both open and targeted, very well advertised, calls, and also a good strategy for the choice of the topics. The Unit acknowledges the lack of a detailed recruitment plan in order to increase the predictability of openings of permanent academic positions in the Department. They seem to be working on it, but it is

possible that they do not control all the sides and steps of the process. The relatively new tenure-track policy seems to be well appreciated in this Unit.

Researcher education

Most of the doctoral students are recruited either in the University's Masters program or in the Department's collaborative networks. They need to have an advisor and a topic before being recruited.

The doctoral students are accepted once they have found an advisor and have agreed with him/her about the subject of their research. So, in principle, once the student enters the doctoral program, his/her PhD work to come is well defined.

The students seem to be well integrated in the activities of the Department, get feedback from their advisor often, and in the future, it is foreseen that both advisors and students will receive feedback from the doctoral program periodically. The doctoral students give yearly presentations of their work. The Unit seems to consider the doctoral students as an important part of the research staff in the Department.

Research infrastructure

Traditionally the main research infrastructure for the Mathematics Department was the library. The Department was very proud of an excellent library, managed by the Department itself, until it was incorporated into the Helsinki University Library. In the report the Unit speaks of a decline in the quality and accessibility of the books and journals, and of rules that are not satisfactory for the mathematicians, but that are difficult to discuss and negotiate with a staff that has no link and no hierarchy relation to the Departments. At this level it is clear that something should be done to improve the

use of the library by the mathematicians of the University. A meeting between the Department (or the Departments in the Faculty of Science) with the management of the library could maybe be positive and desirable.

A new infrastructure is the laboratory of industrial Mathematics, which contains in particular X-ray imaging equipment, a high-resolution camera and a 3D printer. This is essential for the work on applied problems and for the preparation of students for jobs in the private sector.

Finally, the Unit seems to have access to good infrastructure concerning scientific computing, with computers based on both CPU and GPU based computing capabilities.

The three infrastructures are important for the good functioning of the Department.

The report prepared by the Unit does not say anything about the internet accessibility of documentation and scientific publishing databases by the members of the Department. Today this is almost more important than having access to a physical library.

The only complaint that we could read about the maintenance of the infrastructure concerns the library and the non-possibility of participating in the decisions about how to deal with the mathematical content in the general library of the University. This seems to create some problems. For instance, mathematical books and journals can be interesting for researchers many years after their publication, which is not the case in many other fields. This should be taken into account by the library's management. The management and maintenance of the computing facilities seems to be satisfactory.

Funding

The internal (University) funding of the Mathematics and Statistics Department is less than half of the total funding,

because the Unit has been very successful attracting competitive external funding, like two Academy of Finland Centers of Excellence other institutions in Finland, some funds coming from the private sector and European funds (ERC, etc.). So, despite the important budget cuts of the last years, the total budget of the Unit is good. Nevertheless, the high proportion of external funds creates a risk for the future.

The Unit can only hope that their excellent work will continue to allow them to secure external competitive funds in good quantity, but this is always a source of uncertainty. In this situation, diversification of the sources of funding is very important, and they are trying to do it as much as they can.

Collaboration

All the groups in the Unit have collaboration networks within Finland, but also outside of Finland, and more importantly around the two centers of excellence. Establishing external collaborations is easy for this Unit, because their excellence and their excellent visibility in some of its areas, attract many international researchers and students of the highest level. Also, the existence of interdisciplinary or cross-disciplinary research in the Department is the source of important collaborations with other institutes and organizations in Finland and abroad working in Biology, Genetics, Physics, health, computer science, etc.

The collaboration level is already high, and the Unit plans to continue developing their collaborative networks in the direction of their traditional and new research lines.

Connections with 'other constellations'

Quoting the Unit's report, the ATMATH collaboration connects the Department with the Institute for Atmospheric and Earth System Research (INAR). There is also collaboration with the Helsinki Centre for Data Science

HiDATA, the Helsinki Institute for Information Technology HIIT, and the Finnish Center for Artificial Intelligence FCAI, as well as the Helsinki Institute of Life Sciences HiLIFE. The researchers involved in the ATMATH spearhead activities providing expertise in non-equilibrium dynamics, partial differential equations, random geometry and application of probabilistic methods to analysis, fluid turbulence, chaotic and stochastic dynamical systems, as well as non-equilibrium classical and quantum systems, models of cell division that are identical to the models applied in aerosol physics, adaptive MCMC algorithms that have become commonly used in many applications in physics and Bayesian statistics, and they are world leaders in the validation of these algorithms.

It is excellent that the Unit participates in the study of very applied problems important for the society and the private sector, and naturally, this cannot function without important collaborative efforts with other scientific areas, and in this sense, the Unit is exemplary in its efforts to develop collaboration with other institutions in other areas in a well-structured and formalized manner.

Societal and contextual factors

It is clear that many members of this Department are very dynamic and are always looking for new ways to contribute to the society, on top of the natural contributions to the advancement of their field. This dynamism is the source of many efforts that tend to improve the quality and the impact of this Department.

The Unit seems to be living in a very good moment of its history, with a very good strategy in place concerning mathematical research and also its applications. The efforts of the Unit's members will help in maintaining, or even improving, the already very high level of this Department.

Natural Sciences Panel

DEPARTMENT OF PHYSICS AND HELSINKI INSTITUTE OF PHYSICS (HIP) (NS UNIT 29)

Faculty of Science

1 SUMMARY

1.1 Description of the use of criteria

The Panel has carefully followed the criteria given for RAUH. The use of criteria was discussed throughout the assessment and cross-calibrated between the Units. The Panel was unanimous in the grading of the Units.

1.2 Assessment summary

This Unit contains two entities, the Department of Physics and Helsinki Institute of Physics (HIP) which are administratively separate, but which are rather seamlessly integrated; About half of the Department professors have an adjoint scientist status at HIP, and HIP researchers participate actively in teaching programmes. Sharing of cost for salaries, etc. also exists, and several research programmes cut across the two entities.

Strengths

- Well-articulated research goals that build on the research strengths of the Unit and align with the strategic directions of the University.
- Successful participation in world leading, large

international projects, like CERN's CMS detector at LHC and the Planck cosmic microwave background satellite.

- Excellent contributions to other space-based science such as analysis of formation and mergers of cosmic structures including black holes, and the sustainability utilisation of space.
- A strong materials-physics program based on-going development of the Unit's experimental infrastructure and a world-leading research effort in computational materials physics.
- Ability to attract external funding to maintain or increase research activities in most areas
- More than 90% of publications involve international collaboration, and a unique complement of state-of-the-

art experimental facilities.

- Examples of successful research commercialisation (i.e. spin-off companies).
- A healthy age structure, and successful renewal of research topics during the reviewed period.
- A strong outreach program, including a strong media presence, authorship of prize-winning popular-science books and engagement with school children and the general public.
- Excellent training of a large number of early-career researchers and graduate students in diverse areas of physics, including around 20 PhD graduates per year.
- Well defined measures for managing the well-being of staff and students.

Development areas

- This Unit is performing at the highest international level and has only relatively minor development issues to deal with, most of which have been identified in their self-assessment.
- Although there are opportunities to increase external funding, particularly from EU programs, the ongoing reduction in base funding risks impacting on the

maintenance and operation of experimental facilities and staff development.

- Consideration could be given to the concept of a supervisory panel for PhD students (e.g. a primary supervision and one or more supervisors/advisors).

Recommendations

- The Unit should attempt to increase its level EU funding.

- The number of high-level publications with high impact factor, although already quite large, could increase further.
- Gender equality should be a consideration in appointment processes. It should be noted, however, that two of the four female professors have important leading positions (director at HIP and vice-Rector for research of HU, respectively).

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

This Unit, comprised of the Department of Physics and the Helsinki University part of the Helsinki Institute of Physics (HIP/Helsinki) is to a large extent research oriented. It has a very broad and varied research profile, ranging from a large presence in several of the most excellent international facilities like CMS at CERN, ESA, ESO, ESRF, ITER, JET and FAIR, to strong collaborative research in computational and experimental materials physics, and smaller but important contributions to fields like sustainable utilisation of space. The Unit publishes around 300-400 papers each year, with more than 60 % categorised as astrophysics or particle physics. It also trains a large number of early-career researchers and graduate students in diverse areas of physics, including around 20 PhD graduates per year. In the

reviewed period, efforts have also been made to increase industrial contracts and to form start-up companies.

The quality of the research personnel is excellent, and several of the professors are widely known internationally. The visibility in international conferences is high, and published work is predominantly in top international journals, with very good bibliometric measures.

Theoretical work is multi-faceted, with strong in-house support for the experimental activities, in addition to original work in a large variety of interesting fields of physics – often with an excellent choice of work done in internationally emerging “hot” topics, such as that of gravitational waves. This topic also has generated interest in participation in the next stage of detectors, the

Laser Interferometer Space Antenna (LISA). One highly accomplished theory professor, now well-known to the Finnish public, has been engaged in much appreciated public outreach, writing a number of books in Finnish on a variety of topics of modern physics and cosmology, and participating in a large number of newspaper articles and interviews, and in radio and television programs.

Strengths and development areas

The Unit's research is grouped in two themes; “Astro- and Particle Physics” and “Matter and Materials”, with around 84 personnel in the former and 82 in the latter, including a total of 23 professors (actually, 24 are listed in Appendix 2 of the self-assessment document).

Within the “Astro- and Particle-Physics” theme the Unit is involved in several major international research programs and rightly shares in the success of these programs. This includes a significant contribution to the CMS experiment at CERN that brought the discovery of the last piece of the puzzle of the Standard Model of particles, the Higgs boson, successfully to completion. Of course this discovery was collectively done by some 6000 scientists in ATLAS and CMS, which leads to an inherent weakness of modern big science: How to award credit to a single research group, not to speak of a single person, for such an enormous, and successful, enterprise? An impressive large space-borne experiment, the Planck satellite mission with contributions from this Unit, has given a large amount of useful data which has narrowly pinned down the parameters of the present Standard Model of cosmology, such as the amount of dark matter and dark energy. The Unit was also actively engaged in the analysis of gravity waves, a long standing goal of physics that opens a new window on the structure of the Universe. One cannot be other than impressed by the ability of this Unit to contribute in such a crucial way to both of the present front fields of fundamental physics, particle physics and cosmology. Other significant research activities in this theme include the space physics program which specialises in understanding space plasmas and space weather. This program is aligned with the Academy of Finland Centre of Excellence (ForeSail) which focusses on the sustainable utilization of space.

Besides these large international projects the Unit also undertakes world-class research in its Matter and Materials theme, including a particularly strong program in computational materials physics. This research focusses on understanding and controlling the macroscopic behaviour of various materials; understanding the response of materials subjected to extreme environments; developing functional

materials for micro- and optoelectronics, spintronics, fusion technology and particle detectors; the fabrication and properties of material-nanostructures; and computational modelling of materials and biological systems.

The number of publications is very high, as is the number of PhDs awarded. In the self-assessment report it is suggested that a larger fraction of publications should in the future be aimed at the top category of journals. Still, the Unit contributes more than its share of JUFO Level 3 journal articles (1/3 while being only 1/4 of staff and funding). This research strength is facilitated by strong international engagement, with over 90% of papers involving international collaboration.

GRADING: EXCELLENT

Research goals

Previously, this Unit had rather large activities in nuclear physics, and in plasma thin films, that were discontinued in the 1990s and early 2000s. There was also a very successful group in Atmospheric and Earth Systems Research (INAR) which on the other hand grew so big – around 170 scientists – that it is now its own research Unit (# 30 in this assessment round). Another large group was started in 1997 – the project-based Helsinki Institute of Physics (HIP) which was a merger of the Research Institute for Theoretical Physics and Research Institute for High Energy Physics at the University of Helsinki, and the Institute of Particle Physics Technology at Helsinki University of Technology (now Aalto University). To this institute several smaller universities are adjoined, as is also the Radiation and Nuclear Safety authority (STUK). In the presently assessed Unit (# 29) only the University of Helsinki part of HIP is included, together with the Department of Physics of University of Helsinki (UH).

Around the same time as the creation of HIP, an activity started in space physics jointly with the Finnish Meteorological Institute. This successful activity has generated 3 ERC grants and an Academy of Finland Centre of Excellence (ForeSail).

Being a 3+3 year project-based institute, HIP has the possibility to renew its research directions regularly, with some large commitments like CERN and FAIR of course having a preferred status for long-range planning.

A technological programme has as its aim to take advantage of innovations of CERN to generate industrial applications.

In theoretical physics and cosmology, attention is now, after the discovery of gravitational waves by LIGO/VIRGO and the Nobel Prize in 2017, focused on this new research area of gravitations waves, where the ESA-supported LISA project is planned to be launched within a 15-year timescale. Here the Helsinki group has made new discoveries concerning the detectability of pressure waves generated at cosmological phase transitions. A recruitment, and a visiting professor, in this field is planned for this year, based on grants from the Academy of Finland.

Research on materials in extreme environments has been strengthened, as nuclear physics has been replaced by physics of materials and nanoscience. This will in the near future be focused on environments of extreme radiation levels, temperatures, and pressures. This is of importance, for instance, for space physics, particle physics and fusion research. The goal is to be world leaders in these and related areas within a 10-year period, and recruitment of one professor, a lecturer and a permanent staff scientist is planned. Research in this and related areas of the “Matter and Materials” theme are supported by the particularly strong research effort in computational materials physics.

Particle physics follows very much the same schedule as the rest of Europe, as CERN will enter a new era of high-luminosity LHC, and a slight energy upgrade. This will mean substantial upgrades of the computing infrastructure and detectors, and the successful Finnish elements of the CMS silicon detectors and endcap timing detector will have to be suitably modified, and a contribution to the Phase II Tracker design is anticipated.

Space physics will in the coming years be dominated by the Centre of Excellence ForeSail and its paradigm-changing sustainable utilisation of space, including controlling the space debris and prolonging missions thanks to new radiation tolerant technologies, with one new tenure-track professor hiring planned for 2020.

Among new topics entering the agenda one notes the theory of quantum information and computing, where high-level mathematical theory has already been performed, and where the focus will now be on quantum information theory, in particular how to realize a quantum operating system. Also here, plans are for obtaining Academy of Finland funds for a tenure-track professor in collaboration with the Department of Mathematics and Statistics, the Department of Computer Science, and the Faculty of Arts.

Biological physics is represented with a significant theory activity around biomembrane function in various diseases. Also, the Unit contributes to the HiLIFE institute through development of imaging and non-invasive scattering techniques. A joint professorship with HiLIFE is planned in the fields of chemistry and bio-nanoimaging.

The rationale for selecting these areas is based on leveraging existing strengths and capabilities, achieving major scientific outcomes and having significant societal impact. Detailed arguments for each area are well articulated in the Unit's self-assessment report. There are inherent structures – especially in HIP thanks to its 3- or 6-year cycles – which cause natural periods of strategic decisions, evaluating past performance and also following international developments. This has been, and is still, a very valuable instrument for keeping the scientific profile up to date. The fact that funds are applied for from external sources (the Academy of Finland, and ERC, for instance) lends further strength to the new areas selected for expansion.

Research results

The Unit is very productive with some 2500 publications generated in the period 2012-2017 (with rather large year-to-year fluctuations explained by the LHC accelerator schedule). The examples they have chosen show very well the enormous breadth of topics to which the Unit has contributed significantly: gravitational waves, extreme space weather events, cosmology with the Planck satellite, magnetism in nanostructures, the Higgs boson discovery, the structure of supercritical water, the Philae comet lander, scattering in discrete random media in planetary science (which was supported by an ERC Advanced Grant).

All examples given have had large international impact, and contain novel aspects and in many cases

unique new methods which have generated many followers internationally.

Analysis on research outputs

The bibliometric indicators show excellence, given that several of the fields of publication belong to the most competitive world-wide. Still, the citation rate is above average, and rising. A very large proportion of the Unit's research is international, and published in top-ranked journals. Nonetheless, the ambition is to improve the fraction in highest-impact journals even further. The number of PhD degrees awarded is very high, of the order of 20 per year, of which many have entered the private sector, with the fraction increasing. It seems that the new PhD system of a joint graduate school introduced in 2014 has been working very well, and gives possibilities for the future to tailor courses to improve competitiveness also for future job markets.

There is a large congruence between the excellent outputs generated by the Unit, and its well-balanced self-reflections.

International benchmark(s)

The Unit has selected a successful Swedish university, Uppsala University, as its benchmark.

The rationale behind choosing Uppsala as benchmark is the fact that it has a similar research profile, with even a better Shanghai ranking than UH – whatever this signifies. Anyway the aim to reach at least the level of Uppsala seems like a good and realistic ambition of the Unit.

2.2 Societal impact

The Unit demonstrated a broad range of societal impacts, including outreach programs aimed at students and the general public, engagement with industry, the publication of popular sciences books, the founding of new start-up companies, and political lobbying. The Department is also a strong advocate for open access publication, including disseminated through posts on social media. The international visibility and further development of technology transfer activities have been recognised as development areas.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The broad range of research of the Unit, covering basic physics and astrophysics as well as a range of more applied physics areas means that the societal impact is equally broad and important. The Unit has identified no less than five targets for societal impact: the general public and schools, private industry, hospitals and health care, future energy solution, and decision-making bodies. For the general public and schools, a main task is to convey new results in an understandable way in the national languages Finnish and Swedish. This is done using a wide spectrum of arenas, from social media to school visits, press releases and popular books. A planetarium movie has been filmed at the X-ray Laboratory of the Department of physics, showing the world of insects at the microscopic level. Public visits to Helsinki Observatory, and high school student and teacher travel to

CERN have been very popular, with several thousand CERN visits from people from hundreds of Finnish schools.

Industrial collaboration has been performed in fields like material science, medical physics, space physics and astronomy. Accelerator mass spectroscopy is used for radiocarbon dating with many industrial and research institute customers. The group active in research at CERN is facilitating transfer of knowledge to the private sector, with excellent examples of successful startups. Space technology and satellite data is transferred to many customers.

For hospitals and health care, medical imaging pursued in collaboration with the local hospital district, as well as with veterinary units of HiLIFE.

Energy research is important for nuclear fission and fusion, and activities in battery research, solar cells and superconductors all have industrial partners.

As many of the themes for contacts with the public touch upon research policy issues, like the current theme being the sustainable use of space, as proposed by the ForeSail Centre of Excellence, there are contacts via the University leadership to the decision-making bodies in Finland.

Activities and outcomes

Open access of publications is a strong policy of the Department, and results are disseminated through posts on social media, in particular Twitter. Some professors of the Unit have been writing a number of popular books on science, with Kari Enqvist being at the forefront with prize-winning efforts of popularization.

Open access is a great advantage for the specially interested members of the general public who want to know where current science is going. The many books and newspaper articles (including the well-deserved literary prize) of professor Enqvist have without doubt brought a new generation of interested science students in Finland to university studies in physics, mathematics and related fields.

The Unit is also engaged in collaboration with a wide range of industries and research centres and during the five year period, 2012-2017, it established six new start-up companies based on its research in ultrasonics and medical physics. These are immediate benefits that provide new employment opportunities and directly support the Finnish economy.

The very high ambitions of the Unit are clearly visible in this part of the self-assessment. As the Unit is active in many highly international fields, there is a healthy self-reflection that many of the outreach activities so far have been limited to the Finnish general public, whereas the international visibility is much lower. This is something they want to address in the future.

Another area where the Unit has high ambitions, but where activities recently have been stymied by political decisions is the technology transfer from Big Science to Finnish companies. This was functioning very well until 2015, but after being severely cut then, no new model has been put in place. This is clearly a frustrating situation, and one can only hope for success in present active discussions with Finnish government authorities.

2.3 Research environment and Unit viability

The Unit, consisting of the Department of Physics and HIP, provides a well-functioning and cooperative environment for Physics research within the Faculty of Science. Its management structure is well defined and includes representation from academic staff through membership of its Faculty Executive Board and Faculty Council. It's research is supported by a broad range of equipment and infrastructure, and includes strong collaborative links with other UH academic units, particularly INAR and Chemistry, and strong national and international engagement. The Unit also has appropriate mechanisms in place to manage staff and student well-being, including a joint "work well-being group" that promotes well-being and gender equality, and engages in conflict resolution. In this context, the Unit has recognised the need to improve student and postdoc supervision/mentoring and this is endorsed by the review panel. Funding for the Unit is increasingly dependent on competitive grants from external sources and there is scope to further increase this from EU funding programs. However, this needs to be managed carefully to ensure that the increasing dependence on short term funding does not impact adversely on strategic planning and career development.

GRADING: EXCELLENT

Leadership, goal setting and follow-up

The Department of Physics and HIP are both administratively under the Faculty of Science, with their heads both members of the Faculty executive board and

Faculty council. In that sense, contact with the Faculty is very strong. The Physics Department has two divisions, physics of materials and particle and astrophysics, each of which has its operational budget and personnel management.

HIP is a multi-university enterprise, and has a board consisting of representatives from the partner institutions. Leadership is established by a Director and a Research Coordinator, who are also members of a Steering Group. In addition, there is also a Science Advisory Board, which annually evaluates the performance of HIP.

Besides these rather conventional and formal leadership structures, there is an interesting joint group between the Department of Physics and HIP, namely "the work well-being group", which has an important role in promoting work well-being and gender equality, and also engages itself in conflict resolution. It is led by a very committed and socially competent professor and is also in charge of organizing a popular, joint physics colloquium.

Since 2016, the University provides the entire administrative support to all Departments in a single service organization. This seems to be functioning well on the whole, with some fine-tuning needed in clearly defining "who does what?".

The University has a 4-year cycle for its strategy work, and the same period is followed by HIP, with the annual addition of recommendations from the Steering group. Follow-up is done for the funding indicators decided by the ministry, like number of publications, ranking and citations, number of exams at different levels, etc.

Human resources, careers and recruitment

The Unit has the majority of researchers being young MSc and PhD students, and postdocs, meaning a young and vigorous atmosphere in the various groups. Of the 24 professors listed in the self-assessment (Appendix 2) one notices that four are female – although not outstanding it is anyway a decent number for a Northern European university. One may note that two of the women have important leadership positions.

There are annual development discussions with all staff members. PhD students have at least one personal supervisor, and is also a member of an independent progress follow-up group, which has at least one meeting every year. PhD students are offered mentoring events, but no such system exists yet for postdocs. For large research groups this is usually not much of a problem, but it is recognized that small groups should also be aided by postdoc mentoring, and discussions with the University leadership is ongoing.

When it comes to tenured or tenure-track positions the Department of Physics has a plan until 2025 with a wish list on positions one would like to see filled, and which would be discontinued. As is the situation in many other present-day universities, there is an uncertainty in the extent of external funding, meaning that there is a risk that not all planned positions can be filled.

Researcher education

With the new doctoral programmes in place, one has a guarantee that the level of courses is rather even, which is a big advantage when forming collaborations.

The supervisor and starting PhD student agree on

a research topic, and a 1-2 page document is written as a memorandum, which is sent to the doctoral programme board for approval. At present a co-supervisor is not compulsory, neither has a system of a mentor (from another research group) for each PhD student been implemented.

The research groups seem to well integrate the young researchers with continuous supervision and support. Some weaknesses are acknowledged concerning career planning support, but it is believed that the increased focus on mentoring for PhD student as well as for postdocs could be a remedy.

Research infrastructure

This Unit has a remarkably strong infrastructure, or in their own words: "The Unit has a unique world class research infrastructure selection at its disposal, both locally in Helsinki and also internationally at the major Big Science research facilities."

In-house they have a detector laboratory, and a range of small accelerators and the possibility of mass spectroscopy and positron annihilation spectroscopy. For nanostructures there is a beam deposition facility, and various ion sputter deposition and dry etching facilities. The x-ray lab has an absorption spectroscopy station, and microtomography scanners.

Also for computational research the resources are substantial, with local clusters providing several thousand CPUs, and a strong connection to grid and cloud computing infrastructure. The Unit also is a heavy user of national and European supercomputing resources.

The infrastructure plans are updated yearly at the Faculty level, where the Unit has a strong strategic leadership role for so-called PROF1 calls from the Academy of Finland, and infrastructure funding.

Funding

Currently more than 50% of the funding of the Unit is through external projects, and is likely to increase even further in view of their ambitious goals for the future. One potential large source of funding is through EU support and in an effort to increase competitiveness, application mentoring and peer support is being developed. To mitigate the effect on personnel of discontinuous jumps in short term project funding, there is a plan to increase the fraction of permanent staff salaries paid from projects, to then also leave room for filling a larger number of long-term positions.

As HIP has a mandate from the government to contribute to the activities in Big Science, like CERN, a large part of their budget obtains earmarked funds directly from the ministry of education and culture.

The Unit senses that Helsinki University does not do quite as much ground work at the EU level as is needed to create calls which have a content that suits the activities and knowledge of the University.

Collaboration

The research of the Unit is very dominantly international in character, and around 90 % of their 400 yearly publications are published together with international partners, with CERN/CMS the prime example. However, also collaboration on the national level is important, being performed with all four campuses of UH, most national universities and the technical research centre VTT, the meteorological institute FMI, and various centres of environmental science, biotechnology, agriculture, forestry, food and nutrition, pharmacy, etc., and of course HIP is in itself a national centre.

With such a large network of interacting centres, all with their own infrastructure, the Unit has discovered a (minor) weakness that there is no transparent central

system for finding the available infrastructures and how to access them. They thus propose such a system and suggest that this would create new collaborations, and make existing ones stronger.

Connections with 'other constellations'

The expertise in computational biophysics, and various physical imaging and dating methods has led to a significant contribution to various centres, most notably HiLIFE.

It is encouraging to note that the traditionally very important use of physics in many sectors of society, through innovations and inventions of, for example, imaging techniques and various sensors and detectors is kept at a high level by this Unit, with the usefulness for biological and medical areas being emphasized through the important presence of the Unit in HiLIFE.

Societal and contextual factors

In this section, the Unit has some complaints, mainly related to the fact that basic University funding has steadily gone down in recent years. This has led to adjustments, layoffs, a moratorium on recruitments, and creation of a central University Services administration which is not (yet?) suitably adapted to, for instance, special tasks relating to the CERN and FAIR duties of the HIP part of the Unit. The administrative shift of HIP from an independent institute under the central administration and the Vice Chancellor to the Faculty of Science and the Dean at the beginning of 2015 was on the other hand going relatively smoothly.

As the basic funding has decreased, the Unit sees a growing significance of external funding, which seems to be a deliberate policy in Finland. This also means that EU funding will be more important.

Acronyms

ATLAS - A Toroidal LHC Apparatus, a general-purpose detector at the Large Hadron Collider

CERN - European Organization for Nuclear Research

CMS - Compact Muon Solenoid, a general-purpose detector at the Large Hadron Collider

ERC - European Research Council

ESA - European Space Agency

ESO - European Southern Observatory

ESRF - European Synchrotron Radiation Facility

FAIR - Facility for Antiproton and Ion Research

HILIFE - Helsinki Institute of Life Science

HIP - Helsinki Institute of Physics

INAR - Institute for Atmospheric and Earth System Research

ITER - International Thermonuclear Experimental Reactor

JET - Joint European Torus

LHC - Large Hadron Collider

LIGO/VIRGO - Laser Interferometer Gravitational-Wave Observatory

LISA - Laser Interferometer Space Antenna

VTT - Technical Research Centre of Finland Ltd

Natural Sciences Panel

INSTITUTE FOR ATMOSPHERIC AND EARTH SYSTEM RESEARCH (INAR) (NS UNIT 30)

Faculty of Science

1 SUMMARY

1.1 Description of the use of criteria

The Panel has carefully followed the criteria given for RAUH. The use of criteria was discussed throughout the assessment and cross-calibrated between the Units. The Panel was unanimous in the grading of the Units.

1.2 Assessment summary

The Institute for Atmospheric and Earth System Research (INAR) has evolved around the process understanding of atmospheric nucleation and its role in air quality and atmospheric radiative forcing. The observations-based boreal forest ecosystems - atmospheric coupling is a unique combination and strength of INAR. Quite early on the atmospheric aerosol formation research and the investigation of the dynamics of terrestrial ecosystems for surface fluxes, in particular of organic species and CO₂ were integrated.

INAR is built on a world leading disciplinary contribution to the understanding of homogeneous nucleation processes in the atmosphere. On this disciplinary depth a “horizontal” value chain is built. This value chain goes from process understanding based on comprehensive observations at a single site through a worldwide

instrumentation and observational capability. The next steps are aggregation of information through model calculations to develop societal impact information. INAR has identified the information areas to be C-cycle quantification; urban air quality; forestry practices and negative C-emission technology, and climate adaptation information.

The INAR model to build a value chain on top of disciplinary depth, serves as a model for how the University could transform its strategic thinking at the graduate level (translational science – “the researcher is also on the bedside of the patient” to use a metaphor from medicine). INAR can be seen as a model for “application driven basic research”. Significant entrepreneurship and science diplomacy skills have been important requirements in this development.

The plans for the future are ambitious and reflect that the science at INAR is close to societal applications (like quantifying carbon fluxes, underpinning the development and exploitation of forestry resources in Finland, improving urban air quality worldwide and inform the adaptation to climate change). The work towards these goals requires significant science diplomacy, which is being pioneered by INAR, securing of funding where INAR also wants to attract significant business interests, and governance of the infrastructure (ESFRI for instance) so that it has international institutional backing.

The scientific quality, societal impact and viability of INAR are judged as excellent. The scientific achievements are excellent and the publication record at INAR is unique. There is clear understanding of the role and positioning

of science in society. The Unit has identified audiences and stakeholders as well as activities to reach them. The outcomes provide convincing evidence. The Unit documents a range of practises in leadership, goal-setting, follow-up, career planning and management, science education, infrastructure for research, funding, collaboration, connections with related constellations, societal and contextual factors, which together justifies the grading.

INAR can enhance its research potential as well as its societal impact (and relevance) even further by a more systematic inclusion of the reactive nitrogen biogeochemical cycle, the water cycle as the carrier of atmospheric aerosols, and earth system models at all scales. Collaboration with the Department of Geosciences and Geography (Unit 27) is relevant here.

Strengths

- Unique expertise in aerosol formation processes
- Focus on boreal forest terrestrial ecosystem-atmosphere interactions and fluxes
- Significant role in global atmospheric chemistry

observational infrastructure, also in process level understanding. Excellent fund raising capabilities

- Science diplomacy and science advice expertise
- An excellent research culture led by a clear mission, excellent leadership and good working practises

Development areas

- Need to move from the single leader to leadership as a part of the institute culture
- The viability of the research infrastructure and data curation should be pursued vigorously through all available pathways.
- Earth system modelling at all scales should be given a higher priority in order to be able to reach the science for societal impact ambition.

Recommendations

- Explore further the establishment of “INAR-Finland” as a mechanism to enhance viability through national institutional support and cohesion
- Establish more positions for infrastructure scientists

and improve and diversify the base funding of the infrastructure to ensure the viability of the research infrastructures

- Continue the effort to establish and secure multi-institutional and international responsibility and formalized commitment to the research infrastructure and data curation
- Particular emphasis should be put on formalizing the sharing of the research infrastructure responsibility with the Finnish Meteorological Institute
- Use INAR as an example of translational science organization of importance for the strategic transformation of University of Helsinki (UH).
- For Earth System Analysis, in order to meet its ambition INAR needs to enhance its capabilities. This can be done through institutional collaboration.
- INAR should contribute more strongly and systematically to the research of the reactive nitrogen biogeochemical cycle and the water cycle as a carrier of atmospheric aerosols.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The science agenda of INAR over several decades can be characterized by an extreme ambition to understand and describe on a process level how gases nucleate in the atmosphere and enter the aerosol life cycle, growing from molecular sizes to cluster sizes and stabilization, and further activation of the clusters for enhanced growth. The observations-based boreal forest ecosystems - atmospheric coupling is a unique combination and strength of INAR. Quite early on at INAR, the atmospheric aerosol formation research and the investigation of the dynamics of terrestrial ecosystems for surface fluxes, in particular of organic species and CO₂ were integrated. The scientific achievements are excellent and the publication record at INAR is unique.

The agenda has grown into a unique combination of atmospheric physics, chemistry and ecosystem research. Significant steps have been taken to establish new instrumentation and observational sites in networks that can evolve into a global Earth system observatory. The scientific output is exceptional in quantity and quality.

INAR is well positioned to focus even more on the biogeochemical cycle of reactive nitrogen (Nr), essential for the carbon cycle, not least in the boreal regions, for the chemical composition of the atmosphere, for water quality, eutrophication, particulate matter load - composition and size distribution, deposition to terrestrial ecosystems, N₂O and the role of agriculture and forestry in the Nr cycle. Also the hydrosphere could be emphasized more as H₂O is

strongly coupled to aerosol cycling, ecosystem state, the heat budget of the surface and the planetary boundary layer; the water cycle is a core issue in Earth System science.

Most publications from the group focus on processes, and underscore the significance of the findings on aerosol formation for radiative forcing and climate change. A comprehensive modelling capability based on earth system modelling on all spatial and temporal scales, and with a range of complexities in the process description, is needed. “High societal impact” programmes depend on proper modelling approaches to be able to scale up, generalize and explain process level observations and interpretations.

GRADING: EXCELLENT

Research goals

The ambitions of INAR are supported by the evaluation panel, formulated in “Science for Service” terms: (1) Reduce uncertainty of the remaining carbon budget significantly; (2) Quantify the potential of land-based climate mitigation by finding ways to increase carbon sinks and stocks in boreal ecosystems, (3) Quantify air-quality-climate interactions in pristine and polluted regions, and ascertain the technological, political, and economic steps that are needed to reduce air-pollution levels in megacities by a factor of 6–10; (4) Assess climate change impacts and support adaptation by providing better climate projections and services and assessing socio-

economic risks and vulnerabilities to climate change as well as adaptation trajectories.

These are objectives of large national, regional and global importance and with a large societal impact potential both for climate change mitigation and for economic growth (cf. the future directions of the forestry industry in Finland).

These ambitions are being pursued through process-oriented experiments in the physical-chemical laboratory; measurements in the field in many places globally, very often with a process- or mechanism-focus; focus on the atmosphere-land surface interface in boreal forests; insisting on the relevance of the findings of process studies for the “large questions” (climate change and feedback mechanisms, the hydrosphere, air quality and its health impact, the UN Sustainability Goals); in instrument innovation. The evaluation panel praises the achievements during the assessment period, and support the aspirations in the medium term, which are in 10 years, to be a world-leading institute for atmospheric and Earth system research (beyond atmospheric aerosol research) boosting novel research and innovation actions.

To succeed in the ambitious science for service goals, a clearer strategy is needed for **Seamless Earth System Modelling**. Seamless modelling and prediction, means to consider all compartments of the Earth system as well as disciplines of the weather-climate-water-environment enterprise value cycle (monitoring and observation, models, forecasting, dissemination and communication,

perception and interpretation, decision-making, end-user products) to deliver tailor made weather, climate, water and environmental information covering minutes to centuries and local to global scales.

A **Value chain analysis** should be made, which can be characterized by a backend system developed and supported by research, of observations, data assimilation, operational Earth system model forecasting and ensemble predictions including verification. Post processing models and specific observations should be developed and put into operation for the general public as well as for specialized applications. In this perspective, the big-data revolution will be a game changer, dramatically changing the value chain approach and its interaction with users.

The science for services paradigm accelerating science to societal applications. The advances in Earth system prediction are important to satisfy the growing capacity of the user community for sophisticated services. INAR may in collaboration with operational centres like FMI, clarify their science to services chain in practice. This can be done by co-designing of projects for instance. An essential driving force in value chains is the need to serve the sectors of society dependent on environmental services.

Research results

INAR has developed a comprehensive, in-depth, microlevel (in space and time) understanding of processes related to the growth from the molecular scale to a few nm. This is an important breakthrough in the understanding of the start of the atmospheric aerosol growth. There is less contribution from INAR to the research of the further aerosol growth into the size ranges where the atmospheric lifetime can be many days (0.1-10 micrometer size) and of particular importance for the impact of aerosols in atmospheric physics and

dynamics as well as the environmental impact on health, ecosystems and climate. At these sizes, the removal is slow and the aerosol abundance is high, and the aerosol can be spread over long distances (regional and even globally), and the radiative effects and the contribution to air quality and human health deterioration and the deposition to ecosystems, water ways etc. are the largest. INAR is one among a large number of expert groups worldwide which do research on the 0.1-10 micrometer size range aerosols.

INAR has pioneered the understanding of aerosol nucleation processes in the atmosphere. INAR is not a pioneer in model development, which today rests with networks of science groups and with an institution like ECMWF (European Centre for Medium Range Weather Forecasts in Reading, UK; ECMWF an international organization with close to 30 European countries as its members, it is the leading global centre for weather forecasting today, and is expanding quickly into Earth System modelling including atmospheric chemistry through the Copernicus programme of the EU). INAR is linking up to these modelling networks and has started applying and experimenting with the models for their own purposes, for instance by developing specialized modules for aerosol formation. To reach INAR's future ambitions this work needs intensification.

The research results are excellent and the publication record at INAR is unique. A summary of the understanding of the nucleation processes in aerosol evolution can be found in Kulmala et al., *Science* Vol 339 22 February 2013 p. 946.

Analysis on research outputs

INAR has a very strong publication record, and the evaluation panel endorses the summary given by INAR "We have published 175-210 papers listed in Web of Science annually (229-358 papers when JUFO levels 0-3 are included), the

number of published papers has increased during the assessment period by 20%. The published papers include 10% more highly-cited papers than is the world average, 17% of the published papers are among the world top 1%. The main focus of the papers is on atmospheric sciences, meteorology, and environmental sciences, but the papers with highest impact are multidisciplinary. Altogether 73% of all papers involve international collaboration, and have the highest impact compared to papers with national collaboration with other organizations (15%) or no collaboration outside the University (12%). Papers with international collaboration has increased by 7% during the assessment period. Companies co-author 15% of all papers, 15% up during the assessment period. The number of our publications in the highest JUFO level 3 corresponds to 26% of the publications produced by the whole Faculty of Science at that level."

INAR shows very ambitious and capable entrepreneurship, grows national and international unparalleled, often multidisciplinary, science and science policy networks, and takes on positions of trust for the whole community.

The acquisition of funding has been remarkable both on a national level, through EU funding including ERC grants, and through other channels. The range of relevant funding sources means that the vulnerability to fluctuations in one source is reduced. The base funding level at 30% is low and forces INAR to invest perhaps too much in the competitive funding market.

International benchmark(s)

INAR has selected the Max Planck Institute-model, Germany, as their international benchmark. The INAR performance is excellent by the standard offered by the Max Planck Institute-model.

2.2 Societal impact

In the Unit, there is clear understanding of the role and positioning of science in society. The Unit has identified audiences and stakeholders as well as activities to reach them. The outcomes provide convincing evidence.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

Outreach and societal communication are strongly emphasized. Good examples are mentioned in the self assessment: Science-art interaction, interaction with NGOs like the Baltic Sea Action Group, supporting the Earth System stewardship thinking in the Evangelical Lutheran Church of Finland, leadership of science assessment of forestry through EASAC (European Academies' Science Advisory Council).

The national and international networks INAR are committed to are very impressive. The links to private industry are developing fast, as are those in countries like China.

There is a science diplomacy strategy building international structures that are regional or bilateral (Pan-Eurasian Experiment PEEEX, SMEAR) where INAR has a strong or very strong influence on the strategic choices. The alternative would be to contribute more heavily to established global technical organizations like World Meteorological Organization (WMO). INAR seems to follow a more pragmatic and efficient route, bypassing the slow governance structure in the UN-system, which is often dominated by public institutions, have weak mechanisms for interdisciplinarity and for working across institutional barriers (e.g. weather, water, environment, pollution policy) and where the private sector is absent. The INAR strategy also falls in line with the growth of diverse forms of international collaborations on a bilateral or regional basis, driven by agreements on common goals and approaches, with substantial capabilities among all partners, and with a more likeminded culture, reducing governance overhead and ensuring faster progress.

Activities and outcomes

INAR aims to follow the value cycle characterized by a discovery-translation-application continuum often used in translational science, and applied in medical science (“the researcher at the bedside”) but this model is also applicable in the Earth System sciences. INAR often hints at this type of thinking in the SAR without stating it explicitly (the ambition is to complete the value chain or value cycle “science for service” and allowing the learning and experiences from the translation and application parts to feed back to research plans and practises). Research and the curiosity of researchers are important in all parts of the value cycle. University of Helsinki (UH) could use INAR’s experience here in its strategic transformation to meet new challenges in general.

2.3 Research environment and Unit viability

The Unit documents a range of practises in leadership, goal-setting, follow-up, career planning and management, science education, infrastructure for research, funding, collaboration, connections with related constellations, societal and contextual factors, which together justifies the grading below.

We recommend that INAR explores further the establishment of “INAR-Finland” (modelled on Helsinki Institute of Physics) as a mechanism to enhance viability through national institutional support and cohesion.

GRADING: EXCELLENT

Leadership, goal setting and follow-up

The ambitions of INAR have been achieved through capable entrepreneurship, growing national and international unparalleled, often multidisciplinary, science and science policy networks, and by taking on positions of trust for the whole community, and by moving these networks towards a common goal (“build a global observatory”). INAR has had a clear mission definition, and slowly moved the mission to societal benefit (“the importance of understanding the processes and interactions related to climate change and air quality for societies and for the Globe”). Through a convincing mission and execution of it, INAR attracts public and private funders and eventually investors, interacts with them to become part of the mission of each other (the institute is “a pioneer in science diplomacy in the Earth Sciences domain”).

The INAR mission has been promoted through a restructuring of UH and Finnish institutions, and eventually

European institutions and even institutions in other parts of the world like China, and complementary skills have been added (e.g. the consolidation of the Division of Atmospheric Sciences under the Department of Physics, with the Department of Forest Sciences; the close partnership with the Finnish Meteorological Institute, the establishment of European observational research infrastructures). This enables a more dynamic recruitment capability than can be achieved in a narrower administrative environment, and is to the benefit of all institutions involved.

INAR is meeting a challenge in transforming Markku Kulmala’s leadership capabilities into “structural capital” in INAR, so that the dependence on a single person is reduced. Having Markku Kulmala, a charismatic world leading environmental researcher as the head of Unit, is a real strength. It also poses challenges for the viability of the Unit in the long run. The Unit is diversifying in topics and organisational structure. This should be used actively to strengthen the collective leadership of the Unit and develop the structural capital and capability to evolve with less dependence on one individual.

INAR explained that they receive support in leadership from the Faculties and the University mainly in issues related to administration. The form of support is typically guidance and secretarial help. Leadership education and a mentoring program organized by the Faculties or University and directed to all group leaders would be highly appreciated by INAR. It was further explained that the distributed structure under two Faculties is a challenge, especially as the organizational position of the INAR personnel under the Faculties differs.

Another challenge is the balance of research versus education leadership, as degree programs are directly under Faculties (not Departments). The evaluation committee recommends that this is discussed between INAR and the Faculties. However, the atmospheric sciences master and doctoral programs are run by INAR, which makes their leadership, development, and close linkage to ongoing science easier than in programs involving various Departments and Faculties.

Human resources, careers and recruitment

The INAR leadership seems to have a good track record in practising “to whom is research responsible?” (ethical considerations), by balancing academic excellence, responsibility towards each other and society, and in the way it touches lives and societies. (“The balancing act on a three-legged chair”).

The mission of INAR is met also through the educational curriculum at INAR, by growing a very large group of specialized experts with PhDs and carrying the same science-culture as the “mother”-institution, the Hyytiälä spirit or brand (literally hundreds of atmospheric scientists can easily be identified to be of the “Hyytiälä brand” wherever you meet them the world over).

INAR seems to have an efficient “enabling culture” as judged by e.g. its mission, methods, getting the right persons in the right place, credit to young scientists when they accomplish something, good combination of observations and theory, the leader “is always there”, “The Hyytiälä school”.

It is recommended to establish more positions for infrastructure scientists (staff scientists with a career path which differs from the traditional researcher's).

Researcher education

The education of researchers in this environment fosters new qualities as the in depth research in atmospheric nucleation is accompanied by the understanding of forestry practices, the biogeochemical cycling between terrestrial ecosystems and the atmosphere, and how to move mature science results to societal applications (science for society), in short in depth knowledge in one discipline is complemented by a broad understanding of the value chain; the chain from science to society. The students interviewed by the panel saw this combined perspective in their education as a real advantage in the job market.

The education curriculum and educational methods are being developed in a comprehensive way in an Earth system science and science for society direction. This is very promising.

The student satisfaction is judged to be very good at INAR, with a good level of understanding of the translational nature of the approach at the same time as there is in-depth research in some topics.

Research infrastructure

The development of the science has been enabled by significant contributions to atmospheric instrumentation and observations both at the level of process understanding and the mapping of national, regional and global variability and trends in these processes. INAR has taken on large responsibilities for a range of atmospheric research infrastructures of national, European and global scope.

INAR is recommended to continue its effort to

establish and secure multi-institutional and international responsibilities and formalized commitment to the research infrastructure and data curation over the long term, thereby ensuring a sustainable model for them in collaboration with national and international partners.

It is recommended to improve and even diversify the base funding of the infrastructure (could be joint with e.g. national development aid funds for capacity building in countries involved in SMEAR station establishment or PEEEX field work and that fit the requirements for such funding).

Research infrastructures may have "strong" or "weak" aspects. Operational services built on observation, like weather forecasting, and also ocean, climate and pollution forecasting and analysis, traditionally rely on strong, regulated and standardized observational (and modelling) infrastructures (in particular through WMO). An observational infrastructure needs to be "strong" to be useful in an operational sense, but this requirement may soften as artificial intelligence and big data methods penetrate these fields.

The strong dependence of INAR on a comprehensive research infrastructure and data curation require specialist scientists' support (staff scientists) in order to extract the value of the infrastructures for societal impact and for UH ranking.

The strength of infrastructures at INAR and risks associated with them

- Societal importance (cost-benefit). The INAR infrastructures typically have high benefits over costs (infrastructures of high societal importance and low redundancy).
- There is a strong and growing policy demand for the information provided by these infrastructures.
- The INAR infrastructure triggers Industry interest,

involvement and drive – and has a diversity in stakeholders, but is in need of base funding and specialized scientist support.

- The University mandate is traditionally not to support a specialized research infrastructure or the curation of its data. This weakness is to some extent rectified by INAR's efforts to establish European Research Infrastructure Consortia (ERICs), involve Finnish institutions which are more obvious stakeholders (like FMI). This work should continue.
- Science interface (is there a clear policy and willingness to combine research and operational monitoring (multipurpose)? Are there appropriate links to internal and external research interests?). This seems more and more to be the goal of INAR.
- The research infrastructure is shared with others (power sharing), this is the case for INAR.
- Other strong aspects of INAR's research infrastructures are that they are international when its purpose warrants it, flexible in adapting to evolving user needs, practice open data policy (aware of and practice public good - private good considerations and value positive externalities).

Funding

There is a clear and ambitious funding strategy including a constructive awareness that the combination of funding won through competition and a base funding of about 30% is very powerful.

The evaluation panel heard that for INAR in the coming years, the aim is to retain the level of Academy of Finland funding for the Unit, increase the EU funding by approximately 50%, gain direct ministry funding in exchange of carrying out national duties, increase the basic funding

from the University by approximately 25%, and most importantly, increase the funding from business collaboration and knowledge transport from current 0.5 M to 2.7 M EURO in the coming three years. The panel considers that this may be reachable by INAR, and that INAR is in a special position in this context among the other Units at UH.

The comprehensive collaboration on atmospheric mathematics involving mathematicians and atmospheric scientists may also open new sources of funding. UH funding and funding from business collaboration is projected to increase and surpass existing level due to increased activity with the business collaborators. Also funding linked to Nokia China, Vaisala China, and other companies based in China will contribute here.

The reviewers find this to be a very promising route, choosing to explore the funding opportunities linked to “science for society” issues rather than being confined to the traditional academic institutional thinking. This should in practice enhance the freedom of selecting research

pathways for INAR, because the development of mutual dependencies with significant stakeholders should mobilize trust and resources.

Collaboration

The collaborations developed by INAR are unique and strong inside UH, in Helsinki, in Finland, in the region, in Europe and globally. This is outlined in many places in this document.

For Earth system analysis, forecasts, prognosis or projections across all scales in time and space, INAR depends on the collaboration with and the leadership of other groups. Such collaborative efforts have been developing over many years, but should be strengthened if INAR is to meet its ambitions.

INAR as an institution is strengthened by the close relationship with the Finnish Meteorological Institute next door, with joint strategic goal setting, exchange of personnel, joint projects, mutual dependence on each other’s research infrastructure and data curation. The

Finnish Meteorological Institute seems particularly well placed nationally to share the commitments and the benefits of the research infrastructures to ensure their viability. It is recommended to formalise the mutual dependence and benefits as much as possible to secure sustainability of the research infrastructures and their use.

Connections with ‘other constellations’

The connections with other constellations developed by INAR are strong in Helsinki, Finland, in the region, in Europe and globally. This is outlined in many places in this document.

Societal and contextual factors

The Unit’s identification of the important trends and developments to prioritize for the coming decade is important and of global significance, and INAR is well placed to succeed. A closer integration of earth system modelling on all spatial and temporal scales can enhance the chances of success further.

Social Sciences Panel

PANEL SUMMARY REPORT

1 OVERALL ASSESSMENT

The University of Helsinki is the leading research University of Finland. All background statistics submitted to the Panel in preparation of the assessment substantiate this assertion. The University is also recognised internationally for its eminence, something that is reflected in its position in established University rankings but also by its membership in the LERU group of leading European research universities.

Furthermore, there is an explicit commitment on the part of the University to further strengthen its position internationally as a highly regarded research University. The background statistics about funding and performance of universities in Finland show that the social and behavioural sciences form a significant component of the activities of the University of Helsinki as a whole as well as the lead role of the University nationally in these fields.

The current assessment is performed against the background of a series of major reforms in the higher education sector in Finland in the last decade as well as in reform initiatives taken within the University of Helsinki, including the reform of administrative services and the “Big Wheel”. The fact that these reforms have coincided with the 2016 budget cuts by the government makes it even more impressive that the University has been able to successfully implement the reforms. This would not have been possible but for the, by any standards, high degree of loyalty and commitment to the University on the part of all representatives of Faculty, students and staff. This loyalty, which we have experienced continuously during interviews and conversations, provides the basis for a consistently constructive and collegial atmosphere that seems to be

present in all the Units under review.

The Social Sciences Panel recognises that these contextual considerations makes it particularly important that the assessment of individual Units is fine-grained and that it highlights, as far as possible, differences in performance also within the Units and tries to judge the future potential of the Units in this light. This has resulted in Unit reports that stand out for their careful and detailed engagement and that try to explore the performance and promise of the Units by abstaining from broad and generalised statements and by using the range of categories at our disposal as sensitively and sensibly as possibly.

This may perhaps to some degree make it less urgent to write a detailed Panel report – since that would risk leading to a reiteration of observations of the Unit reports. However, it also makes it more difficult; the Unit reports tend to defy an effort at producing broad summaries beyond an engagement with the research practices and findings of the Units. Nevertheless, in the sequel, some summarising statements will have to appear but they should be read with a tacit admonition to the reader to go back to the reports on individual Units for well-informed analyses and conclusions based on close scrutiny of their research findings.

The nine social science Units at the University are all interesting and lively scholarly spaces. They have all brought forth research of high international quality. There are, however, some differences between the Units that will be commented upon in sections 2 Strengths and development areas and 3 Good practices and recommendations. In this section, it may be sufficient to state the following:

Scientific quality

There are interesting results produced in all Units but not to the same extent across Units. In applying the criteria, laid out in the forms, as correctly and rigorously as possible, our conclusion is that none of the Units is weak and that three of them are excellent or, in one case, very good to excellent. (In one case, the Faculty of Educational Sciences, we would probably, had the template contained that option, even have used the designation “outstanding”.)

In numerical terms, the median position would be “very good” but given the qualitative excellence of three of the Units and the fact that there is highly respectable research being performed also in the two Units that have been assigned the category “good”, this “average grade” might be slightly misleading. The social and behavioural sciences at the University constitute, taken as a whole, an impressive domain of research where a sense of the need to uphold high quality permeates the entire organisation.

Societal impact

The social sciences at the University stand out, in almost any international comparison, by their degree of societal impact. Five Units have been deemed “excellent”, one “very good to excellent”, two “very good” and only one merely “good”. This strong performance of the Helsinki social sciences has to some extent to do with historical legacies and the national role of the University in the capital and with long-standing traditions of advisory functions relative to Parliament and government.

It also derives, however, from a genuine commitment

on the part of Faculty members to serve Finland and its people and to honour the social nature of social science. Be that as it may, to an outsider the societal visibility and service orientation of the social sciences at the University of Helsinki is striking and a great, but, of course, not always unproblematic, asset. Again, the field of educational sciences stands out but there are strong links in many other fields as well, including economics, social policy, demography, criminology, social science research relating to forestry and agriculture.

Research environment and viability

Even if the organisational reforms at the University are still in process and even if some of them came to be implemented so that they coincided with government-initiated budgetary cuts, there can be little doubt that there is great promise and potential in the Units now under review.

Furthermore, most Units have themselves deliberated about how to maximise those potentials and have drawn up plans accordingly. There is genuine commitment among

leadership, Faculty and students alike to strengthen the Units further and to gradually adjust for difficulties in the initial period. In the Unit assessments, a relatively large number of additional ideas and recommendations have been proposed. The grades reflect this positive view. Four of the Units have been deemed “very good to excellent” and only one just “good”.

2 STRENGTHS AND DEVELOPMENT AREAS

The social sciences have a long history in Finland. In the course of this history a noticeable feature has been the degree to which social scientists in Finland have been able

to articulate in scholarly terms social concerns and societal ambitions and thereby also to contribute to an amelioration of these concerns. Under fortuitous circumstances this

has entailed that curiosity- and problem-driven research incentives have developed in tandem and been mutually supportive.

2.1 Key strengths and highlights

In recent decades this has clearly been the case for educational sciences. However, much the same seems to have applied to social research as well as to economic modelling. It is our impression that there is still room for further development in analogous ways when it comes to areas such as forestry, climate change and living conditions

in rural areas. At its best they may lead to research that is theoretically or methodologically innovative and curiosity-drive while also being societally relevant. Needless to say, there are possible pitfalls and tensions. Thus there is a need to balance demands for societal relevance and for adherence to strategic University commitments against

the need to respect the curiosity-driven nature of basic scholarly research. There is also an obvious need to balance theoretical and data-collection ambitions against the often relatively limited resources in terms of funding compared to, say, those at a leading American research University or a Max Planck Institute.

Scientific quality

There are a number of examples where research in some of the Units is not only very good or excellent but at the cutting-edge of international scholarly work and in some cases even world-leading. Some examples from the field of the social sciences of this are the following ones:

Educational Sciences: School pedagogy; digital learning environments; early childhood learning; brain research and education; multilingualism and justice in education

Law: Public international law and human rights; European law and European constitutionalism; global and comparative law

Economics: econometrics and theoretical microeconomic; neuroscience and behavioural economics

Social Research: inequalities of health; interventions to promote equality, health and well-being; disability policies; basic social security systems

Society and Change: Borders and Boundaries, infrastructures and institutions in contemporary Europe

All of these cases are examples of cutting-edge research that also address problems of immediate and obvious societal relevance.

Societal impact

The social sciences at the University exhibit an extraordinary degree of societal impact or, at the very least, of societal visibility and accessibility for policy-makers but also for other interested parties and also for the general public. Examples of this abound in all nine Units. Both Units at the Faculty of Agriculture and Forestry, i.e. the Department of Economics and Management at that Faculty and the Ruralia Institute, have close links to practitioners and knowledge users.

Thus, the Department of Economics and Management closely monitors trends of relevance for the economics of agriculture but is also deeply engaged in studies of resource use, not least concerning the maritime resources of the Baltic, as well as questions concerning bio-diversity in agriculture and forestry. The Department is involved in collaboration with a large number of University institutes in the Nordic countries, Europe, the United States but e.g. also in Africa.

The Ruralia institute is uniquely closely tied to the ground level in agriculture and forestry in its two locations in Eastern and Western Finland. It has a clear focus on sustainable use of natural resources with a view to the potential of solving global problems in the face of the future. The institute has direct and close ties to agriculture, resource utilisation and forestry.

The Society and Change Unit is closely connected to the management of important sets of register data of direct relevance to social problem monitoring and problem solving.

The Faculty of Law performs an extensive, and seemingly growing and time-consuming, service to Finnish Parliament in answering requests and preparing testimony on aspects of legal regulation that Parliament deems relevant and important and on which to seek expert research-based advice.

The scholars in the newly constituted Politics, Media and Communication Unit are often requested to provide expert opinion and to participate in hearings or debates in the media, including radio and TV programmes.

Many other examples can be given. The overall picture is one of frequent requests and expressions of interest in the results of the work of the social science Units at the University of Helsinki. Although this inevitably may entail time-consuming commitments, it is difficult not to see it as an advantage that the University is fully aware of, draws on and preserves.

Research environment and viability

Despite the wide range and deep-seated nature of changes at the University of Helsinki in the last decade and in particular in the period since the middle of the decade, it is encouraging to observe how seemingly smooth the transformations into the current set of Units have been and in what a positive and constructive spirit they have been received and implemented. The pervading sense of collegiality and readiness to engage in collaborative work within a new framework is nothing short of remarkable.

This state of affairs reflects not only the loyalty of Faculty and staff but also the fact that key elements of the reforms rest not only or even mainly on a top-down process but as much on a bottom-up approach and have as their background an ambition to promote a strengthening of links between research and teaching. Above all, the reforms have been designed so as to help achieve two important features:

1. To promote an environment in which teaching programmes and research activities mutually stimulate each other. Thus operational Units should comprise areas where there can be reasonable expectations, based on experience, that fruitful scholarly links may emerge. In such a perspective it is, for instance, reasonable to create a Unit where the study of politics and of media and communication are grouped together.
2. In structural terms, it is also significant that the Faculty level Deans and Faculty Councils can play a proactive role. In this sense the institutional shifts are consonant with the ambition of the University of Helsinki to secure an even more prominent position in the international research landscape.

2.2 Development areas

The research assessment reports of the nine social science Units have examined several interesting development areas within the framework of these Units and illustrated them relatively extensively. In this section some of them will be mentioned again, if in passing and in somewhat different terms. The main effort in this section, however, is to highlight some developmental features that reflect tendencies across several Units.

Some of those features may have to do with broader societal or even global changes. Thus, it is striking to what an extent many, if not all of the social science Units, in their research activities reflect pervasive shifts in societies globally such as the emergence of a new digital world, or the need to think once again about the long-term implications of migration, ethnic relations, diversity, multilingualism, justice and democracy, not to speak of the global challenges of climate change, sustainability and resource depletion. Nobody who would take even a brief look at the research agendas of the social sciences at the University of Helsinki could but be impressed by the engagement and energy devoted to an analysis of the global challenges to humankind.

Scientific quality

There is a strong sense across all Units of the need to consider mechanisms designed to highlight the key role of scientific quality. Such considerations tend to refer to a series of epistemic mechanisms, including the following ones:

- an active seminar culture both for the Unit as a whole and for separate sub-unit working groups and projects,

- resources to promote the possibilities of early-career scholars to participate in international scholarly events,
- a well-functioning and internationally competitive recruitment system of early-scholars at and beyond the postdoctoral stage,
- a sustained discussion about publication outlets but also about the rationale and potential for setting aside some resources to increase the quality of at least some selected manuscripts in both an intellectual and editorial sense,
- the establishment of international benchmark institutions
- the formulation of a common strategy that also involves considerations of mechanisms to uphold scientific quality at the sub-unit level,
- an openness in both institutional and epistemic terms to the potentials inherent in addressing new themes that might bring both increasing resources and prospects of additional societal impact; in all such cases, the epistemic potentials should also be addressed.

To take but one example of the last point, both Units at the Faculty of Agriculture and Forestry (Department of Economics and Management, SOC Unit 31 and Ruralia Institute, SOC Unit 32) articulate themes that directly relate to global challenges, including climate change and the sustainable development goals of the United Nations. This provides possibilities both for an even greater societal impact but perhaps also for scholarly innovation and for introducing systems of quality control at the sub-unit level. In the case of the Ruralia Institute there are also a range of examples

whereby marginal additional resources for editing reports and bringing out the more general implications of research findings relative to those of other fields of the social and human sciences – social and cultural anthropology is but one example – might entail substantial advances.

In the case of Units with a well-established reputation for scientific excellence, there tends to be a consensus on the nature, significance and practices for upholding a high level of scientific quality. In such settings considerations of relevance to the question of scientific quality may become actualised in contexts where changes seemingly concern matters of an institutional rather than an epistemic nature. The question can then turn on the recruitment of a senior scholar with expertise in a field that has not been represented in quite the same way before or the acquisition of a new type of infrastructure or the development of a new methodology that allows for new types of inquiry. In such Units, these types of innovation tend to yield a further stimulus and reinforce scientific quality. Examples might be provided by cases such as brain research and schooling or the development of new methodologies for the use of register data, to take but two examples from the Units of Educational Sciences and Social Research respectively (SOC Unit 33 and 37).

Societal impact

The social sciences at the University of Helsinki are engaged in research that has every potential to have a societal impact. What distinguishes the University of Helsinki from many other universities is that this potential so often seems to have been actualised. This reflects the relevance of the

research produced. However, it is also related to the fact that the University occupies a unique role in Finland and that the communicative links between the University and relevant State institutions and policy-makers are close and long standing.

There is also a tradition that leading scholars at the University participate in the public debate of the country. In fields such as law, history, political science, education and sociology, scholars at the University are playing a more prominent role in the public sphere than in most European countries.

This, however, may also pose something of a dilemma to the University and its Units. Thus, the successful and frequent examples of interaction and impact, may well come to entail a focus on types of research that are most in demand by certain well-defined groupings, more often than not of an elite character.

This aspect is emphasised in the assessment report on the Faculty of Law. Thus, the reviewer poses the question whether it might not be desirable that some branches of immediate relevance to less privileged strata in society be more strongly emphasised, such as consumer law, gender law, immigration law and law relating to the rights of children, of landlords and tenants, to take some examples.

Needless to say, whatever choice is being made, it will have implications for the possibility to develop new fields of expertise and to maintain older ones in which an international standing and a reputation of excellence may already have been acquired. However, choices should in all such cases be underpinned by explicit argumentation.

Research environment and viability

In the case of the relatively small but well-functioning and cohesive Ruralia Institute (SOC Unit 32), there is an excellent

working climate as well as excellent relations to clearly defined target groups. There are also mechanisms installed, including a system for short-term visiting scholars, that could be further improved with relatively small additional resources. Similarly, the long-term viability of the Unit would probably be substantially augmented by some further recruitment based on a combined consideration of the potentials for gains in both scientific quality and societal impact.

Analogously, the Swedish School of Social Science (SOC Unit 39) is characterised by an exemplary working climate. It is also a Unit that has been able to expand its activities through successes in obtaining increased external funding. It is clearly a case where expansion has been successfully implemented without internal frictions and where a further strengthening of its role and of the scientific quality of its research is within reach and where the Unit might well be, if not at a take-off point, then at least in a period of promising consolidation.

Two other interesting examples of changes in research environment concern Economics and Politics, Media and Communication (SOC Unit 35 and 36). In the case of Economics, this is a Unit with great achievements, in some cases of a world-leading character, despite its relatively small size. It is also a Unit with great potential. In all likelihood, the creation of the Helsinki Graduate School of Economics, as an entity linking economics at three universities in the Helsinki region, will provide the necessary size and space for enabling this potential to be realised.

In the case of Politics, Media and Communication, a Unit has been created where, in a spirit of good relations and collegiality, the potential for studies of a more joint nature, e.g. on questions of media, democracy and the public sphere and their interrelationships, are being explored with an open mind. Helsinki has a strong tradition

in the study of politics as well as interesting research results concerning media and communication. There is every reason to expect a further strengthening of these two fields that share a tradition of significant societal impact.

An interesting change in the research environment of the Faculty of Social Sciences is that of the Unit with a focus on Society and Change (SOC Unit 38), created in 2016 for the purpose of teaching collaboration of four disciplines in the new BA and MA programmes. With the discontinuation of the old Departments in early 2018, the new Unit was created linking four disciplinary fields, all with an orientation towards historical and comparative research with a strong global orientation, and one research centre for European studies. Several features are interesting and impressive, including the following ones:

Scholars continue to pursue research in individual disciplines but also explore potential collaboration across disciplines. The collaborative approach seems to have been successfully extended from the field of teaching so as to include collaborative research work as well.

- Within the Unit there is a significant degree of external funding – amounting to almost 60% of the income, including two earlier awarded ERC-projects and two from the Academy of Finland.
- All these four disciplines (Social and Economic History, Development Studies, Social and Cultural Anthropology and Political History) share a commitment to detailed empirical research but are also underpinned by theoretical concerns of a historical and/or global nature.
- Jointly these features have allowed the Unit to emerge as an internationally prominent Unit for the study of global environmental change and resource use and also as a leading Unit for comparative research on the Nordic welfare model and the comparative study of borders.

• In many social science Faculties, the more qualitatively and historically orientated disciplines often tend to take second place. However, there is in contemporary societies an urgent need for research that allows for well-informed

qualitative judgements both for the formulation of policies and for public discussion. (The field of political history in Finland is but one example of this.) The constellation of disciplines in the Society and Change Unit is highly

promising in this respect. It remains to be seen to what extent such potential may be realised, but the University of Helsinki has created an interesting and unusual research environment that deserves sustained support.

3 GOOD PRACTICES AND RECOMMENDATIONS

3.1 Good practices

The social sciences at the University of Helsinki provide a range of positive experiences of good practice, most of which have been highlighted in the reports about the individual Units. Time and again the Panel was encouraged and impressed by the constructive and positive nature on the part of the representatives of the different Units. Five such experiences may be briefly reiterated in this section:

- The quality of leadership in the Unit of Educational sciences in identifying needs for further research undertakings and the nearly seamless way such new efforts translate into plans for recruitment of senior faculty, plans for educational and PhD training and for considerations about data acquisition and infrastructure.

- The openness and thoughtfulness of the Faculty of Law in their consideration of the future development at a point in time when some major externally funded projects have come to an end and new ones have to be considered at a Unit that has a long-standing tradition of excellence and a high reputation nationally and internationally and where external demands for opinions have been considerable and growing in recent times.
- Analogous impressions came across in our conversations with the representatives of the Unit for Social Research.
- The flexibility and openness to new ideas at a Unit such as the Ruralia Institute, where senior researchers seem deeply committed to practice-orientated work

- and exhibit a highly positive attitude to early-career scholars and to the challenge of being active at different locations.
- The attractiveness of the architectural layout of the Swedish School of Social Science. It is a building that seems optimally designed so as to promote interactions of both a scholarly and social nature. It is possible to work in separate offices but the design also allows open and shared space and proximity to the lunch and cafeteria area where students and staff can interact informally.

3.2 Recommendations

- Efficient and generous administrative support is available in the preparation of research proposals of key importance, such as ERC proposals and proposals for funding from the Academy of Finland. However, there may also be a need for support for other types of applications as well as for further administrative and supporting staff in the implementation stage of research projects and programmes. More generally, there seems to be a perception, or perhaps misperception, that relationships to central administration may be in need of further articulation and improvement.
- When assessment Units coincide with Faculties, strategy considerations and responsibility of leadership are clear. However, there appears to be a perceived need for further articulation of relationships between strategy, responsibility and resource allocation below the Faculty level. This is only natural at the current stage of reform and with an inevitable openness to the outcome of the changes underway. However, eventually the question of academic leadership and resource allocation at the sub-Faculty level will need additional consideration.
- There is an urgent need to put in place at Unit level (and beyond) an easy-access and confidential system for reporting staff and student concerns relating to

social welfare, harassment, bullying and discrimination. Personal safety and security are central to a good research environment and it would be in line with the general policies and stance of the University of Helsinki to put such a system in place.

- The establishment of doctoral schools and programmes are major achievements. However, the balance between internally and externally funded PhD candidates was a recurring issue in the materials submitted and in interviews. Clearly, there is a need for further consideration of this issue.
- There is also a need for further consideration of support and career promotion for early-career scholars at the postdoctoral level and beyond. Systematic efforts to promote early-career scholars will enhance international recruitment and contribute to the attractiveness and competitiveness of the University of Helsinki internationally.
- The University of Helsinki is an eminent research University and is poised to further strengthen that position. In our Unit reports as well as in the Panel report we have highlighted a series of institutional and policy measures that might be considered to serve that purpose. We have also highlighted the societal, and in

some cases even global, relevance of research activities at the University. However, it will remain the case that excellent scholarly work is largely curiosity-driven and its long-term consequences unforeseen and even unforeseeable. The University of Helsinki has a long tradition of being a site for curiosity-driven research that has been of high societal relevance. It is essential that it remains so and that the curiosity-driven nature of research be respected. This is equally true whether the research undertakings are pursued individually or collectively.

- Furthermore, there is a need in academic settings at large to further enhance collaborative research in the social sciences and the humanities. However, collaborative work does not necessarily entail that articles and books are collectively produced. It does demand, however, that there is an intensely communicatively open research environment where scholars listen to and learn from each other. We believe that the social science Units at the University of Helsinki already are well functioning research environments. However, for the future it is important to further strengthen the collaborative elements of social science research while respecting the curiosity-driven nature of research.

Social Sciences Panel

DEPARTMENT OF ECONOMICS AND MANAGEMENT (SOC UNIT 31)

Faculty of Agriculture and Forestry

1 SUMMARY

1.1 Description of the use of criteria

The Social Sciences Panel has in the assessment of each Unit had at its starting point the basic stance underlying the research assessment exercise, namely that the ultimate purpose of the assessment is to enhance the future competitiveness of the Units and, in the last instance, all of the University of Helsinki. This future-orientated outlook affects the assessments of all Units and all of the three overarching assessment themes.

Concerning the first of these three themes, that of *scientific quality*, the Panel has examined the substantive and thematic objectives formulated by each Unit as well as the range of institutes that a given Unit in its SAR has highlighted as relevant for a comparison. In several cases this led to a fruitful exchange of views and to new insights. The Panel has also taken note of the extent to which each Unit has articulated its objectives. In this case as well the probing promoted useful questions concerning the further articulation of objectives. The Panel has also, often in minute detail, studied the publication records of every Unit. In this part of the assessment, the Social Sciences Panel has made extensive use of the bibliometric data supplied but not so as to simply copy the outcome of the bibliometric analysis but in order to establish a reasonable point of comparison.

The Panel has been fortunate enough to have had members who have a firm grasp of given international standards in the fields of the Units covered. Several members have also had a long-standing familiarity with the

University of Helsinki and the academic system of Finland. Eminent examples of this are provided, for instance, by the assessments of Department of Economics and Management (Faculty of Agriculture and Forestry) and Economics (Faculty of Social Sciences) but it applies in various degrees to all Units.

Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stake-holders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stake-holders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is more difficult yet to clarify what changes have in the last instance occurred in societal conditions.

On the whole the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stake-holders and actual or potential recipients of their findings. In several cases, including Faculty of Educational Sciences,

Faculty of Law, Economics (Faculty of Social Sciences) and Social Research (Faculty of Social Sciences), there are also well-established institutionalized linkages, in other cases there are well-established forms of contacts (as for Ruralia Institute and Swedish School of Social Science). In the case of Finland, such linkages appear to be remarkably well developed in an international perspective. At the same time, some of the assessments, for instance of the Faculty of Law, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

Research environment and Unit viability is a criterion that refers to the future potential of a Unit. This is to some extent a function of the other two criteria but not exclusively so. The Panel members have devoted much attention to forming a well-grounded view of the future viability of a Unit and has for most Units expressed a high degree of confidence in their viability. This optimism, however, is contingent upon Units' undertaking a further clarification of their strategies and in some cases also in their internal procedures.

Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades.

This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread

of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

The mood of the Unit is positive, i.e. the Unit is in a process of reconstruction and renewal after the budget cuts (which still set their mark on the Unit). The strategy process should arrive at tangible results and mark out the future course. The funding situation is difficult as regards volume (being a small Unit). On the other hand, the Unit has a reasonably diversified portfolio of external funds. PhD students and post docs appear well motivated to take part in the activities of the Unit and find the small size an advantage. It seems as if the Unit is in a good position when it comes to making societal impact.

Strengths

- An awareness of the value of finding common ground as expressed in the strategy process.
- Societally relevant research areas in combination with courses in demand by students
- The advantage of being a small organisation with many specialities in the same place.
- A transparent recruitment process involving sub-units.

Development areas

- The average JUFO level of publication.
- The number of PhD students and post docs.
- The number of international collaborations.

Recommendations

- Formulate a mission and a strategy in writing to finalise a first round of the strategy process.
- Monitor publication records.
- Find funds for conference participation of PhD students and post docs.
- Analyse the input/output ratio of disciplines as a basis for initiating measures to ensure their sustainability.
- Adequate secretarial assistance at the Unit level.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit is working on its research goals as an essential part of its strategy. It is important that the Unit finds a formula for its mission and operational mode. This is vital in setting priorities, while at the same time allowing the freedom that is inherent in a small, research-centred organisation. The Unit is small and variations among sub-units can easily show up in the publication record or other output measures as less than impressive figures. Taking that into account together with scarce resources and teaching assignments the scientific production of the Unit may be deemed adequate. Nevertheless, monitoring the output on the sub-unit level is important in order to gain an impression of where possible problems are and what could be done to solve them.

Strengths

- The advantage of being a small organisation with many specialities.
- Societally relevant research areas.

Development areas

- A consensus of how to describe the Unit in strategic terms to guide research priorities is not yet in place (e.g. how to turn diversity into an advantage).
- Small sub-units that can have difficulties in acquiring resources for research (e.g. PhD students and post docs within the UH).

GRADING: GOOD

Research goals

Each sub-unit has a path it would like to follow. Agricultural Economics and Farm Management (AE) focuses on improved competitiveness and market power in the food chain, Environmental and Resource Economics (ERE) on forest economics and water resource economics, Food Business Management (FBM) on food business management, and Marketing (MKT) on food marketing and associated concepts. Climate change and increased international and national co-operation are themes shared by most sub-units.

The sub-units thus have their specific research areas. It is not obvious, however, that they comprise a coherent set that makes full use of the strengths of the Unit. Heterogeneity is a weakness in the sense that the sub-units as themselves do not have sufficient resources for having postdocs and producing PhDs. At least for some parts of the Unit this has been a longstanding problem. The Unit does not seem to have a common strategy for explicitly coping with this difficulty.

At first glance it seems reasonable to suggest that, given the limited size of the Unit, it would serve the Unit well to have a more coordinated approach to future focus areas than what is apparent from the SAR. The areas defined there do serve the society well and represent the relative strengths of the sub-units. Climate change and the Sustainable Development Goals of the United Nations could

play an important role in coordinating activities in sub-units.

The Unit recognises these problems and is discussing various routes to follow in solving them. One is to stress the high level of competence and another to recognise the fact that multidisciplinary co-operation is a cornerstone of much of what is done in the Unit. These two threads are not necessarily in conflict with each other. The question is how to balance them, i.e. how to get the Unit to perceive itself as having a common mission. In finding this balance the Unit should be flexible and open to co-operation with various specialities in the natural and social sciences that would complement the skills and expertise available within the Unit.

The Unit should take the opportunity to continue its work and develop and formulate a mission and strategy that define the needs of the Unit, guide the staff in making their choices and make it clear for external partners within and outside the UH what the Unit stands for.

Research results

The examples show research into how to improve efficiency and food security in Africa and Asia; power relationships and the effects of trade policies in the agricultural sector; game theory and bioeconomic modelling applied to fisheries; food business management; profitability of logging and transportation in wood procurement; cooperation between Consumer Economics (Faculty of Agriculture and Forestry) and Social Science History (Faculty of Social Sciences).

Analysis on research outputs

As the Unit is small, its track record in publishing fluctuates over the years. For instance, productivity is not easy to assess, being 0.24 ($P' = 42/5/35$) per staff and year according to bibliometric analysis or 1.17 ($P' = 41/35$) according to the SAR. Furthermore, quality measures vary with none of the 48 publications in Jufo 3 according to HULib analysis and 10% in Jufo 3 in the SAR. With that reservation in mind, an attempt at interpreting the data would indicate the following. The impact is not very convincing judging from an average MNJS of 0.90 (decreasing), PPIOp10 of 0.07 (varying), yet international

cooperation in the scientific process is common (PP (Intl collab) 0.33), although not excessive.

There is large variation between sub-units. This is, at least partly, attributable to the varying teaching loads of the staff members. A strategy for the Unit should contain a component addressing the question of improving the quality of the output the Unit generates. A first step towards this goal would be to monitor the output on the sub-unit level to acquire a grasp of the situation for future action.

International benchmark

The SAR does not have much to say about international

benchmarks, which is reasonable because the sub-units are so small. Comparison with large international departments may not make much sense. The panel interview has revealed a more comprehensive picture. The Department of Economics, University of Copenhagen, is the nearest comparison. Their entity is somewhat similar to the Unit but is three or four times larger. They have solutions the Unit could find inspiration from. The University of Manchester could also provide something along the same lines, but the British system is so different from the Finnish one that their solutions do not appear directly applicable to the situation in Finland.

2.2 Societal impact

The focus of the Unit lies on real-world problems. This forms a sensible basis for producing results that can make an impact on society. Five examples show key results relating to an Emerging Finnish consumer society; the establishment of an international food security research initiative focusing on Africa and Europe; creating and maintaining an international network of researchers in agricultural research; leadership of the Finnish Climate panel; a pan-European funding initiative to enhance the protection of the Baltic Sea. The results should generate societal impact.

Strengths

- Focus of the Unit on applications.
- Contacts with organisations that are relevant for disseminating research results.
- Procedures to disseminate research results.
- Finnish Climate Panel chair.

Development areas

- Focus on a narrow range of (mostly) research-related organisations.
- Vulnerability as old networks tied to individuals disappear with retirees.

GRADING: GOOD

Target areas, audiences, research questions and goals

There is a wide array of target audiences mentioned in the SAR. This fits well with the statement that “Overall, the most important goal is to transmit the research results as widely and effectively as possible in the society”. The key stakeholders identified in the SAR indicate important channels for dissemination and communication. They are many but show which kinds of audience are of primary interest. They include the following institutions: SYKE, LUKE, VTT, VATT, MTK, MKK, IFAMA, FAO, AGRICORD, the EU Commission IFPRI, KSLA, NJF, Business Finland (Tekes), the City of Helsinki. Thus, there is a focus on research institutes (e.g. SYKE, LUKE, VTT, VATT and NJF) and research funding

agencies (e.g. Business Finland). The broadening of contacts to other kinds of institutions should be considered. MTK and the City of Helsinki are of course relevant in this respect.

The suggestion based on the broad description of the audiences and the rather narrow examples (of currently ongoing cooperation?) would be to carry out a more reasoned analysis of how main targets would be selected, based on the research profile of the Unit. This could give some insight into what is worth disseminating and to whom.

At the same time one should observe that the more dissemination and popularisation are emphasised and resources devoted to them, the less time and resources are left for actual research. It is thus commendable that the Unit has installed what appears to be an elaborate and efficient procedure for dissemination of abstracts of research results. It is also in line with the stated goal "...to transmit the research results as widely and effectively as possible in the society ...".

The Unit is planning or looking for opportunities for more specific projects that would have direct impact. The project aiming at creating a Food Business Industry Climate Index sounds exciting but at the same time demanding (with various interesting problems related to sampling, conducting surveys, and statistical methods). The same is true for investigations into a biodiversity offset market for Finland. It would probably strengthen the effort if similar ideas abroad could be found and international co-operation established.

Activities and outcomes

The impact of a small Unit is not easy to evaluate because its activities can vary quite a lot from one year to the next, depending on what processes are going on in the government, within international organisations, and what are the current main topics of discussion in the society. It may nevertheless be possible to make a few general

comments on this.

The ambitions to popularise and disseminate research results may have considerable impact if the message is the right one at the right point in time. However, the impact is normally indirect, passing many links before it actually does affect the state of things. Thus, impact is more often than not something that needs time if it is to mature at all.

The same can be said about primary targets for co-operation. Collaboration essentially occurs with other organisations in academia (see also the following section). Thus, it does not normally cause a direct impact but can generate results that eventually have an impact on some part of society.

Participation in the IPCC panel is definitely a merit in making direct impact. Contributing to raising money for the Baltic Sea constitutes another example.

The impact of MKT mainly consists of training students to serve society in various positions.

2.3 Research environment and Unit viability

The Unit is in a process of forming its strategy following the budget cuts that have affected its activities. It is essential that this process arrives at tangible results in order to settle different viewpoints. Being in a process of staff renewal provides strategic opportunities. The Unit is working with a "bottom up" management style that is conducive to the nature and size of the Unit. The funding situation is difficult

as regards volume, and also with regard to other units at the UH that are involved in resource economics. The structure of the funding is reasonably diversified, however. During the interview, PhD students and post docs [there was only one of each, however] expressed their satisfaction in taking part in the activities of the Department and considered its small size an advantage.

Strengths

- An awareness of the value of finding common ground after budget cuts.
- Good research environment for PhD students and post docs.
- A diversified portfolio of external funds.
- Participation in HELSUS.

Development areas

- A strategy process that has not yet come to completion. Until the mission and strategy are settled the future course of the Unit is not defined.
- Limited resources to match the top-heavy organisation with more PhD students and post docs.
- No resources for graduate students and post docs to attend conferences and comparable events.
- Limited possibilities to steer resources following a strategy due to the governance system (this is not unique to this Unit but is more critical for a small Unit).

GRADING: GOOD

Leadership, goal setting and follow-up

The organisation is rather traditional with heads for undergraduate teaching, a board and a welfare committee. However, the responsibilities of the different elements of the organisation, including the role of group heads, are not well defined. This may be due to the limited size of the Unit or decision making being in fact more ad hoc. The Unit head has for instance biannual follow-up meetings with the sub-unit leaders as an instrument of control over the Unit.

A “bottom-up” governance model is used (“... we aim to retain the appeal of career and development by retaining academic freedom and flexibility ...”). This management style could be inspiring and motivate sub-units to take initiative. However, it could be a hurdle in the case of radical change. It may also be difficult to bring about the synergies, especially when the units are rather variable.

Since the Unit is small, internal variability could be a serious issue. Its size makes it more vulnerable than a larger unit within which there may be various options available to balance ups and downs. There are 26 staff members in

Level 1-3 and 5 groups, meaning that on average there are some five members with doctoral degrees per group. As the sub-units vary in size, not all of them may sustain the critical mass essential for their success. The budget cuts of the last few years have not alleviated the problem.

Human resources, careers and recruitment

The SAR shows a Unit that is top heavy. Close to 30% of its human resources consist of professors, and more than one half belongs to levels four and three. The intake of additional PhD students and post docs is a concern. So far the Unit has only gained a single two-year PhD position available through the UH. The Unit therefore has to use its own resources or admit students who have grants.

It would indeed be good to keep in mind that the statistics miss more than one third of the PhD students that are actually active at the Unit since they study on grants. The situation should also be seen in light of staff renewal due to retirements. Once the new staff members have assumed their positions, one should expect an increase in the number of PhD students and post docs.

The Unit is in a phase of renewal. For instance, the FBM sub-unit has recently recruited three key researchers. The hiring process is transparent in that advertisements for positions are circulated among all sub-unit leaders.

Researcher education

The salaried positions are advertised internationally. The procedures for admitting students with grants vary between sub-units. In many cases, the professor responsible for selecting the students makes his or her decision based on the applications.

The SAR mentions that PhD students have “a key role in the publication stream of the sub-units”. However, the

report does not explain how the students are supervised to have such a big role and produce internationally recognised research so early in their careers. Their participation in national graduate schools is an excellent idea. Each student has a main supervisor within the Unit, while assistant supervisors are often from other units.

Despite the important contributions of PhD students (and probably also those of post docs) there is little or no money available for them to attend conferences and workshops. This is a serious drawback for students who are in the process of establishing their own research networks. Solving this problem should have a high priority on the agenda of the Unit.

Research infrastructure

The Unit is active in areas that have to do with large data sets (e.g. panel data) and require sophisticated statistical analyses. It is not clear from the SAR how support functions are integrated in the work flow to ensure top quality output.

The Unit has advanced plans for a seminar series, and it has plans for an experimental lab with 26 laptops. A precondition for realising the plans, however, is that resources are made available by the Faculty. As to the experimental lab, the SAR does not contain information about how it is going to be used, that is, what kind of research is it designed for. Perhaps the lab is a part of the future strategy of the Unit, but at the moment it is not possible to assess its significance to the Unit.

Funding

The Unit has experienced budget cuts over the last few years. Due to the small size of the Unit these may be difficult to compensate with early retirements and other means of saving money. That said, the Unit has a rather large amount

portion of reasonably stable base funding (although it has been decreasing over the last few years). It also has a reasonably diversified portfolio of external funding with a comparatively large share of EU funding.

Since funding is a critical issue, efforts are needed to secure resources. However, there is no well thought through strategy for how this could be done. The Unit appears to have extensive international networks in academia which could be used for project applications. The H2020 constitutes one example.

The situation of the marketing (MKT) sub-unit is a cause for concern. It has a considerable teaching load, produces a large share of the scientific articles published by the Unit as well as doctoral dissertations. Nevertheless, it

has been subject to rather severe budget cuts. This situation may not be sustainable in the long run.

Collaboration and connections with 'other constellations'

The Unit has extensive cooperation within the UH, with other Finnish universities, and internationally. For instance, under the heading "Cross-border and interdisciplinary collaborations", the SAR lists about 50 departments and universities. This is a large number. The question is to what extent it is viable to keep all these links alive. It is not clear from the report what kind of collaboration makes the list and how essential the various collaborators are to the Unit. It may serve a purpose to be more strategic and try to focus

on the truly important collaborators and collaborating institutions.

All sub-units have members in HELSUS. This is obviously an important unit to interact with.

Societal and contextual factors

Societal and other contextual factors will evidently affect public opinion, government funding, the agenda of other funding agencies, and the propensity of students to apply to programmes. An analysis of the implications for the Unit of the possible development of these factors is not found in the SAR but it might serve the Unit well when it comes to developing a strategy.

Social Sciences Panel

RURALIA INSTITUTE (SOC UNIT 32)

Faculty of Agriculture and Forestry

1 SUMMARY

1.1 Description of the use of criteria

The Social Sciences Panel has in the assessment of each Unit had at its starting point the basic stance underlying the research assessment exercise, namely that the ultimate purpose of the assessment is to enhance the future competitiveness of the Units and, in the last instance, all of the University of Helsinki. This future-orientated outlook affects the assessments of all Units and all of the three overarching assessment themes.

Concerning the first of these three themes, that of *scientific quality*, the Panel has examined the substantive and thematic objectives formulated by each Unit as well as the range of institutes that a given Unit in its SAR has highlighted as relevant for a comparison. In several cases this led to a fruitful exchange of views and to new insights. The Panel has also taken note of the extent to which each Unit has articulated its objectives. In this case as well the probing promoted useful questions concerning the further articulation of objectives. The Panel has also, often in minute detail, studied the publication records of every Unit. In this part of the assessment, the Social Sciences Panel has made extensive use of the bibliometric data supplied but not so as to simply copy the outcome of the bibliometric analysis but in order to establish a reasonable point of comparison.

The Panel has been fortunate enough to have had members who have a firm grasp of given international standards in the fields of the Units covered. Several members have also had a long-standing familiarity with the

University of Helsinki and the academic system of Finland. Eminent examples of this are provided, for instance, by the assessments of Department of Economics and Management (Faculty of Agriculture and Forestry) and Economics (Faculty of Social Sciences) but it applies in various degrees to all Units.

Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stake-holders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stake-holders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is more difficult yet to clarify what changes have in the last instance occurred in societal conditions.

On the whole the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stake-holders and actual or potential recipients of their findings. In several cases, including Faculty of Educational Sciences,

Faculty of Law, Economics (Faculty of Social Sciences) and Social Research (Faculty of Social Sciences), there are also well-established institutionalized linkages, in other cases there are well-established forms of contacts (as for Ruralia Institute and Swedish School of Social Science). In the case of Finland, such linkages appear to be remarkably well developed in an international perspective. At the same time, some of the assessments, for instance of the Faculty of Law, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

Research environment and Unit viability is a criterion that refers to the future potential of a Unit. This is to some extent a function of the other two criteria but not exclusively so. The Panel members have devoted much attention to forming a well-grounded view of the future viability of a Unit and has for most Units expressed a high degree of confidence in their viability. This optimism, however, is contingent upon Units' undertaking a further clarification of their strategies and in some cases also in their internal procedures.

Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades.

This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread

of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

The Ruralia Institute is undertaking excellent societal, maximising different dimensions of public engagement for non-academic partnership building, stakeholder involvement, seminars and workshops, and other forms of co-creation. The Unit faces an inevitable tension between financial sustainability, societal impact, and scientific quality. This is recognised in the self-assessment report. Scientific quality could be higher, which influences in turn international benchmarking performances. There are important links between scientific quality and notions of leadership, goal setting, and following through on this.

Strengths

- Societal Impact: The Unit has excellent impact evidence, as noted below, and contributes to the economy and society of rural Finland.
- Multi and Interdisciplinary Research: The Unit has successfully brought together individuals working across the social science and connected these to policy and practice.

- Funding quantity and diversity: The Unit should be congratulated for achieving income from a variety of sources.

Development areas

- Scientific quality, particularly the quality of research outputs: The Unit should strive to make more of an academic impact by targeting leading journals in the social sciences dealing with the areas of economic and social change, lifting the concerns above the field of rural policy and practice.
- Research environment, particularly career development for early career staff: The Unit should consider a defined career structure and development trajectory for early career staff, who appear to be precarious by the short-term funding nature of projects.
- Leadership, goal setting, follow-up, particularly senior staff: Based on the nominated outputs and analysis of published outputs, Professorial leadership appears to be uneven and senior staffs should be given targets for increasing the quality of research outputs to stretch scientific quality.

Recommendations

- Scientific quality: The Panel encourages research goals stemming from conceptual areas of concern (problematising and conceptualising 'the rural' and its development). The research goals could be stretched in terms of academic impact. Furthermore, the panel suggests an action plan to be made to strengthen the number of JUFO level 2 and 3 publications.
- Societal impact: Although the level of Societal impact is excellent, it could be useful to pay attention to the feedback collection e.g. using participant feedback in the development work. Also the possibilities of the industry collaboration could be further investigated in the Unit.
- Research environment and Unit viability: The panel would encourage a recruitment strategy around candidates about to bring *both* academic research and societal impact. The Panel suggests the Unit to make a plan on increasing the amount of Academy of Finland funding.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit shows success in combining international high-quality rural research with strong societal impact. The significance of the results is mixed in terms of advanced scientific quality and novelty. On the other hand the outputs on region-making, deinstitutionalisation, boundaries and identities belong to the excellent category. All in all, the research goals could be stretched in terms of academic impact.

GRADING: GOOD

Research goals

The Unit partially succeeds in combining international high-quality rural research with strong societal impact. The Research goals in the Unit (past, current, and future) mostly reflect this. Sustainable development from a local and rural perspective comes through strongly, attracting funding. It is stated that rural research and sustainable science have a common background philosophy, in that both focus on real life concerns, which require multidisciplinary and interdisciplinary approaches. This is correct. Research therein is presented as 'solution oriented' and benefits from engagement with stakeholders, i.e. it is applied by design and delivery. Though this is important for creating a pathway to/for societal impact, the Panel would encourage research goals stemming from conceptual areas of concern (problematizing and conceptualising 'the rural' and its development). The outputs on region-making, deinstitutionalisation, boundaries and

identities are indicative of this and these are excellent indeed. The panel suggests a continuation of this line of scholarship, alongside the prioritisation of areas of societal impact.

Research results

This section of the Ruralia Institute's self-assessment report is clearly presented and easy to follow. Moreover, it links to the selection of the top 10 research outputs. Five areas are flagged: psychological ownership of natural resources; regional identity and governmental reforms; social sustainability and management of large carnivore populations; regional economic impacts of big investments; and development of co-operation legislation in several countries. The significance of the results, evidenced through the research outputs (see below), is mixed in terms of advanced scientific quality and novelty. This was discussed with the Unit during the interview process.

Analysis on research outputs

As noted in the self-assessment report, 'most of the publications are based on applied research and practical development projects'. This though does not restrict the potential originality, significance, and rigour of the research output scientific quality. The outputs match the Unit's goals based on its self-reflection, but, as noted above, the research goals could be stretched in terms of academic impact. This was discussed with the Unit during the interview process.

The CWTS report indicates that the quality of research outputs could be higher. The trends, trend output and impact data shows:

- Declining MNJS (mean normalized journal score) and MNCS (The mean field normalized citation score), i.e. publishing declining quality in journals with declining impact.
- PP(top 10%) (the proportion of highly cited publications) fluctuations noted, but the current trend is down.

Likewise, when compared to the Faculty summary data on JUFO level journals, the Ruralia Institute has a disproportionate volume of outputs in lower quality journals (JUFO 1 and 0). The number of JUFO level 3 and 2 outputs needs to be higher. The panel proposes an action plan to make this happen. This was discussed with the Unit during the interview process.

An analysis of the top 10 outputs provided shows:

- With a few exceptions, they are written by project-based, junior, and middle-career staff.
- Limited sustained examples coming from the Professoriate, who appear to be consumed with the rubrics of obtaining external funding and the undertaking of project management.
- Perhaps the best academic quality outputs, published in *International Journal of Urban and Regional Research* and *Geoforum*, are lead-authored by the academics from

Oulu and not the Ruralia Institute. The same applies for Watts et al, published in *Journal of Rural Studies*, which is led by the University of Aberdeen.

International benchmark

The international benchmarks are appropriate and none

are missing. The Ruralia Institute is indeed, to quote the self-assessment report, 'one of the leading academic units focusing on rural research in Europe'. Links to other centres are noted: Centre for Rural Policy Research (Exeter), as well as the Danish Centre for Rural Research and Institute for Rural and Regional Research. The panel though encourages

the Unit and engage in collaboration across Europe and beyond to maximise these possible connections. Key here is use of the Visiting Scholar Program, with the challenge being to have sustained research output leadership from the Unit.

2.2 Societal impact

The societal impact activities and results are truly excellent in the Unit. The societal impact of the Ruralia Institute is evident from the self-assessment report, which details the work with 1300 non-academic partners, numerous workshops and engagement events metrics. The different dimensions of public engagement for non-academic partnership building, stakeholder involvement, seminars and workshops, and other forms of co-creation are thus present. More evidence though is needed on how the Ruralia Institute has shaped and influenced policy and debate around policy interventions, i.e. material impacts on state intervention and public policy beyond public engagement

GRADING: EXCELLENT

Though excellent, it is unclear whether societal impact connects to the 'reach and significance' of impacts on the economy, society, culture, public policy or services, health, the environment or quality of life that were underpinned by the research conducted in the Unit. Key here are *indicators and evidence* most appropriate to support the impact(s) claimed, distinct from evidence of dissemination and uptake, in order to demonstrate both the reach and significance of the impact(s) claimed. For example, attendance figures at an event may illustrate the pathway to a change in understanding or awareness and provide an indication of the reach of the impact. However, on their own, they would not serve as evidence of the significance of the impact, which might be demonstrated, for example, through participant

feedback or critical reviews. The panel did not see much of this reflection in the self-assessment report. Addressing this would produce sustained international and world-leading societal impact. This was discussed with the Unit during the interview process.

Oddly in the provided data, CWTS, PP (industry) (the proportion of publication by a unit involving industry, a company co-authoring) is zero through the assessment period, which could be higher given the interesting dimensions of societal impact reported. The question arises: why is there no collaboration with industry?

2.3 Research environment and Unit viability

The leadership procedures and operation guidelines are systematic and in use in the Unit. The interview process revealed a highly effective collaborative environment and working culture between those in the Unit, based in the various geographical locations. Career development for early career researchers should be a future priority in the Unit. International collaboration could be strengthened to support academic impact. The panel also recommend investigating opportunities, which with the industry could be fruitful.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The Faculty of Agriculture and Forestry self-assessment document is valuable in this context. This states that since 2018, 'the Faculty has launched documented procedures. These procedures include guidelines in ...' We questioned this during the interview process and were satisfied by the responses and experiences given.

Under the heading 'Personal Plans and Targets' it is noted that 'Annual personal work planning procedures and development discussions by individual/staff members and their superiors are similar and equally timed in each Department. These plans and discussions also serve a systematic platform for the follow-up of the targets at personal level. At Faculty level, a work wellbeing survey is carried out regularly, and Department and education programme level target setting takes place once a year and a follow-up twice a year'. The interview process confirmed that this was working effectively and also revealed a highly

effective collaborative environment and working culture between those in the Unit, based in the various geographical locations. The panel notes that the Unit is highly collegiate, the interview rapport was highly engaged and positive, and there is much to build on.

Human resources, careers and recruitment

Appendix 1 of the University of Helsinki (UH) General Information has some pleasing trends, such as a trend of 50%/50% female to male ratio at UH, though females could be represented more in senior roles.

With 42 staff in total, the Ruralia Institute is a relatively compact Unit, with 19 teaching and research staff, plus 23 other staff. Career development for early career researchers should be a future priority, given the comments made in section concerning the wellbeing at work survey results, which are invariably linked to the discussions on permanent contracts.

The panel would encourage a recruitment strategy around candidates about to *bring* both academic research and societal impact, rather than split these into two distinctive categories. Societal Impact in this regard should not be reduced to the availability and presence of applied research.

Funding

The funding data report in Appendix 1 is impressive, given the noted competition pressures on obtaining this. External funding is operating at 71% of funded income, with the biggest category being other external funding at 55%. Grant

income from the Academy of Finland could be higher (noted at 4%), given the Faculty figure (of 18%), and plans are needed for increasing this.

Collaboration

As noted above, gained from Scopus data, there is evidence of collaboration, but this seems to be mainly within Finland, which occupies page 15 of the report. The international collaboration discussion on page 16 is interesting in that it focuses on EU funding opportunities and not academic collaboration to develop intellectual capital, which might lead to papers as well as funded activity. Plans are needed for achieving this. For instance, does the Ruralia Institute Visiting Scholars program have any target areas for the next few years, as the list of possibilities for collaboration appears to be extensive? As mentioned, the absence of industrial collaboration could be addressed, where there are opportunities.

Societal and contextual factors

A number of contextual factors are flagged in the Unit's self-assessment report, particularly the dominance of urban discourses leading to city-based research developments. The Panel was wondering whether this though represents an opportunity to look at the urban-rural interplays, particularly how this is playing out in spatial planning, economic development, and city-region building. The Unit could do with more on targeted funding areas to ensure the mentioned resilience. This was discussed with the Unit during the interview process.

Social Sciences Panel

FACULTY OF EDUCATIONAL SCIENCES (SOC UNIT 33)

1 SUMMARY

1.1 Description of the use of criteria

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Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stake-holders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stake-holders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is more difficult yet to clarify what changes have in the last instance occurred in societal conditions.

On the whole the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stake-holders and actual or potential recipients of their findings. In several cases, including Faculty of Educational Sciences,

Faculty of Law, Economics (Faculty of Social Sciences) and Social Research (Faculty of Social Sciences), there are also well-established institutionalized linkages, in other cases there are well-established forms of contacts (as for Ruralia Institute and Swedish School of Social Science). In the case of Finland, such linkages appear to be remarkably well developed in an international perspective. At the same time, some of the assessments, for instance of the Faculty of Law, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

Research environment and Unit viability is a criterion that refers to the future potential of a Unit. This is to some extent a function of the other two criteria but not exclusively so. The Panel members have devoted much attention to forming a well-grounded view of the future viability of a Unit and has for most Units expressed a high degree of confidence in their viability. This optimism, however, is contingent upon Units' undertaking a further clarification of their strategies and in some cases also in their internal procedures.

Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades.

This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread

of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

The Faculty of Educational Sciences has outstandingly strong research, with a track record of substantial number of publications in highly-ranked refereed journals and books. The research results demonstrates multiple discoveries and creative findings in most areas of educational research. Solid discoveries have been made from cross-disciplinary approaches. Creative findings have been connected to psychological, educational, and neuroscientific evidence from learning research. Excellence of the Faculty is manifested as 35th worldwide in the Times Higher Education (THE) university rankings in education.

Societal impact is graded as excellent, even outstanding. There is a clear understanding of the role and positioning of the Unit's research in society. Relevant stakeholders and audiences have been identified and a rich variety of influential activities are launched.

Research environment and Unit viability is graded as very good to excellent. The deans of the Faculty aim to promote a collegial form of leadership. Follow-up is necessary to determine how the actions taken have improved transparency, collegiality, and inclusiveness in decision making. These will be important in order to strengthen the identity of the (still fairly new) Faculty of

Educational Sciences. For the future, the relevance and productiveness of the Research Community (RC) structure needs to be considered and discussed. From the perspective of support for the careers of young researchers, and recruitment of the best candidates as post doc researchers and the goal of increasing article-based dissertation completion seem likely to be productive. Faculty has been successful in receiving competitive external funding from a range of sources. Wide collaboration at national and international levels is evident.

Strengths

- Excellent scientific quality is manifested in many ways. The Unit is 35th in THE university rankings in education. Research results demonstrate multiple discoveries and creative findings in most areas of research. Substantial number of publication in highly-ranked journals and books. This Unit is an international world leading reference and continuously visited by teams from all over the world. The focus has to be on Finnish and Swedish publications to reach their main target. Nevertheless since 2015, significant increase in publications at the JUFO 3 (top) level. In addition, increase in total number

of publications per person/year. The number of article-based dissertations has increased.

- Societal impact can be assessed as excellent and even outstanding. There is a clear understanding of the role and positioning of the Unit's research in society. Relevant stakeholders and audiences have been identified and a rich variety of influential activities are launched. Evidence from the outcomes of all activities are not provided, but most of them are evident.
- Infrastructure and Unit viability. Faculty has been successful in receiving competitive external funding from a range of sources, including the Academy of Finland, Ministry of Education and Culture, and Business Finland. Leadership has been developed into more collegial direction. Researcher education is well organised and productive. To strengthen the future viability of the Faculty strategic discussion concerning the integration of teaching into Research Communities is needed. Launching an international master program in education will further strengthen the internationalisation and international visibility of the Faculty.

Development areas

- In terms of the research goals, questions remain as to how far the organisation of recent RCs can be seen as relevant for reaching the set goals, and how vital the various RCs are in terms of producing excellence for the future.

Recommendations

- For the future, the relevance and productiveness of the RC structure, how they are resourced and developed, and what is their future prospects, needs to be considered and discussed.
- Balancing teaching and research responsibilities is

important concerning the whole personnel.

- Increase administrative support at the Faculty level. Special support is needed by those who have big projects with external funding.
- Wellbeing of the personnel should be followed up after developmental activities have been conducted.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Faculty of Educational Sciences has outstandingly strong research, with a track record of substantial number of publications in highly-ranked refereed journals and books. The research results demonstrates multiple discoveries and creative findings in most areas of educational research. Solid discoveries have been made from cross-disciplinary approaches. Creative findings have been connected to psychological, educational, and neuroscientific evidence from learning research. Using multiple methods, these have combined a societal analysis of policy and organisations with findings on individual learning and wellbeing. Productive conceptual lines of inquiry encompass the notion of (transformative) agency, which is strongly present in many domain of research. Excellence of the Faculty is manifested as 35th worldwide in the Times Higher Education (THE) university rankings in education.

GRADING: EXCELLENT

Research goals

In the self-assessment report (SAR), the research goals of the Faculty are defined in general terms, and also specified in terms of research themes and areas. In general terms, based on UH's strategic plan 2017–2020, the Faculty of Educational Sciences is committed to carrying out outstanding scientific research with high societal impact. In specific terms, eight cross-disciplinary Research Communities have been established to co-construct scholarly expertise. The intention is to gain multiple perspectives from education sciences, and further from sociology, psychology, philosophy, brain and cognitive sciences, and computer science. Such a cross-disciplinary perspective seems productive in terms of introducing new ways of thinking about the foundations and dynamics of education, human learning, and human behaviour, across the human lifespan. A cross-disciplinary orientation is also necessary to achieve distinctive or

transformative advances in theoretical, methodological, and practice-related outcomes (corresponding to the goals of originality and novelty).

Despite structural changes during the assessment period (with psychology, logopaedics, and cognitive science moving to other Faculties in 2016), a cross-disciplinary orientation appears to have been maintained. This is productive and necessary, in order to maintain the goals of originality and novelty in research, plus high standards in research-based education. The Faculty's goal (connected to the research goals) has been to educate top-quality experts in education, including teachers for all the levels and subject domains of education. Such a goal imply cross-disciplinary and innovative research on learning, teaching and pedagogy within different domains, such as arts, mathematics, linguistics, geography for all levels of schooling plus for non-institutionalized contexts. Educational research further need

to cover different levels of human life, comprising society, communities, and individuals. These aspects are present in the Faculty's Research Communities (RCs).

The eight specified RCs (established in a collective bottom-up process in the autumn of 2016), which are presented in the SAR, cover UH's strategic research areas, including the digital world, wellbeing, globalisation, and sustainability. The RCs have been formed as a means to enhance collaborative research efforts and projects, and thus to promote co-authorship and publication in outstanding publication channels. The SAR does not indicate the size or number of researchers within each RC, but it can be expected that the RCs will differ in size.

Based on the brief characterisation of the core contents of the eight RCs, half of them have a strong emphasis on societal, social, and cultural issues. One such issue is 'Diversity, Multilingualism and Social Justice in Education', which forms an element in the Nordic Centre of Excellence's *Justice through Education* (JustEd). This emphasis on societal, social, and cultural issues demonstrates strong and well-grounded research goals. These indicate excellent opportunities to produce internationally recognised research with a high societal impact. They further imply innovative studies and findings on the foundations and dynamics of education in society, and the consequences of governmental practices and policies at the societal level.

Another strong emphasis in the research goals of the Faculty involves the RCs' concerns with school pedagogy in a range of subject domains, paying attention to learning, teaching, and teacher education, and also moving beyond institutionalised schooling contexts. In addition, several RCs address important aspects of human wellbeing, development, emotions, and motivations (extending also

beyond schooling contexts). These research areas within educational and developmental psychology are supported by methodological developments that have utilised multiple forms of data (including physiological data), and advanced tools in brain research. In pedagogical research, digital tools and learning environments are widely addressed, with particular regard to science and technology education, as well as education in craft, design, and home economics. Such a multi-disciplinary orientation, covering multiple methods, seems relevant in encompassing novel initiatives and research findings, plus innovative approaches in developing learning environments.

The two major areas of research are complemented with research on educational assessment. In terms of methodological developments, the RCs represent a range of widely utilised approaches. These include theory-practice interaction and historicity (emphasised in LECl); also large-scale quantitative assessments, interventions, and general research-based improvements in educational practices (Educational Psychology). In addition, digital tools and methods have been widely adopted in many RCs.

The goals for general methodological developments or for theoretical developments have not been given so much emphasis, although digital methods are widely addressed within several RCs. Conceptual innovations that have been widely discussed in international scholarly forums have been introduced and emphasised in the Learning, Culture and Intervention RC. It should be noted that such innovations are encompassed also in the research results.

The developmental goals of the Faculty, in terms of strengthening and further advancing its excellence, manifested as 35th worldwide in the Times Higher Education (THE) university rankings in education (2018), are specified in three major ways: (1) efforts to strengthen international

collaboration through mobility, and through recruiting international scholars and young researchers; (2) advancing open science and open access in publishing; (3) increasing involvement in UH's interdisciplinary research centres. These goals can be regarded as meaningful and productive ways to strengthen scientific quality, and especially the impact of research within international scientific discussion. The goals are also in line with UH's overall strategic goals. However, one might question the relevance of having exact percentages set for Helsinki University as a whole (for example in the proportion of foreign research personnel) with regard to education, which has teacher education as a societal task.

In terms of the research goals, questions remain as to how far the organisation of recent RCs can be seen as relevant for reaching the set goals, and how vital the various RCs are in terms of producing excellence for the future.

In addition, there are questions as to how the recruitment of international scholars and younger researchers is/will be conducted in relation to the eight research areas covered by the eight RCs. There are questions also as to how much emphasis is to be laid on future recruitments to those six knowledge areas which have, during the assessment period, produced significant scholarly results (see section Research results). This applies also to those ten 'key research areas' indicated in the presentation of top publications (see Analysis on research outputs.). Strategic discussion of this kind seems important if there is to be a shared understanding of the key research areas for future developments (e.g. in recruitments). Such an understanding is also needed with a view to balancing the kinds of profile needed for research-based teacher education within the Faculty, considering at the same time the need to further sharpen excellence in certain top areas of research (i.e. those involving possibilities for global leadership).

Research results

In the SAR, the most important research results are presented within six knowledge areas, which (during the assessment period) have produced significant scholarly results, including advances in theory, methods, and practice (cf. the goals for the eight RCs, where the research results are presented in six areas). Five of the six knowledge areas are situated within the areas having a focus on *school pedagogy, learning, digital learning environments, teaching, and wellbeing*. One of the most important of the six areas, in terms of results, is located in in *societal* area. Here the focus is strongly on early childhood education.

The research results described in the SAR include innovative findings pertaining to digital learning (profiling), brain research, and children's (psychological) wellbeing. These areas are approached via strong research tracks on student learning and motivation, plus innovative learning initiatives in STEAM (Science, Technology, Arts, Engineering, Mathematics) education. They cover also language and religious education. In addition, findings from teaching, teacher learning, pedagogy, and learning interventions have produced innovative openings and new discoveries on learning environments. These are supported by methodological advancements/developments in learning assessment, wellbeing, and school achievements.

Productive conceptual lines of inquiry encompass the notion of (transformative) agency, which is strongly present in the domain of design thinking, maker culture, and agency. Agentic approaches, including identity formation, are strongly present in developing early childhood education, and also in school-based education and adult learning. Creative findings have been connected to psychological, educational, and neuroscientific evidence from learning research. So far, solid discoveries have been made from cross-disciplinary

approaches. Using multiple methods, these have combined a societal analysis of policy and organisations with findings on individual children's wellbeing, paying heed to compassion. They have produced solid discoveries, manifested e.g. in high-level article-based dissertations on early childhood education and university studies. The societal results comprise important outcomes on education for democratic intercultural citizenship, and for sustainability in education. The *Justice through Education* initiative in the Nordic Countries has produced critical analyses of education policies and practices within Nordic countries.

To sum up, an overview of the results demonstrates multiple discoveries and creative findings in most areas of educational research.

There is no specification in the SAR of what are to be considered the most significant research outcomes; nor are there indications of how the research outcomes are related to the RC research goals.

Analysis on research outputs

Analysis of the research outputs shows that the Faculty has produced a substantial number of publications, and increasingly, publications in highly-ranked refereed journals and books. About half of the publications have been written in English. In the last three years (i.e. since 2015), there has been a significant increase in publications at the JUFO 3 (top) level. Although during the assessment period the number of publications (total) and also the sum of the JUFO 2 and JUFO 3 publications has remained fairly steady, the move into the JUFO 3 category publication forums is clear (from 3 publications in 2012 to 39 publications in 2017). This is in accordance with the recommendations presented in previous research assessments, conducted in 2012.

The amount of Finnish and Swedish publishing is

considerable, and in line with the goals of strengthening research-based teacher education, and promoting the societal influence of research. Professional teachers working in schooling contexts tend to use their domestic / mother tongue to read scientific findings and to participate in scientific and public discussion. It is therefore important to have research articles in Finnish and Swedish as well as English. This can nevertheless be problematic for impact factor and international readership.

Active publishing has increased also when one measures the total number of publications per person/year. This has increased from 2.04 in 2012 to 3.22 in the assessment period. Note that in the SAR, the domestic JUFO index seems the most relevant for educational sciences, even if, in various categories, certain journals have changed during the assessment period. In education, internal coverage (how well WOS covers the field of education) remains under 50%. Hence, metrics based on WOS data cannot be considered reliable in measuring the impact of education research.

The top 10 publications listed in the SAR differ in terms of the number of citations, from just a few to 170. There are also considerable differences in the personal citation indexes of the researchers. Obviously, older researchers will have higher indexes. It is notable that in the SAR the 'top-ten' publication procedure is criticised. However, the selected publications are indeed seen as representing the 'key research areas' of the Faculty. How these key areas are related to the RCs, and to the six RC result areas, is not clarified.

The number of article-based dissertations has increased, while the admission procedure in doctoral studies has been developed. In addition, there has been an increase in supervision and support for doctoral students by means of co-authorship of articles.

International benchmark

The selection of the Faculty's benchmarking units is conducted by representatives of the RCs. The selection of benchmarks is based on the Times Higher Education University Rankings in Education. There, the Faculty of

Educational Sciences ranks highly (35th in 2018). The universities selected as benchmarks are also high in the rankings. They represent a variety of continents and cultural settings, comprising universities from Europe, USA, and Asia. Similarities between the selected universities include

the fact that they all educate teachers. The criteria used seem relevant for the selection of benchmarks, and the rationale behind the benchmarking can be considered well-grounded.

2.2 Societal impact

There is a clear understanding of the role and positioning of the Unit's research in society. Relevant stakeholders and audiences have been identified and a rich variety of influential activities are launched. Evidence from the outcomes of all activities are not provided, but most of them are evident.

GRADING: EXCELLENT, EVEN OUTSTANDING

Target areas, audiences, research questions and goals

In terms of societal goals, the Faculty of Educational Sciences has a clear understanding of its role, and of the positioning of its research in society. The societal goals have been understood as influencing educational policies and practices, both nationally and globally. The targeted areas have included the development of school systems, teacher education, and curricula. The societal impact is realized through the research-based education of highly-qualified teachers, and through the in-service training of support teachers, school principals, and other education

experts, aimed at ensuring continuous professional learning. In addition, this goal has been realized through doctoral training.

There is clear specification of the critical stakeholders at national and international level, and of the targeted audiences. The Unit is aware of having a critical role in developing the national schooling system, its policy, and its practices, and in advancing the curriculum at all levels of the education system (from kindergarten to elderly adults). The main stakeholders identified at the national level include the Ministry of Education and Culture, and the Finnish National Education Agency (OPH). These have a central role in planning and resourcing the school system, and in developing curriculum and assessment practices at the national level. Other critical stakeholders include the Finnish Education Evaluation Centre (FINEEC), which has a critical role in auditing the quality assessment of education institutions and their outcomes; also the Academy of Finland, which has the role of funding educational research, the Finnish Local and Developmental Authorities (Kuntaliitto), which fund the research and development of

the schooling system, and the Trade Union of Education (OAJ) which deals with teachers' employment relations and professional status within Finnish society. All of these are properly identified as critical stakeholders with maximal societal impact for education research in Finland. The municipalities identified as stakeholders are limited to the capital area.

The description of activities with a social impact demonstrates convincingly the many ways in which active participation occurs. Influence is exerted via the expert developmental groups of the major stakeholders, participation in curriculum development, developmental projects for educational reforms, the publication of educational materials, and training (for in-service teachers and within teacher education).

Activities are listed, indicating how the Unit has contributed to societal interaction, and has participated in public discussion, notably within the Finnish media. The activities further demonstrate how the development projects go beyond the official schooling system, extending to elderly adults and pre-school children. Important issues cover multi-

literacy, digitalisation, immigrant integration, and special-needs projects at national and EU level. Although the direct outcomes are not specified in every case, one can expect that the contributions may be similar to those made in the VETURI project, which has contributed to current regulations concerning special-needs education in Finland.

At the international level, the Unit has received notable recognition, while two Faculty members have had appointments as UNESCO Chairs: Prof. Hannele Niemi (On Educational Ecosystems for Equity and the Quality of Learning) and Prof. Arto Kallioniemi (as Unesco Chair on Values, Dialogue, and Human Rights). In addition, significant societal impacts have been achieved via active roles in the Finnish Matriculation Examination Board, membership of the Board of the Teacher Training Forum, membership of the Executive Board of the National Agency for Education (OPH), and in the Advisory Board for Food Policy. Each of these roles has been important for developing educational practices and policies, and for implementing national educational reforms. In addition, there has been an active

role in developing national networks aimed at developing school pedagogy in a range of subject matter forums (LUMA, Innokas); also in teacher mentoring (VERME).

Activities and outcomes

Valorisation, dissemination, and communication have been manifested via a wide range of activities. Here, one can highlight writing in popular and professional media and in published books. There have also been lectures and presentations in traditional and social media, plus public discussion on schooling and education at all levels (including children and youth wellbeing). Studies based on brain research have also been actively disseminated. Three professors of the Faculty (Prof. Kirsti Lonka, Prof. Gunilla Holm, and Prof. Minna Huotilainen) have received awards for their active role in public discussion, and in disseminating and communicating research findings to the public at large.

Societal impact outcomes are evident in the domain of university and higher education pedagogics. In addition, innovative initiatives, developed to promote student

learning, wellbeing, and pedagogics, have been nominated as finalists in national (Sitra) and local (Helsinki Challenge) forums. Initiatives by JustED have taken the form of the launching of a Swedish-speaking teacher education program in the capital area. In addition, private funding has been obtained to launch this program. Cooperation with the Finnish Education Evaluation Centre (FINEEC) has led to the standardised assessment of learning outcomes. In-service training in cooperation with the Centre for Continuing Education (HY+) has provided professional development for school principals.

At the global level, educational export has taken place, in the form of (i) short- and long-term training courses for teachers, (ii) competence-building for teacher educators, and (iii) the design of new learning environments. Educational export has been organized for education experts in China, Singapore, Kazakhstan, Saudi Arabia, Peru, Somalia, and South Africa. However, education export activities have so far been relatively minor in overall volume.

2.3 Research environment and Unit viability

The deans of the Faculty aim to promote a collegial form of leadership, and this gives promise for the future. Follow-up is necessary to determine how the actions taken have improved transparency, collegiality, and inclusiveness in decision making. These will be important in order to strengthen the identity of the (still fairly new) Faculty of Educational Sciences.

For the future, the relevance and productiveness of the Research Community (RC) structure, how they are resourced and developed, and what is their future prospects, needs to be considered and discussed.

From the perspective of support for the careers of young researchers, and recruitment of the best candidates

as post doc researchers, the goal of increasing article-based dissertation completion seems likely to be successful and productive for the future development of research in the Faculty. The recruitment practices themselves are not described in the SAR of the Faculty, and would require further clarification. Faculty has been successful in receiving

competitive external funding from a range of sources, including the Academy of Finland and Business Finland. The Faculty has wide collaboration at national and international levels.

GRADING: VERY GOOD TO EXCELLENT

(The Teacher Training Schools is a fabulous infrastructure, living lab and basis for a learning community)

Leadership, goal setting and follow-up

During the assessment period (2012–2018) the Faculty went through many structural changes. These were connected to the broader University changes known as the ‘big wheel’. Research and teaching personnel were cut back, and support administration centralised. In addition, in 2017 the Faculty of Behavioral Sciences was restructured, with Psychology, Logopaedics, and Cognitive Sciences being moved away from the Faculty, and the formation of a new Faculty of Educational Sciences. Following the abolition of the old departments, the personnel from the previous two departments remained in the Faculty of Educational Sciences. Recently, two departments have been formed in the Faculty of Educational Sciences, namely (1) the Department of Education, and (2) the Training Schools. In the autumn of 2016, eight research communities (RCs) were established via a collective bottom-up process within the Department of Education.

The Faculty leadership comprises one dean and three vice deans, each focusing on the core tasks of research, teaching, and societal interaction. This seems to operate as a balanced and functional arrangement in terms of the major functions of the Faculty. In the leadership team, there are in addition the two leaders of the two Departments. The Faculty council, with 18 members, has representatives from all staff groups and students. In addition, the degree

programs (bachelor, master, doctoral) have their own steering groups with student representatives. Three committees, led by the vice deans, are important for renewal and for supporting development. The research committee has critical tasks in developing issues pertaining to research and doctoral education. However, there is no detailed description of how the research committee is related to the Research Communities, or how the committee participates for example in the recruitment process. The SAR does indicate that specific topical issues, such as research focuses or curriculum developments, are discussed regularly in a Faculty meeting, which takes the form of an assembly of all staff and students. This meeting is called by the dean at least once per term. In addition, staff meetings or working groups are organised in the sub-units, such as the Research Communities. In the SAR there is not much self-reflection as to whether these leadership structures are adequate for their purposes.

There is no very explicit description of the official status and size of the RCs; nor is there a detailed description of how the RCs are resourced, or how the representatives of the RCs are selected for the Faculty administration, is not quite explicitly described in the SAR. For the future, the relevance and productiveness of the RC structure, how they are resourced and developed, and what is their future prospects, needs to be considered and discussed.

In developing leadership, staff feedback is collected regularly. This has had an important influence on the development of the leadership culture of the Faculty. Although leadership structures and managerial actions have been well-organised since the inception of the new Faculty of Educational Sciences, challenges have been identified, relating to issues of staff wellbeing. The challenges revealed by the inquiry into personnel wellbeing would seem to be partly explained by the disruption emerging from the ‘big wheel’

reorganisation, and from other recent structural changes. In any case, efforts have indeed been made to address these issues at Faculty level, and actions have been taken to improve staff wellbeing, involving for example possibilities for personnel to exert influence in their work and to participate in decision making. The deans of the Faculty aim to promote a collegial form of leadership, and this gives promise for the future. Follow-up is necessary to determine how the actions taken have improved transparency, collegiality, and inclusiveness in decision making. These will be important in order to strengthen the identity of the (still fairly new) Faculty of Educational Sciences within the University, and also to implement the UH strategic plan for the years 2017–2020. At the Faculty level, the shared strategic objectives are clearly formulated in the SAR, which refers to a ‘creative, international environment for learning and top-level research, a focus on the student and the resources of the reform’.

Human resources, careers and recruitment

The personnel structure within the teaching and research staff is favourable for top level research in relation to level 4 personnel (35 professors and research directors, 8 %), and also level 3 personnel (124 assistant professors on tenure track, plus university lecturers, university researchers, senior researchers 27%). By contrast, level 2 is fairly restricted; however, it will be broadened through the recent provision of 10 new post doc posts. The recruitment practices themselves are not described in the SAR of the Faculty, and would require further clarification.

The Faculty aims to create a thriving and encouraging working culture while exercising high standards of ethical conduct in teaching, research and community relations. The goal is to further raise the profile both nationally and internationally.

Researcher education

Researcher education takes place in two doctoral programs coordinated by the Faculty of Educational Sciences. Both programs are multidisciplinary. The size of the programs is not described in the SAR, but the *School, Education, Society and Culture (SEDUCE)* program seems to cover most of the research domains of the Faculty. This program invites doctoral students from outside institutes and experts (leaders, policy makers, and teachers) in schooling. It can be regarded as positive from the perspective of the societal impact of the research. The other program, *Psychology, Learning and Communication (PsyCo)*, is based on a previous (pre-2017) doctoral program shared with Psychology. The program focuses on methods from behavioural neurosciences and from research on physical and mental wellbeing, plus digital learning technology, and speech, language and social interaction. Having two different doctoral programs seems relevant, since the methods and approaches used in the two programs are quite different from each other.

In the doctoral program, the Faculty has considerably clarified and tightened its admission procedures, which is productive for the completion rate of the PhD students. In addition, supervision practices have been strongly developed, and team-based supervision has been launched to give stable support to PhD candidates.

As compared to the annual intake of doctoral students (although this has decreased from 58 in 2013 to 29 in 2017) there are very few (2–4) salaried doctoral positions per the program. Since the number of these salaried positions is dependent on the number of doctoral completions, this could form a significant motivation for the promotion of active supervision practices within the Faculty. The goal of increasing the completion of article-based dissertations is further productive, in terms of active supervision by senior

researchers. Article dissertations (based on co-authorship of the articles) appear to be better connected to the research strengths of the Faculty. By this means, researcher education can be better integrated with the research communities. From the perspective of support for the careers of young researchers, and recruitment of the best candidates as post doc researchers, the goal of increasing article-based dissertation completion seems likely to be successful and productive for the future development of research in the Faculty.

Research infrastructure

In SAR, the material infrastructure is described as excellent, including as it does the Teacher Training Schools, Minerva Plaza, Playful Learning Center (PLC) laboratory, and IBS video. The SAR does not address the maintenance and development of the infrastructure.

Funding

The selection of funding sources can be considered relevant, and both national and international sources are considered. The funding from the Academy of Finland decreased after 2017, when psychology moved to the Faculty of Medicine. However, it is at a relatively high level. In the last few years, the portfolio of externally-funded projects has moved more towards developmental research and projects funded by the Ministry of Education and Culture. The major reasons for the changes in the funding portfolio can be traced to the changes that have taken place in current government strategy, whereby funding for research and education has been cut. Despite these external constraints, the Faculty has been successful in receiving competitive external funding from a range of sources, including the Academy of Finland and Business Finland (Tekes).

The Faculty's strategic goal is to sustain national funding, and to raise international funding, through support for its research capacity and for the preparation of competitive funding applications. This can be considered a productive strategy in terms of maintaining a balance between the resources available for research and increasing international collaboration in research. The SAR does not address how the preparation of applications receives support from the University central agency for research services.

For the future, it will be especially important to sustain the level of Academy funding in order to secure the continuous renewal of research. In addition, for the sake of long-term research, and for the preservation of recent excellent international rankings (rank 35 in the Times Higher Education metrics for 2018), there will have to be a steady renewal of research within all key areas of the Faculty. The maintenance of excellence and innovativeness will be further supported by the successful recruitment of ten new post doc researchers, resourced from basic University funding.

Collaboration

The Faculty has wide collaboration at national and international levels. At the national level, collaborative projects and networks include multidisciplinary relations within the University. In addition, there are national networks and collaboration with all those other Finnish Universities (Eastern Finland, Jyväskylä, Oulu, Tampere, Turku, Lapland and Åbo Akademi) that have programs in educational research and teacher education. Developmental projects exist also with Aalto University, and with the University of the Arts, situated in the capital area.

International collaboration covers all continents except Africa. However, Africa is included in plans for future

collaboration. The most active collaborative relationships are with other Nordic countries, the UK, Europe, Canada, and the USA. In addition, collaborative relationships have been created with universities in South America, China, Japan, and Australia. Recent activities include the strengthening of intensive cooperation in education and research between Helsinki University and Beijing Normal University. The teachers from the Training schools have also been active in international collaboration.

The Faculty is thus very well connected and networked in its field. Interdisciplinary collaboration has also been maintained, although the most important disciplinary fields are not described (except for psychology, brain research, and the arts). For the future, research collaboration with other disciplines, such as social psychology and other social sciences, might also provide fruitful relationships and incentives for the renewal of research.

Connections with ‘other constellations’

For the future renewal of learning research, Prof. Kirsi Tirri’s position as a core Fellow in the Helsinki Collegium for Advanced Studies (HCAS) multidisciplinary project seems very promising. The project aims to connect psychological, educational, and neuroscientific evidence. This can be expected to produce new theoretical lines of inquiry and methodological innovations for the future.

Another topical and promising multidisciplinary constellation is the Interdisciplinary Network of Environmental and Sustainability Education Research (SIRENE) network, hosted by the Faculty and acting as a member of Helsinki Institute of Sustainability Sciences (HELSUS).

Societal and contextual factors

As described in SAR, the past five years have been turbulent and full of changes for the Faculty. These changes are taken place within the University, but also at national level, involving government cuts in state funding. The assessment period has witnessed the renewal of degree programs, a decrease and centralisation of administrative personnel, and the abolition of departments. As noted above, psychology, logopaedics, and cognitive sciences have been moved away from the Faculty. Despite these significant changes, which have influenced the research identity of the Faculty, the Faculty has survived in full vigour, and has actually strengthened its research profile.

Following the retirement of many leading scholars, generational changes have taken place, with successful recruitments into new tenure track positions. The Faculty has developed awareness of the high expectations set for educational research. Furthermore, the Faculty has been able to attract more external funding and to identify

new sources of funding. These sources include business cooperation and funding, received from the growing export of Finnish expertise in education.

The emphasis on research-based teacher education, including increasing the time resources for teaching personnel to conduct research, can be seen as further means to strengthen the research outputs of the Faculty. The establishment of the Research Communities can also be seen as productive for rethinking the focal areas of research, and for promoting research collaboration nationally and internationally. Future goals are in line with these endeavours, seeking thus to maintain excellence in research and to advance high-level societal impact. The forecasts on the most important trends and developments for the coming years include an emphasis on life-long learning, the need for multidisciplinary research, and the strengthening of international collaboration and networking. Promising initiatives to realise these goals include the establishment of an international master’s program in education.

There is an urgent need to put in place at Unit level (and beyond) an easy-access and confidential system for reporting staff and student concerns relating social welfare, harassment, bullying and discrimination. Personal safety and security are central to a good research environment.

Social Sciences Panel

FACULTY OF LAW (SOC UNIT 34)

1 SUMMARY

1.1 Description of the use of criteria

The Social Sciences Panel has in the assessment of each Unit had at its starting point the basic stance underlying the research assessment exercise, namely that the ultimate purpose of the assessment is to enhance the future competitiveness of the Units and, in the last instance, all of the University of Helsinki. This future-orientated outlook affects the assessments of all Units and all of the three overarching assessment themes.

Concerning the first of these three themes, that of *scientific quality*, the Panel has examined the substantive and thematic objectives formulated by each Unit as well as the range of institutes that a given Unit in its SAR has highlighted as relevant for a comparison. In several cases this led to a fruitful exchange of views and to new insights. The Panel has also taken note of the extent to which each Unit has articulated its objectives. In this case as well the probing promoted useful questions concerning the further articulation of objectives. The Panel has also, often in minute detail, studied the publication records of every Unit. In this part of the assessment, the Social Sciences Panel has made extensive use of the bibliometric data supplied but not so as to simply copy the outcome of the bibliometric analysis but in order to establish a reasonable point of comparison.

The Panel has been fortunate enough to have had members who have a firm grasp of given international standards in the fields of the Units covered. Several members have also had a long-standing familiarity with the

University of Helsinki and the academic system of Finland. Eminent examples of this are provided, for instance, by the assessments of Department of Economics and Management (Faculty of Agriculture and Forestry) and Economics (Faculty of Social Sciences) but it applies in various degrees to all Units.

Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stake-holders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stake-holders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is more difficult yet to clarify what changes have in the last instance occurred in societal conditions.

On the whole the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stake-holders and actual or potential recipients of their findings. In several cases, including Faculty of Educational Sciences,

Faculty of Law, Economics (Faculty of Social Sciences) and Social Research (Faculty of Social Sciences), there are also well-established institutionalized linkages, in other cases there are well-established forms of contacts (as for Ruralia Institute and Swedish School of Social Science). In the case of Finland, such linkages appear to be remarkably well developed in an international perspective. At the same time, some of the assessments, for instance of the Faculty of Law, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

Research environment and Unit viability is a criterion that refers to the future potential of a Unit. This is to some extent a function of the other two criteria but not exclusively so. The Panel members have devoted much attention to forming a well-grounded view of the future viability of a Unit and has for most Units expressed a high degree of confidence in their viability. This optimism, however, is contingent upon Units' undertaking a further clarification of their strategies and in some cases also in their internal procedures.

Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades.

This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread

of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

Unit 34, the Faculty of Law, is the largest and most comprehensive faculty of law in Finland. It is one of the central institutions of training for the legal profession in Finland, with responsibilities towards the legal profession, the legal system and the society at large. Legal research at a high academic level is essential for maintaining the rule of law and for developing the rationality in law. The Faculty has a teacher and researcher staff of 107, of which 53 are in level 3 and 4. It has a funding of 9.062.000 EUR of which 69% is government core funding and other University funding.

Strengths

- The Unit ranks on line with the best law faculties in the Nordic countries in international rankings.
- It has a strong and established international track record in the fields of international and European law, particularly in legal theory within these fields.
- The Unit has ambitious goals and sets leading European universities as its benchmark. This is not unrealistic.

- The Unit has a strong societal impact, especially at elite level, and many of its researchers are leading national experts for the Parliament and the Government.

Development areas

- The Unit needs a clearer research strategy, and might consider diversifying its research areas.
- The Unit should consider to develop areas of law connected with less organised social groups such as gender law, consumer law, landlord and tenant, the rights of the child and immigration law, as well as legal aid and access to justice. That such areas are less visible in the Unit's strategy gives it a clear profile oriented towards social elites, but this does not seem to be the result of any clear strategic choice.
- Research groups within the Unit lack necessary administrative support for networking and seminar activities.

Recommendations

The Unit has been hit by a larger proportion of the reduction in government funding than the University as such. The increased dependence of the Faculty on private donations may be one driving force behind the orientation toward the social elites. It should be the responsibility not only for the Faculty, but also for the University of Helsinki to ensure that its Faculty of Law has the necessary resources to develop expertise in legal areas relevant to underprivileged groups of society. This is essential for a faculty to continue to be relevant to the development of democracy and the rule of law in the Finnish society, particularly in times with increasing social scepticism towards authority and elites. The University should consider hiring a new, senior professor to give academic and planning leadership in these essential, and socially important areas, areas which have in the past been part of the positive and defining features of the Faculty.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit has some exceptional hubs of research that have achieved funding as Centres of excellence. Both of these have had world leading quality. The Unit, however, needs a clear strategy for how to maintain the quality of research within these fields, and how to bring new areas of research up to an excellent quality.

However, the research priorities could be more clearly articulated. There are some areas of research that are not very well covered by the Unit even if the overall strategy underlines that high-quality research is done in all significant areas of law. Fields consumer law, landlord and tenant, the rights of the child and immigration law, as well as legal aid and access to justice are not very visible in the strategy or self-assessment of the Unit.

GRADING: VERY GOOD

Research goals

The research goals of the Unit are 1) to increase the quality of research, internationalization of research and researchers' work, 2) to increase the interdisciplinary focus, 3) to increase the competence and flexibility to respond to acute societal problems, nationally and globally, and to maintain the responsibilities for professional education and the idea of research-based teaching.

The main task of legal research is to contribute to maintaining and increasing the rationality of law and legal

regulation through academic studies, teaching and dialogue with the legal profession. To this end, legal research must both keep track of developments in scientific thought and fields such as philosophy, psychology and social science, and developments in society. The traditionally strong focus on theoretical issues is one of the hallmarks of the Faculty, contributing to its strong position in the Nordic countries.

The research goal includes "high-quality research in all significant areas of law". This has to do with national status of the Faculty: it is the largest law faculty in Finland. Research priorities could however be a bit more clearly articulated. It is important to respond to society's needs for legal education, there are however a large number of burning issues to be answered. There are strong research groups in the Unit but there are also new areas of research traditions emerging. A large number of new professorships has been started with private donation money but it is not clear how is this taken into consideration in research goals and future strategic choices. The new areas of legal studies should be integrated in the Unit's research strategy (Nordic law, media law, copyright law, sports law and so on). In addition, there are significant areas of research that are not covered but that are significant both nationally and globally (minority issues, gendered configuration of law and legal practices, new inequalities, aged persons rights in social and health care and so on).

Research results

The most important results chosen by the Unit are 1) Theoretical research on public international law and human rights, 2) Theoretical research in European Law and European Constitutionalism, 3) Global and comparative law research particularly in implementation of labour rights, on globalization and legal education and on comparative legal history, 3) Law and Technology research, and 4) National, European and International economic law. The first two sets of results are connected with the two centres of excellence that were hosted at the Unit until 2011 and 2013.

These results have been selected by the Unit due to their originality and strong academic and societal impact. The rationale behind these choices is based on past performance indicators that are really good indeed (two centres of excellence funded by the Academy of Finland) and publications in high quality forums + strong social impact of research results both nationally and globally. There is however variation between research field and groups.

Analysis on research outputs

When considering the JUFO-levels, the numbers of publications at levels 0 and 1 have fallen and numbers at levels 2 and 3 risen during the assessment period. This indicates a positive development in the Faculty. However, due to the particular nature of legal scholarship and its special task in Finnish society and legal practice, a large

number of publications is published in Finnish journals (such as in *Lakimies*, which is the leading Finnish journal in law, published by the Finnish lawyers' society). The number of peer-reviewed scientific/scholarly publications has decreased a little, but the number has varied quite a lot in the course of the years (2014:197, 2015:204, 2016:241). The percentage of English publications in all publications has increased from 46.2% in 2014 to 51.9% in 2017.

As far as doctoral education is concerned, the Unit has reached the goal of 15 doctoral degree completions during the last years (2015: 22 degrees; 2016: 16 degrees; 2017: 19 degrees).

The research outputs are well matched to the Unit's goals, based on its self-reflection. A law faculty must maintain close ties to the legal profession, and this entails

that a high proportion of its publications must be in the language of the profession and based on the language of the legal sources. At the same time, maintaining a high scientific standard, and the internationalisation of law and legal discourse requires participation in the international scholarly debate. The coverage of the top publications of the Unit is wide, indicating the high capacity that the Unit's research has for discussing, even solving divergent problems that are raised in society, both nationally and internationally.

International benchmark

The international benchmarks of the Unit are

- The Faculty of Law of the University of Leiden
- The Faculty of Law of the University of Leuven
- The Faculty of Law of the University of Edinburgh

These three institutions are on the top 50 list over law faculties of the world both on the THE 2019 ranking and the QS 2018 ranking. Helsinki is on the 50-100 list for law on THE 2019 ranking and the 101-150 list on the QS 2018 ranking. This places Helsinki on line with the best law faculties in the Nordic countries: Copenhagen, Lund, Oslo, Stockholm and Aarhus. (Lund and Copenhagen both rank among the top 50 on the THE. Copenhagen does not figure on the QS ranking, Lund ranks among the 100-151 best on this list.)

The rationale behind the choice of Leiden, Leuven and Edinburgh reflects the ambition of the Unit to place itself among the top 50 of the world. All three benchmark units participate in the LERU network together with Helsinki.

2.2 Societal impact

The societal impact of the Unit is excellent. Many of its researchers are leading national experts for the Parliament and the Government.

The Unit has a clear understanding of its audiences and stakeholders. It is, however, to a large extent oriented towards elites, and could be developed also more in the direction of weaker parties in society and those with the need for legal aid and support to achieve their rights.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The Unit states that it has no particular target areas: legal research carried out in the Unit covers widely-different sectors of the society. Since the Unit is the most important institution of legal research and education in the country, communication with the society is a natural part of the research work. The Unit has strong, active and direct connections to various stakeholders in both the private and public sectors, because of the small size of the country, the traditionally high prestige of legal scholarship in Finnish

society and of the Unit's position as the first and biggest in the country. Also, the professional literature (commentaries, text books etc.) is usually published by legal scholars.

The rationale for the selection of the societal impact goals are consistent with the main task of a higher institution of legal learning; to participate in the legal profession in the wider sense and to contribute to the rationalisation of law and the legal process.

Activities and outcomes

The research of the Faculty retains its position being the

most societally relevant unit of legal research in Finland. Many of the Faculty's researchers are regularly invited by various authorities to deliver reasoned legal (expert) opinions. Especially notable are the role of staff members on the committees of the Parliament (Constitutional Law Committee, Law Committee, Administrative Committee, Great Committee, Commerce Committee). It is not unusual for a professor to be invited by the Parliament (with a written opinion) to 20-40 Committee sessions /year. Also, the private sector regularly uses Faculty researchers' expertise. These contacts have helped to identify new research needs, and in some cases resulted in donations to the University for furthering research on new topical themes.

Professional, but research-based textbooks and commentaries are widely published by Faculty researchers and used in legal practice. The Faculty also offers

supplementary education especially in administrative and tax law. Researchers also participate regularly in supplementary education organized by private actors (Talentum etc.) and public sector institutions (Ministry of Justice, Courts, The Office of the Prosecutor General). Many researchers of the Faculty appear often in the media and participate in public discussions and events.

There has recently been a heated public debate around social and health care reform and interpretations of constitutional law. It looks like that researchers are meeting increasingly negative (even fierce) feedback of their commentaries and statements. The Faculty should reflect upon how such participation in current on-going political processes reflects back on the standing of the Faculty as an academic unit with responsibilities towards independent long-term research and education. Social impact work has

its dark side to be more discussed.

The aims and the activities of the Faculty seem to be mainly focussed on those developing and applying the law in the Finnish society, as well as on the private sector. There seems to be less focus on access to justice and legal aid, and groups of society that have difficulties in accessing their rights and legal services. This also reflects back on the research in the Unit. There are some areas of research that are not very well covered by the Unit even if the overall strategy underlines that high-quality research is done in all significant areas of law. Fields like consumer law, landlord and tenant and immigration law are not very visible in the strategy or self-assessment of the Unit.

There could be even stronger involvement in global networks and institutions.

2.3 Research environment and Unit viability

The Unit is very well positioned for the future because of its role in educating new generations of lawyers for the Finnish society. Lack of resources and strategy inhibits the ability of the Faculty to develop research in fields that are not backed by the interests of the social elites. Lack of administrative support inhibits the research groups in their ability to establish and maintain research networks and networking activities.

There is an urgent need to put in place at Unit level (and beyond) an easy-access and confidential system for

reporting staff and student concerns relating social welfare, harassment, bullying and discrimination. Personal safety and security are central to a good research environment.

GRADING: VERY GOOD/GOOD

Leadership, goal setting and follow-up

The Unit could be very well positioned for the future because of its role in educating new generations of lawyers for the Finnish society. This ensures that the researchers of

the Unit has competences in most central legal disciplines. There is, however, a tension experienced by all legal faculties between the drive for internationalisation and interdisciplinarity and the need to maintain researched based expertise in fields of national law. The Faculty has put high emphasis on internationalisation, but less on interdisciplinarity and research in fields of law and society.

The 2012 evaluation stated in its report about the Unit's management system: "This system does not ensure sufficiently that vital areas and challenges of research are

covered when researchers do not spontaneously respond to vital challenges. At a comprehensive law faculty the bottom up strategy has to be supplemented by strategies where research plans also are systematically dealt with. This may already be in place, but the material given to the panel does not describe this.” We agree with this and also question the seemingly lack of processes and activities to develop and decide upon a common research strategy for the Unit.

The Faculty prepares its own implementation plan of the University strategy every year, picking up those development targets which are the most important for it and providing ideas on how to achieve those targets. The implementation plan is prepared both at the steering group and the Faculty Council and also discussed on Faculty days to which the whole staff is invited. The most important strength of the procedures is the participation option of all staff members. The weakness, however, is the feeling or even the fact that the University strategy and the annual development targets are presented in a top-down manner, and do not always match the needs of the Faculty.

The application for external funding is based on both bottom-up and top-down initiatives. While the researchers in each discipline have the best expertise to recognize the areas that need research, the lead shown by the Faculty encourages the researchers to apply for external funding. The funding portfolio of the Unit would be more balanced if it included more EU-based funding. However, the fact that the University strategy is forceful in stressing funding from EU sources is problematic, since not all of the EU calls are suitable for the research undertaken by the Unit. A major problem faced by the Unit is that the University offers individual administrative support only for ERC applications. This does not encourage applications for other sources of funds (such as from the Academy of Finland or Nordforsk).

The non-existence of any kind of technical administrative support makes strategic planning and deeper analysis of the Faculty’s research activities and its future development needs impossible. Regular problems with the University’s Communications unit are preventing systematic planning of research communication.

Human resources, careers and recruitment

The Faculty’s personnel structure is currently quite well prepared for the future. However, the actively developed tenure track system may have unexpected impacts by ‘blocking’ the career development of the current post docs and doctoral candidates. The Faculty staff consists of 30 persons on the 4th career level, around 20 persons on the 3rd career level and 17 persons on the 2nd career level (16 post-doctoral researchers, one university instructor). Moreover, there are around 30 doctoral students on fully-salaried positions in the Faculty (1st career level), and around 50 other researchers (doctoral students and postdocs with grants, emeritus professors and docents) taking part in the research activities of the Faculty.

During 2018, the recruitment procedures and guidelines of the University have been vigorously discussed within the Faculty for improving transparency and best practices in the Faculty’s recruitment. At the same, time the University qualification requirements and their application have been on the agenda – to introduce awareness about the merits needed. Especially the importance of highquality publications, international research networks and external research funding has been pointed out. When considering international calls for applications to the Faculty positions, the challenge has been – and will be in the future – how a sustainable balance between the professional (mainly national) education and (international) academic research can be guaranteed.

The ongoing educational reform (towards closer cooperation between teachers and other legal subjects) is breaking down the traditional barriers between legal fields and subjects, and encouraging researchers to collaborate. In the future, the academic positions of the Faculty could be opened with more general focus / subjects than today.

There are many new positions with donation money. How these new positions are taken into account in the overall strategy of career advancement and recruitment is unclear.

Researcher education

The number of fully salaried doctoral students is diminishing and becoming too small due to the dramatically changed funding system. This reduces the attractiveness of an academic career and may threaten training and recruitment of the new generation of staff positions in the future.

Research infrastructure

Libraries and electronic databases are the main infrastructure of legal research. Additionally, the Unit has developed its own infrastructure such as Legal Tech Lab and China Law Center, as well as supporting the founding of the SSH center. In the near future, new structures will be created, such as a system of research assistants, aiming to encourage the foundation of new research groups. It is a fundamental issue that there are enough resources for books and databases etc. Also, from that perspective, cuts to funding are problematic. Additionally, the library could develop its services more towards information services offered to researchers.

Funding

The funding sources include both source of basic funding (from the University budget) and divergent sources of

external funding. As the statistics demonstrate, the level of basic funding has fallen due to the cuts made to the funding of Finnish universities. However, the level of funding from the government has fallen by 26% since 2015 (from 9.289.000 EUR to 6.750.000 EUR), whereas the level of government funding to the University in total has fallen by 12% in the same period (from 459.224.000 EUR to 406.269.000 EUR). This means that the Unit has been hit by a larger proportion of the reduction in government funding than the University as such.

What becomes competitive external funding, two Academy of Finland centres of excellence ended during the assessment period, representing a wide-focused European approach in the Faculty's research. Additionally, many projects funded by the Academy of Finland have been closely related to the topics of the former centres and to the Faculty's research focus areas such as globalizing and transnational law, digitalisation and law, security and privacy. The Faculty has succeeded very well in obtaining donation-based funding. During the assessment period, the Faculty received donated positions for Professor of Nordic law, Professor of Media law, Professor of Copyright law, Professor of Sports Law, Assistant /Tenure Professor of Labour and Social Law, Professor of Environmental Law, Professor of Stock Market Law, Professor of Cooperative Law, Professor of Practice in Financial Statements Law and Professor of Practice in Legal Practice Law.

In total, there has been a reduction by 28% in the

funding of the Unit from 2015 to 2017. The equivalent figure is 7% for the University as such. This reflects both the fact that the reduction in government funding has hit the Unit harder than the University average, and the fact that legal research in national dogmatic disciplines is more difficult to fund through external sources than research in many other disciplines.

Collaboration

The Unit has a wide scope of collaboration with other scholars and institutions, both nationally and internationally. Within the University, the Unit's researchers have a lot of cooperation, with researchers in different fields and disciplines. Often cooperation is based on networks between individual researchers, but the new activities in the profile within the University have especially brought researchers together to draft funding applications, plan joint activities and new practices of cooperation. Thus, the Unit's researchers are involved in the HelSus and HelDig cooperation, and in activities of the Aleksanteri Institute.

The Unit collaborates actively with the other law faculties in the country. There is both educational and research cooperation. Faculties in other Nordic countries have traditionally been close partners with the Unit. The Nordic associations (e.g. in criminal law, administrative and civil law) function as a framework for workshops, conferences and research cooperation in the field concerned. The China Law Center hosted by the Unit has been a meeting point for Finnish and Nordic researchers

interested in Chinese law. The Center also hosted a research project in labour law which involved scholars from the Chinese Academy

for Social Sciences and the Beijing University. Cooperation in other legal fields with the better Chinese universities has also been coordinated by the Center.

For years the European University Institute (EUI) has been an important cooperation partner. The Among other European partners are the German Max Planck Institutes, especially in fields of private (international) law, international law, criminal law, IPR law and legal history. Research training has been organized with the University of Edinburgh and University of Maastricht. The New York University has been one of the main US research partners.

Societal and contextual factors

Legal studies reflect changes in society both nationally and globally. The Unit must be ready to react promptly to those changes, which requires a dynamic attitude. Sustainability is clearly a new key-word which will make its way into legal studies even more strongly. Law and technology, law and digitalization, IPR and privacy continue to be important due to rapid developments in AI research, machine learning etc. It is also visible that the role of legal-ethical issues will grow in the regulation of medical and technological fields. Legal scholarship will need to be more sensitive to ethical issues in the future. This will increase opportunities for interdisciplinary research, too.

Social Sciences Panel

ECONOMICS (SOC UNIT 35)

Faculty of Social Sciences

1 SUMMARY

1.1 Description of the use of criteria

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Concerning the first of these three themes, that of *scientific quality*, the Panel has examined the substantive and thematic objectives formulated by each Unit as well as the range of institutes that a given Unit in its SAR has highlighted as relevant for a comparison. In several cases this led to a fruitful exchange of views and to new insights. The Panel has also taken note of the extent to which each Unit has articulated its objectives. In this case as well the probing promoted useful questions concerning the further articulation of objectives. The Panel has also, often in minute detail, studied the publication records of every Unit. In this part of the assessment, the Social Sciences Panel has made extensive use of the bibliometric data supplied but not so as to simply copy the outcome of the bibliometric analysis but in order to establish a reasonable point of comparison.

The Panel has been fortunate enough to have had members who have a firm grasp of given international standards in the fields of the Units covered. Several members have also had a long-standing familiarity with the

University of Helsinki and the academic system of Finland. Eminent examples of this are provided, for instance, by the assessments of Department of Economics and Management (Faculty of Agriculture and Forestry) and Economics (Faculty of Social Sciences) but it applies in various degrees to all Units.

Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stake-holders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stake-holders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is more difficult yet to clarify what changes have in the last instance occurred in societal conditions.

On the whole the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stake-holders and actual or potential recipients of their findings. In several cases, including Faculty of Educational Sciences,

Faculty of Law, Economics (Faculty of Social Sciences) and Social Research (Faculty of Social Sciences), there are also well-established institutionalized linkages, in other cases there are well-established forms of contacts (as for Ruralia Institute and Swedish School of Social Science). In the case of Finland, such linkages appear to be remarkably well developed in an international perspective. At the same time, some of the assessments, for instance of the Faculty of Law, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

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Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades.

This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread

of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

The economics Unit is generally doing a good job. Its greatest weakness is its small size. In some areas their researchers are world-leading, in some others the research maintains a high international level. The societal impact of the Unit is strong, with some extra high visibility/high importance contributions to society. Extensive consultation with national research institutes is a definite bonus. The research environment is determined by the size of the Unit. The Unit cannot cover all areas of economic research. Co-operation within the Helsinki Graduate School of Economics (Helsinki GSE) will be crucial. It should also boost the number of completed PhDs, although given the current level of supervisory potential, the numbers should already be higher than they are.

Some of the drawbacks are independent of the Unit. The University of Helsinki (UH) is responsible for leaving it without secretarial assistance, which has made many

everyday tasks more difficult to perform and very time-consuming. The same is true for not paying salaries to all PhD students admitted to the PhD programme, which is one reason for some students not finishing their degrees.

International co-operation and internationalization seem to be current buzzwords within UH. The example of the Unit shows that it is easy to overemphasize them. In fact, the world-leading research within the Unit has been carried out without international collaboration, although the participants are of course well connected with the international community. The emphasis in evaluations should be on quality, not on counting the number of publications with participants “from two or more countries”, see PP (intl collab) in the CWTS report.

Strengths

- Strong, internationally competitive areas of research

- The vision of the Helsinki Graduate School of Economics
- Extensive consultations with research national institutes
- High-profile assignments

Development areas

- Small size
- Current PhD production too small
- Lack of cohesive strategy
- Lack of supporting staff (secretary)

Recommendations

- Increase PhD production (make full use of the Helsinki GSE)
- Employ a microeconomist
- Reflect on balance between quantity and quality of papers (macroeconomic group)
- Collaboration with universities in the Stockholm area

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

Research carried out within the Unit is of high quality. It is by necessity concentrated on specific themes that reflect the interests of individual researchers. Econometricians form a world-leading group. They are developing new time series models, which includes working out the statistical theory and inference for them. Their work on these models has also led to successful empirical applications. Despite these and other advances, elaboration of research goals on the Unit level would be desirable. Collaboration with resource and environmental economists in the Faculty of Agriculture and Forestry is starting and is strongly encouraged.

GRADING: VERY GOOD

Since the Unit is small, the interests of leading researchers dictate the directions of research. The main areas of research are microeconomics including behavioural economics, labour and public economics, macroeconomics, and econometrics. The goal of the Unit is simply to advance (or, preferably, carry out) high-quality research in economics. This is a laudable goal, but elaboration of research goals would be desirable. This would include discussion on processes through which these goals could be realised. As research goals are currently “very much determined by the interests of individual researchers”, the benefits and shortcomings of this situation should be weighed against each other. For example, does this strategy leave the Unit vulnerable to individual staff

departures with impact on Unit viability and sustainability? The Unit might reflect further on the processes that enable (or impede) new goals from emerging and to be supported; and on the extent to which the research goals of the sub-units align with those of the Unit as a whole. It could also consider ways to maximize the new opportunities to collaborate that have been created by the recent restructuring.

In this report, scientific quality of the output is assessed by research group as listed in the SAR. The econometrics group is clearly the strongest of the research groups and has published almost exclusively in top econometrics journals during the period of assessment. (Note, however, that not a single econometrics journal has a JUFO Level 3 ranking, which affects the statistics in the SAR.) The econometrics group was one of the first ones to study noncausal time series models and apply them to macroeconomic time series data. It is currently world-leading in this area. The work of the group on vector autoregressive models and nonlinear models, Gaussian mixture models in particular, is also of highest international quality. As always, evaluating the impact and significance of these innovations takes time. At the moment it is not possible to make any precise estimates of how impactful the work of the group will eventually be, but the potential is clearly there.

The primus motor of the group, Professor Pentti Saikkonen, now Emeritus, has been an external resource

to the Unit since he has been Professor of Statistics at the Department of Mathematics and Statistics at UH. He can be viewed as a key factor to the success of the group. To keep it going, further strengthening the group by hiring one or two promising junior time series econometricians is recommended.

As already suggested, research conducted in the Unit is by necessity tightly focused on specific themes. The microeconomic group excels in theoretical research in areas such as mechanism design and game theory. Another successful strand is the experimental one, in which empirical methods in neuroscience are applied to the study of behavioural economic and business economic problems. The leading expert here is Dr M-L Halko who is a well-connected researcher with collaborators in various institutes and departments, both internationally and in Finland. As the SAR points out, her study on the feelings of entrepreneurs towards their own enterprises has attracted enormous attention around the world. This choice of topic shows vivid imagination and creative curiosity. As the neuroscience and instruments for measuring brain activity are becoming more and more sophisticated, this line of research has great potential. Many new questions relevant for behavioural economics and business economics in general may be investigated using these new instruments.

The labour group has the opportunity to make use of the rich registry data collected in Finland. Judging from

the publication mentioned in the SAR (there is only one so far), the researchers in this group have numerous external collaborators. Nevertheless, strengthening the group by a competent microeconomerician would further increase its potential to work on relevant research questions related to an ageing labour force, labour supply bottlenecks, basic income, need for qualified migrant labour, and so on. In countries such as Denmark and Sweden, the availability of registry data and the possibilities of combining data from different registers have attracted foreign researchers to work at universities in these countries. The SAR does not contain information about international co-operation of this kind, but the potential may be there. Generally speaking, it is not possible on the basis of a single publication to draw conclusions about the quality of research conducted by this group.

The close contact between the Unit and the VATT Institute for Economic Research in the form of joint professorships should foster new research ideas.

The research of the macroeconomics group is heterogeneous and the scientific level of output, judging solely by journal classification, is not particularly high. The topics range from fiscal, trade and monetary policy to economic growth. Connections between the financial and real sectors of the economy have become an important topic in macroeconomic research since the recent financial crisis, and study of financial institutions and macroprudential policy is one of the topics of the group. The growth issues include forays into environmental problems such as international protection of biodiversity. Members of

the group have international connections and co-workers. The International Monetary Fund, International Institute for Applied Systems Analysis and Institute of Labour Economics (IZA) are among them.

One might have expected macroeconomic modelling and the use of Finnish data to figure among research topics of the macro group. This has, however, not been the case. It seems that this type of nationally very important empirical research has been left to research institutes such as the Bank of Finland or VATT. To compensate, according to the SAR, members of the group have frequently consulted macroeconomic model builders at these institutions. However, the research of the econometrics group on structural vector autoregressive models could open up possibilities for co-operation between the macroeconomics group and the econometricians. This opportunity has not yet been fully realised, and the (consultation) efforts have been concentrated on dynamic stochastic general equilibrium (abbreviated DSGE in the SAR) models that are darlings of central banks in many parts of the world, including Scandinavia.

Judging from the publication outlets, the work of the macroeconomics group leaves room for improvement. An increase in the ambition level would seem desirable. Reflection on the balance between quality and quantity of outputs and the introduction of a publication dissemination strategy might be one way to respond to this. But then, the group is small, and the expectations have to be adjusted accordingly. The buoyant labour market for

economists explains the persistent difficulties in recruiting macroeconometricians mentioned in the SAR. This problem is beyond the control of the Unit and is thus a challenging one to address effectively.

As an indicator of the overall quality of research and PhD supervision, the numbers of citations for the six Category 4 professors in Web of Science are as follows: 611, 375, 215, 158, 121 and 92 (up until 24 January 2019). The number of papers with at least 100 cites: 1.

Not only are the aforementioned groups small, but due to the size of the Unit, important areas of economics are not represented. These include monetary economics, environmental economics and financial economics. That research in these areas is limited is not the only problem. In order to train specialists, the Unit is required to teach courses and supervise graduate students in the disciplines that are missing. Obviously, the research institutes and the Bank of Finland cannot fill this gap. Pooling the teaching resources with the Aalto University and Hanken School of Economics, soon the Helsinki GSE, certainly helps, but since this development is not yet in place, the SAR is not clear about whether this can adequately resolve the problem. As far as environmental economics is concerned, the Unit is planning close co-operation with Environmental and Resource Economics within the Department of Economics and Management (Unit 31) in the Faculty of Agriculture and Forestry. This would alleviate shortages and stimulate research in that area.

2.2 Societal impact

The impact of the Unit on the society is vast and many-faceted. A member of the Unit is chairing the influential Finnish Economic Policy Council. The Unit has been largely responsible for running the only internationally viable PhD programme in the country. This responsibility will soon be shouldered by the recently founded Helsinki Graduate School of Economics, in which the Unit has a central role. Members of the Unit are consulting extensively with the Bank of Finland, a number of economic research institutes and government ministries. On top of all that, the Unit is training hundreds of students every year to serve the society in various capacities. The impact of this can hardly be underestimated.

GRADING: EXCELLENT

Since most of the research of the Unit is basic research, either developing economic theory or quantitative methods, its societal impact becomes evident and can mostly be evaluated only in the long run. However, the work done in the Unit on developing R-code for applying nonlinear Gaussian

mixture models and depositing it in the Comprehensive R Archive Network (CRAN) <https://cran.r-project.org/> has an immediate impact in that it makes the code available to the international research community. Needless to say, this greatly facilitates the use of these models by econometricians and statisticians around the world.

More generally, members of the Unit consult extensively with major policy makers and research institutes. The list of them in the SAR is impressive. It may be hoped that the Unit also gains from these interactions in the form of new research ideas.

Probably the most visible and also very successful contribution of the Unit has been Professor Uusitalo chairing the Finnish Economic Policy Council. The Council prepares annual evaluations of the economic policy and policies of the Finnish government. Its latest report was published in January 2019 and, like the preceding reports, has reached a wide audience. The contribution of Professor Vartiainen as member of the committee of the Finnish Ministry of Education and Culture “with the task of renewing the university financing system in Finland” must also be

emphasised. The significance of this contribution can hardly be underestimated as the conclusions of the committee are likely to affect the whole university education system in the country. There is potential to scale up this expertise to the international, i.e., European Union level. This impressive societal impact might be further enhanced by readjusting the balance between being reactive/opportunistic and being proactive/strategic, as well as by sharing good practice on impact across the Unit as a whole, a process in which the Faculty might play a role.

As the SAR points out, the Unit is responsible for two thirds of the graduate teaching within the Helsinki GSE. The School is the successor of the recently dismantled Finnish PhD programme in economics. Since it also has students from other Finnish universities, the Unit still contributes to economics education throughout the country.

The hundreds of students at all levels finishing their education also count as societal impact. The Helsinki GSE should improve the PhD production which, at its current level, seems low. Supervision of students plays a crucial role here

2.3 Research environment and Unit viability

A major constraint for the Unit has been its small size. As a result, as the SAR indicates, it has been unable to cover all areas of economic science. Despite this disadvantage, the Unit has been doing quite well. It has maintained fruitful collaboration with the Aalto University and the Hanken School of Economics. This is formalised in the framework of the new Helsinki Graduate School of Economics. The Unit will receive five new professorships through this School, which will alleviate the size problem. Recruitment to the PhD programme of the School is international, which is important in an era where competition of talented graduate students is no longer a domestic affair. Post-doc positions are advertised internationally as well. All this makes the Unit a viable player not only on the national but on the international scene. As a next step, collaboration with economics departments at other major Scandinavian universities could be given serious consideration.

GRADING: VERY GOOD

The Unit has a head that handles the connections with the Faculty of Social Sciences. As the SAR explains, the administrative staff at UH has been centralized. Removing all secretarial help from the Unit and placing it on a higher level must be regarded as a mistake. Something similar has been tried at Aarhus University, and the consequences have been mostly negative. Having at least some administrative personnel at Unit level is necessary for the smooth functioning of the Unit. The centralisation means, among other things, that some of the routine administrative tasks

have been devolved to the teaching and research staff, which clearly has a negative impact on the time that can be allocated to research.

In the international or even Nordic scale the Unit is very small, and as the self-assessment report (SAR) notes, it cannot cover all areas of economics. The small size of the Unit can be viewed as a consequence of the government policy that has, at least indirectly, favoured spreading resources for research and teaching in economics over nine different universities, most of them being business schools. Contrary to what one might expect, the current formula for resource allocation does not advance specialization among them, which is a clear policy failure. The allocation of resources in economics within the country is radically different from that in other Scandinavian countries, where teaching and research in economics is concentrated in a small number of universities (three or four).

The Unit collaborates fruitfully with Aalto University and the Hanken School of Economics, which helps to optimise existing resources for teaching in the Helsinki area, not only on the graduate level. Furthermore, the new Helsinki GSE will receive 15 new professorships, of which the Unit will receive five. There will be extra funding of two million euro from the Ministry of Education and Culture for a three-year period that started last year. These resources do not solve the size problem but are nevertheless steps in the right direction. They may also influence the research goals of the Unit in the future. The Helsinki GSE should also have a publication policy. A working paper series is essential and, among other things, would help to make the School an

international brand (compare with CREATES at the Aarhus University).

In addition to collaboration within the country, the Unit might consider closer collaboration between the Helsinki GSE and universities in the Stockholm area, including Uppsala. These universities are geographically closer to Helsinki than, say, Oulu. They have their particular strengths. For example, Uppsala is strong on labour, Stockholm University on macroeconomics and Stockholm School of Economics on finance.

The Unit has established a research track in the Master's programme for students planning to continue their studies. The idea is to facilitate the move of interested students from the Master's to the PhD level. Results from Aarhus University, which has a similar track, indicate that such co-operation can be very useful. The Unit's early experiences of the track are clearly positive, and after a tentative start, applications to this programme have strongly increased.

The University webpages indicate that international students can apply to the economics PhD programme of the consortium of the three universities (recently started Helsinki GSE). The PhD positions are advertised internationally, which is positive. There is no information in the SAR about the number of applicants or the ratio of admissions to applicants. For this reason, it is not possible to say much about the results of the selection process. The SAR indicates that the progress of the students admitted is regularly monitored, but no quantitative results are provided. It would be of interest to know the average time

to successful completion. If it is considered too long, the question is what the Unit will do to improve the situation.

The University does not currently pay a salary for all PhD students admitted to the Unit's PhD programme. This has several negative implications. It discourages the most competent foreign students from applying. From the University point of view, it may be convenient that the students are financed by scholarships from private foundations and not from the University budget. But this state of things favours domestic applicants who have a better idea of where to seek funding than foreign students do. Besides, if the PhD students were funded by the University, it would be possible to set a transparent time limit to funding, which is what comparable and competing universities typically do, for example in Sweden or Denmark. A well-defined limit would increase the completion rate of

studies which, according to the SAR, needs to be improved. The problem of foreign students leaving without a degree, mentioned in the SAR, may relate to the fact that they are not salaried. Should they experience financial difficulties, they may be compelled to leave the programme and seek paid employment.

The SAR explains that there are students inactive in the PhD programme but in the panel interview the representatives of the Unit indicated that it is no longer a major problem. The salaried PhD students obviously have an implicit time limit for finishing their studies (funding), but this may not be the case for students with private grants.

Some universities allocate funds to reward their economics departments for each PhD they produce, which acts as a stimulus for ensuring timely completion. The Faculty and University might consider this possibility.

The Unit does set goals for the number of students finishing their degrees (Bachelor's, Master's and PhD) and monitors their performance. Many universities have a career service to help graduating PhDs find jobs. The current Economics Unit may be too small to have one. It is not clear from the SAR whether or not such a service exists on the Faculty level.

The Unit advertises postdoctoral positions internationally and after an initial selection process sends representatives to interview candidates at "job fairs" organized in connection with large economics conferences. As already mentioned, due to the buoyant labour market for economists, these recruiting efforts have not always been successful and recruiting postdocs remains a key challenge. Every effort should be made to ensure that Helsinki GSE will make the Unit more competitive in this respect.

Social Sciences Panel

POLITICS, MEDIA AND COMMUNICATION (SOC UNIT 36)

Faculty of Social Sciences

1 SUMMARY

1.1 Description of the use of criteria

The Social Sciences Panel has in the assessment of each Unit had at its starting point the basic stance underlying the research assessment exercise, namely that the ultimate purpose of the assessment is to enhance the future competitiveness of the Units and, in the last instance, all of the University of Helsinki. This future-orientated outlook affects the assessments of all Units and all of the three overarching assessment themes.

Concerning the first of these three themes, that of *scientific quality*, the Panel has examined the substantive and thematic objectives formulated by each Unit as well as the range of institutes that a given Unit in its SAR has highlighted as relevant for a comparison. In several cases this led to a fruitful exchange of views and to new insights. The Panel has also taken note of the extent to which each of the Units has articulated its objectives. In this case as well the probing promoted useful questions concerning the further articulation of objectives. The Panel has also, often in minute detail, studied the publication records of every Unit. In this part of the assessment, the Social Sciences Panel has made extensive use of the bibliometric data supplied but not so as to simply copy the outcome of the bibliometric analysis but in order to establish a reasonable point of comparison.

The Panel has been fortunate enough to have had members who have a firm grasp of the given international standards in the fields of the Units covered. Several members have also had a long-standing familiarity with the University

of Helsinki and the academic system of Finland. Eminent examples of this are provided, for instance, by the assessments of Units 31 and 35 but it applies in various degrees to all Units.

Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stakeholders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stakeholders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is more difficult yet to clarify what changes have in the last instance occurred in societal conditions.

On the whole the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stakeholders and actual or potential recipients of their findings. In several cases, including Units 33, 34, 35 and 37, there are also well-established institutionalised linkages, in other cases there are well-established forms of contacts (as in Units 32 and 39). In the case of Finland, such linkages appear to be remarkably

well developed from an international perspective. At the same time, some of the assessments, for instance of Unit 34, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

Research environment and Unit viability is a criterion that refers to the future potential of a Unit. This is to some extent a function of the other two criteria but not exclusively so. The Panel members have devoted much attention to forming a well-grounded view of the future viability of a Unit and has for most Units expressed a high degree of confidence in their viability. This optimism, however, is contingent upon Units' undertaking a further clarification of their strategies and in some cases also their internal procedures.

Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades. This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

The Unit Politics, Media and Communication was formed in 2017. It is a relatively small Unit with a staff of 49 (level 1–4). The main impression is a diverse research environment with a number of high-quality research groups. The Unit hosts good and reasonably productive scholars but is, since it was recently formed, still struggling to find trademark hubs that could provide platforms for further successful recruitments, and increased internal as well as national and international collaborations. The Unit's scientific quality, societal impact and work environment can be described as solid. The Unit's self-assessment report represents promising work in the way that it shows an awareness of its strengths and weaknesses but the long term ambition of the Unit is not entirely clear. The self-assessment underlines that the creation of the Unit was not driven by the disciplines themselves and it is not totally clear whether continued co-existence is the wished-for goal. The self-assessment report, as well as the interview at the site visit, can be said to reflect an ambivalence on the matter of co-existence. The written report discusses the goal of raising the collective profile of the Unit and there are signs of internal cross-fertilisation. We can see that the Unit could gain from continued collaboration and our recommendation is for the scholars involved to further reflect on becoming a Unit in the true sense (and not only for the purpose of the assessment). Further collaboration could actually be a way of reaching a critical mass of high quality scholars interacting on an everyday basis. The recommendations below should be seen against this backdrop. If the long-term goal is to continue collaboration then it is important that further steps are taken

that facilitate synergy effects and minimise the existence of two “silos” at the Unit.

Strengths

- Hosting a number of high-quality research groups with international collaborations and reasonably productive scholars within the two disciplines
- Recent increase in external funding
- Very well integrated into the wider society, outreach through media, public debates, talks, policy-oriented committee work
- Able to produce a comparatively high number of Master's thesis

Development areas

- Develop a more distinct profile that enables a collective identity, enables further international recognition and successful recruitments
- Professionalised recruitment of PhD candidates, that makes them into cohorts. Currently PhDs at the Unit belong to different programmes
- Develop more arenas, such as seminars, for interactions between senior and junior scholars within the Unit
- Co-ordinate outreach, for example through policy days linked to profile areas

More specific recommendations facilitating synergy effects within the Unit:

Create profiled research milieus: Democracy is presented as the core that unites researchers in the Unit. The more

specific research areas mentioned are The Public Sphere, Governance, Political Institutions and The Global Sphere. This is all fine but could be further sharpened in order to stand out in the international research community. Reflect on the possibility of creating 2-3 profiled, yet comparatively over-arching, research milieus in order to reach the goal of raising the collective profile. Build on ongoing cross-fertilisation.

Create an all-Unit seminar series: An important infrastructure for top-quality research is the combination of specialised research seminars and common, all-Unit, seminars where scholars from different backgrounds meet and discuss each other's work. Create a common research seminar series, typically meeting every second week, in order to get a critical mass of engaged scholars and ongoing conversations about research in the Unit. Seek to invite international scholars to present their work and stay for week-long visits.

Increase internal co-authorship: Encourage high-profiled senior scholars at the Unit to co-author with younger scholars. This enables synergy effects but can also be an important internal learning process that can lead to more international high quality publications.

Increase participation in international conferences: Participation in international conferences is key for recognition and improved quality. Try to find ways of sending a number of people, not merely individual scholars.

Professionalise recruitment of PhD candidates: This is not entirely in the hands of the Unit but having professionalised recruitment of PhD candidates where they become “cohorts”,

are hired on similar terms and do course work together, would pay off in the long run. The comparatively large number of Master's students at the Unit could be seen as an opportunity, not only for recruitment to the PhD programme but for creating visibility for the Unit in society at large. The need

to reflect on recruitment and working conditions for PhD candidates is not only valid for this Unit, for currently the PhDs at the Unit are in two different programmes. Further collaborations related to PhDs would be a good way to enable a strengthened collective profile and identity.

Data-bases: The Unit is involved in a number of large data bases. Make an inventory of data collections that could be of interest for a wide group of scholars at the Unit. Facilitate access to data beyond core users. When possible open up data to external users.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The self-assessment report points out that the scholars at the Unit are not reaching the most highly ranked journals in political science or media and communication studies. The number of publications with top-quality university presses such as Oxford and Cambridge is low. There is no doubt however that scholars at the Unit are publishing in good generalist journals within the two disciplines.

The bibliometric report displays a slightly negative trend in publication indicators of the number of publications, the mean normalised journal score and the mean field normalised citation score. At the same time there is a slightly positive trend in indicators on collaborations, especially international collaborations. Overall, the trend in publications is rather stable and drops in output should be seen against the backdrop of energy consuming reorganisations taking place at the University of Helsinki.

The self-assessment report is listing a number of research programmes with potential for original and novel

work such as the programme Tackling Biases and Bubbles in Participation, research on Health and Participation, and Digital Politology. There are also examples of internationally well-recognised scholars in the different sub-areas of the disciplines. The challenge is to create research groups or milieus that are big enough for synergy effects and strengthened international recognition.

GRADING: VERY GOOD

Research goals

The stated over-arching goal is to raise the collective profile and reputation of the Unit within and beyond academia. This goal is based on the premise that the Unit hosts a number of distinguished researchers while the reputation of the Unit is not on the same level.

The over-arching goal is well-chosen but thus far the only action directly linked to this goal is to increase

collaboration within the Unit "through a more systematic use of existing complementing expertise". Other goals set are relevant but rather general in character – such as increasing the number of publications in top-quality academic outlets, sustaining current public outreach and societal impact, and continuing to develop the Unit as a dynamic and attractive research environment.

An additional over-arching goal stated in the self-assessment is to create attractive career opportunities for promising young scholars by increasing the level of external research funding, creating mentor programmes, and reducing the teaching and administrative burden on research staff. These actions mainly refer to career opportunities for internal young scholars that otherwise would leave the Unit.

Our reflection is that the research goals could be further specified and, for example, state that in the upcoming five-year period the number of internationally published journal articles (refereed) should equal x% of the

total number of publications from the Unit. It could also be stated that the Unit should strive for x (a specific) number of publications in the most highly ranked journals. The research goals could also target external recruitments that would help build bridges between sub-areas at the Unit.

Research results

Research results are reported under the headings: The Public Sphere, Governance, Political Institutions and The Global Sphere, i.e. the four areas that the Unit plans to emphasise over the upcoming period. The results chosen are relevant for the different research areas and the listing include examples of work that are well recognised. The ten example publications represent solid and potentially novel work but since they are rather recently published the number of citations are still limited. Thus it is hard to assess their impact on the international arena as yet.

The discussion on societal impact does not follow the same structure as the discussion on research results but highlights a broad repertoire of stakeholders and activities more linked to subgroups at the Unit. The target areas,

audiences, activities and outcomes are typical for a social science Unit at a Nordic university: citizens in general are seen as the main target, but policy makers, administrators, business organisations, and civil society actors are also listed as important stakeholders.

Analysis on research outputs

Articles are found in good generalist journals in the field of communication studies and political science. Monographs have been published by highly ranked university press (Cambridge, Oxford) and good commercial publishers (most frequently Routledge and Palgrave Macmillan). There are examples of early-career scholars winning prestigious awards for their work.

Our reflection is that the discussion on the most important research results and improvements in societal impact could have been more clearly tied to the over-arching goal of raising the collective profile. What are the potential synergy effects seen by the Unit itself? Sustaining societal impact is fine but how could interactions with society at large be used to further enrich the research environment at the Unit?

International benchmark(s)

Political Science and Media and Communication Departments in the capitals of the other Nordic countries are seen as relevant benchmarks. The fact that the Unit consists of two separate disciplines is seen as an obstacle for picking out a single suitable benchmark unit.

The self-assessment reports raise the question of how to strengthen experimental research, a methodology relevant for both political science and media and communication research. Based on that, relevant benchmark Units could be the University of Bergen (Comparative Politics Department), where they host the Social Science Core Facility (DIGSSCORE) and the Norwegian Citizen Panel or the University of Gothenburg, where they host the Laboratory of Opinion Research (LORE) that serves political scientists as well as scholars of media and communication. A suggestion is the University of Amsterdam, where they have a centre of politics and communication.

2.2 Societal impact

The Unit has a clear view of their audience and relevant stakeholders. To have a broad repertoire of stakeholders such as society in general, policy makers, administrators, various actors and organisations in business and civil society is common for Nordic social science departments.

It is hard to provide clear evidence of successful impact but to appear in the media, run a web journal, appear in public talks and debates, and participate in expert committees indicates relevance.

Activities are based on individual initiatives rather

than research milieus stepping forward as relevant partners. Input from society at large could be utilised in the development of a collective profile and identity.

GRADING: VERY GOOD

Target areas, audiences, research questions and goals

As stated above, the Unit has a broad repertoire of stakeholders. The goal set by the Unit is to strive to uphold a tradition of being an important societal actor. The self-assessment recognises the need to develop more organised ways to proceed with activities. Sharper research profiles – trademark research milieus – would, most likely, be a helpful tool in this respect.

The research questions (findings) the Unit single

out as important to disseminate knowledge on are: What contributes to decreased inequality in political engagement, democratic influence, media consumption and the access to relevant (political) information? What is the role of transparency and power in political decision-making processes, and in the field of media and communication? How can the democratic system and the media maintain support from citizens? How can international systems respond to global economic challenges?

Activities and outcomes

Activities and outcomes relate to media exposure and participation in public debates, participation in committees and policy-making processes, production of policy-relevant books and research reports, and a variety of collaborations (unspecified) with public and civic society actors. A few examples that seem to be more collective efforts are the web journal *Politiikasta.fi*, the BIBU talks, applied research that serves ministry-driven explorations in the area of social media use, and the mapping of Finnish television programming.

2.3 Research environment and Unit viability

Thus far, there is no established structure for goal-setting and therefore no plan for follow-up measures. In the self-assessment it is stated that the goals presented have been formulated within the framework of this research assessment. The Unit is, however, reflecting on the balance between being cross-disciplinary and keeping a strong identity with the “home” disciplines in a good way and in the interviews it was clear that members of the Unit strive for collaborations that would lead to progress.

GRADING: VERY GOOD

Leadership, goal setting and follow-up

The Unit has two heads of discipline, one in Political Science and one in Media and Communication. This may be

necessary and fit into the structure of the Faculty but the Unit and Faculty could reflect on how to find a leadership structure that enhances further cross-fertilisation.

The goals set are, as previously discussed, rather broad and could be further specified in order to serve the goal of being instrumental.

Human resources, careers and recruitment

University lecturers are the group that dominates the Department. A comparatively (compared with the rest of the Faculty) high number of professors. A limited number of post-doctoral researchers and doctoral students.

The need to increase the number of externally funded post-doctoral researchers and university researchers is recognised. So also is the need to do more strategic

recruitment of doctoral students. A goal set is to strengthen mentoring and support in application processes for early-career scholars.

The burden of teaching is highlighted.

The Unit has several series of internal research seminars but lack an all-unit seminar where participation stands the chance of reaching a critical mass of engaged scholars.

The newly introduced tenure-track style of career paths should encourage more external recruitments.

There is an urgent need to put in place at Unit level (and beyond) an easy-access and confidential system for reporting staff and student concerns relating to social welfare, harassment, bullying and discrimination. Personal safety and security are central to a good research environment.

Researcher education

This is an important area for future development but responsibility is not primarily at the Unit level. The situation for doctoral students varies greatly. Recruitment processes may contribute to uphold fragmentation within the Unit. In the interviews the question of having the PhDs at the Unit within one programme was raised. We support this wish.

The self-assessment does not include information on the average number of years for completion of doctoral theses or the number of drop-outs.

Research infrastructure

Infrastructure related to administration such as IT services, travel, support for arranging conferences, reporting on research activities and library services is provided by the University centrally or at the Faculty level.

The Faculty supports access to Statistics Finland.

The Unit encourages the University or Faculty to develop high-class facilities for laboratory experiments in order to make sure that the scholars at the Unit are not left behind in current international developments in political science and media and communication. Similar comments have been made by scholars in other Units and the

recommendation is that the Faculty make an inventory of infrastructure needs. Will the upcoming Helsinki Institute for Social Sciences and Humanities meet the needs articulated by scholars in this and other Units?

Funding

Around 60% of the funding is internal and 40% is external. The proportion of external funding is a bit below the average at the Faculty but has increased in the last year. The size of external funding has been relatively stable over the evaluated period (2013-) but has increased in more recent years, which is promising. Grants from the Academy of Finland dominate.

Increase in external funding is a prioritised area. Special emphasis will be put on assisting early-career scholars in their effort to attract Academy of Finland grants and ECR starting grants.

Collaboration

There are a number of interdisciplinary projects that also include international collaborations, such as the BIBU consortium that involves scholars at Stanford University, the research network on Comparing Climate Change Policy

covering 20 countries and the Finnish Election Study Consortium, where international collaboration is frequent. A reflection is that these programmes could play a more visible role in the plans to sharpen the profile of the Unit.

To host guest researchers is challenging due to lack of office space. Even shorter visits can, however, be useful and then the access to office space should be less of a problem.

International collaborations are important for further development but so are also internal collaborations between senior and younger scholars. It is not totally clear from the self-assessment what the Unit thinks about collaborations with relevant scholars and research groups outside of the Unit but still within the University of Helsinki.

Societal and contextual factors

Also this Unit has been affected by recent re-organisations within the University and the Faculty with lay-offs in personnel and changes in administrative support, causing stress and less productivity.

Unequal burdens in terms of teaching are highlighted. The Unit is producing a comparatively high number of Master's degrees, which is resource consuming.

Social Sciences Panel

SOCIAL RESEARCH (SOC UNIT 37)

Faculty of Social Sciences

1 SUMMARY

1.1 Description of the use of criteria

The Social Sciences Panel has in the assessment of each Unit had at its starting point the basic stance underlying the research assessment exercise, namely that the ultimate purpose of the assessment is to enhance the future competitiveness of the Units and, in the last instance, all of the University of Helsinki. This future-orientated outlook affects the assessments of all Units and all of the three overarching assessment themes.

Concerning the first of these three themes, that of *scientific quality*, the Panel has examined the substantive and thematic objectives formulated by each Unit as well as the range of institutes that a given Unit in its SAR has highlighted as relevant for a comparison. In several cases this led to a fruitful exchange of views and to new insights. The Panel has also taken note of the extent to which each Unit has articulated its objectives. In this case as well the probing promoted useful questions concerning the further articulation of objectives. The Panel has also, often in minute detail, studied the publication records of every Unit. In this part of the assessment, the Social Sciences Panel has made extensive use of the bibliometric data supplied but not so as to simply copy the outcome of the bibliometric analysis but in order to establish a reasonable point of comparison.

The Panel has been fortunate enough to have had members who have a firm grasp of given international standards in the fields of the Units covered. Several members have also had a long-standing familiarity with the

University of Helsinki and the academic system of Finland. Eminent examples of this are provided, for instance, by the assessments of Department of Economics and Management (Faculty of Agriculture and Forestry) and Economics (Faculty of Social Sciences) but it applies in various degrees to all Units.

Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stake-holders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stake-holders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is more difficult yet to clarify what changes have in the last instance occurred in societal conditions.

On the whole the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stake-holders and actual or potential recipients of their findings. In several cases, including Faculty of Educational Sciences,

Faculty of Law, Economics (Faculty of Social Sciences) and Social Research (Faculty of Social Sciences), there are also well-established institutionalized linkages, in other cases there are well-established forms of contacts (as for Ruralia Institute and Swedish School of Social Science). In the case of Finland, such linkages appear to be remarkably well developed in an international perspective. At the same time, some of the assessments, for instance of the Faculty of Law, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

Research environment and Unit viability is a criterion that refers to the future potential of a Unit. This is to some extent a function of the other two criteria but not exclusively so. The Panel members have devoted much attention to forming a well-grounded view of the future viability of a Unit and has for most Units expressed a high degree of confidence in their viability. This optimism, however, is contingent upon Units' undertaking a further clarification of their strategies and in some cases also in their internal procedures.

Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades.

This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread

of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

Social Research combines former academic departments and two research units for a total of about 200 teaching and research staff (+80 co-employees). It is a recently formed Unit, apparently for assessment purposes (“Unit 37”), mainly based on teaching grouping logic. Its 8 components (demography, social and public policy, social psychology, social statistics, social work, and sociology, Institute of Criminology and Legal Policy and Centre for Consumer Society Research) remain in existence. It is important, to clarify to understand the assessment that follows, that the assessment was initially done of Unit 37 as a whole by the Panel. The final report reflects this late understanding, we hope it will still be useful.

The Faculty’s internal structure (e.g. decision-making procedures) remained difficult to comprehend throughout the assessment for the Panel, and especially what Unit 37 structure would become beyond the assessment. In our interviews the Panel thought (mistakenly) that Unit 37 was there to stay. Nevertheless it is interesting such a misunderstanding could persist along the assessment; the interviewees highlighted the collaboration aspect and responded to the panel as a Unit rather than as separate components. Not only that shows the remarkable compliance and good will of separate

units to go together in a common exercise that could have been considered odd; it also shows the actual potential of collaboration and the ground already covered in that direction through common teaching programmes.

In the SAR the logic of presentation as a single Unit does not enable to distinguish the contours and sizes of the various communities inside (hereafter “components”, even though the results are presented by component (e.g. “demography”, “KRIMO” etc.) which makes it difficult to understand what the Unit is made of. We were not able to find clear indication of how many staff there is in each discipline or research unit on the University website, nor of who were the researchers in these components.

The administrative division of the Faculty in three different systems: (1) the academic discipline division, (2) the research unit division, and (3) the degree program division is somewhat confusing. The Panel’s general recommendation is to pay attention to how research strategy is determined below faculty level, especially for the disciplines.

As we understand it, currently operational units are disciplines/Centres; collaboration units are Masters programs; the research collaboration is mainly between individual researchers. It is unclear whether there is a united

strategy or vision for research. The teams seem to manage this situation with good spirit, informal leadership and a good to excellent and sometimes outstanding outcome.

With such heterogeneity, there is inevitably variation in quality, as well as in impact and research environment, across components. Compared to other assessment units, the Unit is especially diverse and difficult to assess as a single unit. We shall therefore focus on factors of success/achievement rather than on units/sub-units to make this assessment useful for progress.

The Unit members interviewed declare to be rather content/happy with the current structure emerging from the “Big Wheel” change and the profiling strategy; these reforms forced productive interdisciplinary discussions and topical research areas emerged, especially within Central campus; but the reform also created some new silos. The main issues signalled are 1) difficulties to get support from centralised administration for actions that require local knowledge and proximity and 2) continuity of employment especially in the early career.

Overall, the scientific quality is very good with some excellent outputs; the social impact excellent and in some cases truly exceptional, and the research environment very

good to excellent. In conclusion, overall Unit 37 is doing an excellent job, even if there is, inevitable, some variability between components.

Strengths

- Societal impact; as good as it gets for academic research. The research topics are societally relevant and in line with contemporary research trends worldwide.
- Most of the production is of very good quality; some is original and excellent and compares favourably with the best worldwide regarding originality (e.g. powerful interventions), although quantity and quality could be improved in some cases as is expectable with such a large unit.
- Excellent methodological and data assets: the Unit manages several and unique reference data sources, registers and databases.
- The Unit is a major producer of PhDs and more generally of academic personnel in its domain in Finland.
- Most components have solid connections within and outside academia.
- Collegiality level is high (e.g. disciplinary breakfasts and other bonding social events, consultation in decision-making).
- The Unit obtains substantial funding from diverse, competitive and prestigious sources.

Development areas

- Some disciplines tend to stay mainstream with a production that seems more oriented towards producing journal articles than research, and are not excellent.
- Collaboration outside Nordic countries and UK remains limited.
- It is unclear whether the Unit will become a coherent one with a common vision and strategy.

Recommendations

- Continue interventions, collaboration with institutions, transdisciplinarity and bold and original experiments.
- Experiment more cross-over and inter-sectoral research: combine methods and dissemination formats with Arts and Humanities; get involved with industry.
- Most of the domains of investigation are getting digitized and this can be an opportunity to launch inter-unit research centres (e.g. Cybercrime b/w KRIMO and KTK, involving also other faculties and government or inter-government units –this is just an example of possibility, not a strong suggestion).
- Continue or enhance collaboration with HELDIG and HELSUS.
- In some domains where there is no specific competitive edge (such as owning a database or having privileged field access) it may be preferable to launch original

research (e.g. regarding methods, topic with privileged field access etc.) rather than run after the mainstream; in the latter case the components can only hope a “second-tier” position, considering the large size of “competitor” departments working on similar topic in other universities worldwide.

- As the Unit is composite, we recommend an explicit reflection on what (in research, teaching etc.) the components actually want to do together, and on what they would prefer to do alone or do with partners outside the Unit, in their disciplinary or thematic comfort zone.

The Panel wishes to point out that the role of strategic thinking below Faculty level needs to be developed, and strategies made more explicit. Benchmarking in league tables is only a result, and “Search for excellence” cannot be strategy per se. The components of Unit 37 have some excellent assets and unique value propositions, especially regarding impact and access to data or stakeholders for inter-sectoral research. Strategy should build on these assets to make bold choices that can position the components at the best level worldwide. The resilience of the personnel after the tough changes brought by the Big Wheel are a sign of health and strength of that community and of its capacity to cope gracefully with challenges.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The quality of the work is illustrated by the fact the Unit has participated in 3 Academy of Finland Centres of Excellence (Intersubjectivity in Interaction, Philosophy of the Social Sciences, Ageing and care) and coordinates 2 SRC-funded projects. The Unit also has two Academy professors.

There is strong scientific originality and methodological innovation in several interventions and impact research projects which can truly be qualified as inter-sectoral research projects and cutting-edge. E.g. the “stories about friendship” psychological intervention, or the documentation video tutorials that mix research, intervention and pedagogy.

In some components the works appears more diverse, some of it can be considered of a lower standard or lower impact. This is especially the case for disciplinary work where the research question is unclear or appears to have very limited societal relevance, or is superseded by other research at international level. By “cutting edge” we mean here work that stands out by originality, significance and rigour: original topic, methods and collaborations; outstanding empirical data set (qualitative or quantitative) or the construction and exploitation of perennial instruments/data sources. By “lower standard”: we mean here not-excellent studies on very specific field work of which the findings’ contribution to the literature seem minor, or of which the adaptation of the methods to the research question is not the best.

Note that in this assessment, we do not consider the impact factor or classification of outlets as a main criterion: original science is usually difficult to fit in mainstream journals. Journal articles are only one of the many ways of having scientific output; innovative methods (e.g. film, blogs, moocs, exhibitions etc. should be encouraged).

It seems that there is in some components a bias in the research done (or at least the research presented) towards papers with high number of citations. The interest of the research question, and the coherence of the research programme, are very important factors of success in the long term; and this should be encouraged rather than trying to shoehorn at any price in the top outlets.

In general and here too in some cases the components that have a topic strategy that is too scattered may have difficulty to capitalize and reach a world-class level.

Some components may wish to consider encouraging internal collaboration to reach critical mass.

GRADING: VERY GOOD TO EXCELLENT

Research goals

The Unit comprises of disciplines and two research institutes (KRIMO and KTK). The presentation of the Unit distinguishes these different components. At this point, it is difficult for the Panel to appreciate if the integration of these components can be an opportunity or a problem, or

both, and to what extent cooperation should be encouraged (we suggest no to force it anyway). Perhaps the institutes have a stronger tradition of impact of link with demand that acts as a strategic driver; while some disciplines are at risk to be more “academic” (theory-driven and paper-driven rather than problem-driven) because they need to keep a disciplinary affiliation for career reasons. “High-quality and relevance” policy or “publication in top journals” would amount to no strategy.

While some disciplines appear to have a clear rationale, in terms of improving the quality of life, reducing inequalities, and supporting or orienting public policies, such rationales are not made explicit enough in the SAR. That is perhaps because of the nature of the exercise where eight different strategies would have been too long to describe; nevertheless if such strategies exist at component level and are strong they would gain to be made explicit.

While it is understandable that research themes are presented as areas of interest for the advancement of knowledge (especially in a research assessment document) it may be interesting to discuss why these specific themes have been chosen amidst the numerous potential burning societal issues: Funding opportunity? Anteriority on the field? Competitive advantage (e.g. field or data access)?

A candid analysis of the position of each component, compared to the national and international landscape in the various fields would help designing a long term strategy.

The profiling approach suggested by the national policy is a suggestion that deserves consideration.

Should the Faculty want to keep Unit 37 as a real unit, it should reflect on the fact that suppressing what was traditionally the level of local decision in the chain of command, and of subsidiarity in resource allocation (the department) in the Unit may create problems of vision, leadership, and arbitration, especially in times of restriction. On the other hand, bringing together components of the Unit for teaching programmes seems to have liberated creativity, suppressed some silos and fostered new collaboration.

Research results

The Unit as a whole managed to produce results that fit the classic criteria of excellence (funding by the most selective institutions, publication in excellent outlets). As noted above, the results are very diverse and span over 6 disciplines and 2 domains. The production is too diverse to comment at Unit level, but the quality of the content is very good to excellent, which does not always translate into publications in high-ranking journals.

The production is especially relevant in terms of social relevance and impact. The focus is more on contents and facts than on innovation in theory and methods. There is also intelligent and useful exploitation of data sources. The content of the research is very interesting. While most production is excellent, some papers presented are not of excellent quality as they appear to address issues of minor importance, or bring little progress to the literature.

Analysis on research outputs

Based on the elements from the SAR, the quantity of production is not very high, roughly 2 publications per

person per year. Three excellent papers per person for every 5 year period would be an outstanding result, which few researchers meet worldwide.

If we consider that level 3 is an indicator of high quality (which can be questioned, some level 2 can be better, and conversely some level 3 can be uninteresting research, but as we can assume that not all 2+3 are of outstanding quality let us keep level 3 to get an order of magnitude), the current ratio would be below 1 excellent paper every five years *overall* which is not stellar, considering that this means that there must be quite a few people publishing more very good papers. While (again) publishing in “top” journals is not a reliable indicator of excellence, excellent units worldwide manage to publish more than that, so a closer look at the publication strategy is recommended.

To be noted the analysis was made using Web of Science, which does not cover well Social Science, Google Scholar would probably give a more fair account of the production of the Unit. This is a suggestion we make to the University for the next assessment.

The CWTS bibliography analysis, using standard indicators, suggests that the production is average, rather than outstanding. We mitigate this result in our assessment as some of the production is clearly outstanding in terms of content.

The amount of doctoral degrees is impressive. It is unclear whether the Finnish market is able to absorb all graduates. It would be interesting to have a closer look at what the alumni become.

By now this it is fine to have “smaller” papers in specialised “lower” journals and conferences, as part of staying in the field networks and publishing with students and junior, or in the grey literature. Research should not be

driven by indicators, but by strategy. The novel types of output (videos, blogs etc.) are most welcome and leverage impact. Keep going.

Nevertheless there should be more reflection on the publication strategy.

International benchmark(s)

The Unit’s benchmark are “units doing similar research in large Nordic Universities” e.g. University of Stockholm, University of Copenhagen.

That seems a fair comparison at the Faculty level. The Faculty of Social Science at the University of Copenhagen is larger, it has a student body of about 6,700 students and app. 420 staff members and 175 PhD students

The Faculty of Social Sciences of Stockholm University comprises 21 departments, 13 643 Students and approx. 500 PhD and 700 academic staff.

It is extremely difficult to benchmark Faculties, but it is always interesting to browse through other universities websites to see if there are some good ideas to be considered. For example, it is interesting to note the “five strategic themes” of UCPH: Talent, Collaboration, *Digital transformation and “social data science”*, Global insight and vision, Research, teaching and work environments. Only the third theme is actually a strategic domain of research, but it is one that could be food for thought for the Unit.

Components of the Unit 37 should compare with similar departments or centres worldwide, since that is the level where they compete with others for faculty and students. We suggest they pick a benchmark unit in a Nordic country but also one of similar size in the TOP 20 European or American universities.

2.2 Societal impact

Societal impact is the strongest point of the Unit. This is as good as it gets for an academic unit, and world-leading in several domains.

This Unit does have impact, at a level that is spectacular for its size, and this impact makes the world better.

The only weaknesses are the diverse level of impact engagement of the components of the Unit. The descriptions in the self-assessment are very satisfying. Some components have more experience than others, obviously; but they are all engaged in impact strategy, and aware of the need to do so.

GRADING: EXCELLENT

Target areas, audiences, research questions and goals

The targeting strategy is very clear. Targets are multiple and relevant according to Unit's components.

The research questions vary per sub-unit. We found especially interesting the questions that were clearly related to societal challenges.

The *rationale* of the choices could be more explicit (see similar comment above in about the rationale of Research Goals). While diversity within a unit is commendable, especially in terms of angle and methods, perhaps more sharing of the same or similar object of research would facilitate internal collaboration and fruitful dialogue. Making the rationale of research objects choices explicit would facilitate such convergence and crossing.

Activities and outcomes

The SAR provides convincing evidence of impact. The direct intervention of the Unit members, current or former, in the policy making is evident. The Unit's components are clearly generously feeding political decision. That is done through reports, expertise and participation in committees, or simply by providing the workforce for doing the work.

Some of this impact comes naturally from the fact the Institutes historically had public missions.

All in all, societal impact activities and outcomes are outstanding and world-leading for public policy (e.g. handbooks, commentaries, textbooks and even

documentation tutorial videos). Regarding the citizen target, the rationale is less clear: should not that one be targeted through media, or NGOs?

The comment in the self-assessment report regarding using alumni as a mode of dissemination is both relevant and smart; perhaps more explication on how the alumni are kept in touch with their alma mater would be an interesting area to develop.

Regarding activities of valorisation, dissemination and communication, the output of the Unit is very satisfactory. The excellent impact shows that the strategies and means are efficient. Nevertheless, so far the impact is mostly at national level in Finland.

Perhaps a reflection on impact at international level, and on other entities than government agencies (industry, territorial governance) might be fruitful. This is all the more worth considering that the output produces a genuine added value and that in several domains the work is world class and therefore would indeed bring added value to the global community if more disseminated.

2.3 Research environment and Unit viability

This section requires reflection at Faculty and Unit level. The Big Wheel reform had a considerable impact on the Unit, and the simultaneous restructuring of the University Services lead to components getting less administrative support. The integration of the Institutes, with little previous experience of teaching, has added to the long list of changes taken place in the Unit.

The personnel, in the interviews, seem to cope with admirable resilience and good spirit with what appears to have been a brutal organisational and identity trauma, and they are adapting with open-mindedness and collegiality.

Nevertheless the disruption and reorganisation are still recent, the managerial structure (e.g. for accessing resources) is somewhat unclear and it is too early to tell where all this goes.

The prospects seem good for most components, and excellent for some. But the Unit as a whole lacks coherence and direction; which is understandable if Unit 37 has no existence beyond this assessment.

The strengths are the excellent collaboration with other units and stakeholders, as well as the internal collegiality.

The weaknesses are the potential menaces on funding especially from TEKES now becoming Business Finland. This requires strategic thinking. But regarding strategy, it was difficult to evaluate. The Unit 37 as such has no research strategy of its own and individual components strategies were not discussed in depth.

GRADING: VERY GOOD TO EXCELLENT

Leadership, goal setting and follow-up

The degree of collegiality, democracy, and respect is remarkable. The decision for resources is at Faculty level. Local leadership and strategies at the level of the eight components were not discussed in detail for the reasons detailed in the introduction of this report.

There is clear and strong demand of more support for local services. While the central support staff is commended for kindness and efficiency, the small tasks that support daily life and delivery (teaching support, grant management, procurement etc.) require a knowledge of the local situation and culture, reactivity and anticipation that centralized service cannot provide. This situation is clearly detrimental to production and morale.

Human resources, careers and recruitment

There is an important number of co-employees (almost 80 for 200 contract staff). While that is not a problem per se, this requires reflection. The main issue, signalled in the interviews, is the continuity of career especially at an early stage. This starts with the PhD programme that lacks clarity and the amount and consolidation of PhD funding, but continues to post-docs and getting into tenure track. Once in tenure track this seems OK.

In some other universities, a bridging fund exists that enables to keep personnel under employment during the (short) phases between two contracts (e.g. renewal of a research contract that leaves a few months without funding).

The degree of internationalization could be higher in recruitment, although there is in principle no obstacle

to international recruitment and that attractiveness should be high, but perhaps the visibility of the Unit and its components is insufficient. The presentation on the website (which is by the way not up to date at the time we consulted it) could be improved in this respect.

One issue is the precarious status of post-docs; one feeding mechanism is described as follows: as the resources are thin-spread, when someone of the permanent staff goes on leave or reduces teaching for some reason (e.g. sabbatical, getting a large grant etc.) there is need to fill in the gap with some short-term contract (precarious, typically post-doc). One simple solution would be to recalculate the resources needed for teaching and integrating the fact that permanent contracts will always need some leave time.

Researcher education

The PhD programme is a classic weak point in universities; here it is unclear what the doctoral school does.

There is a funding issue: Many PhD students seem very linked to their supervisor's research programme for funding, and this may be patchy. Ideally the Unit could move to a cohort system with university funding, rather than independent sources that need to be consolidated. There is disparity between salaried students (paid by the University) and others who work on grants. The situation is improving but problems remain. Also students in the same component might find themselves in different doctoral programs.

Career support and mentoring needs improvement. Peer mentoring was suggested by some.

Research infrastructure

For some, the Central Campus seems to be the basic entity rather than the faculty of social science.

Some components of the Unit maintain perennial instruments and databases (e.g. CODATwins, crimes database...), and have close connections with main stakeholders for policy, and this provides an excellent environment and assets for production, and leverage for social impact.

There is reflection, and need, for developing infrastructure in data science, with dedicated support personnel, and likely also staff training. How does this connect with the department of Computer Science? Of Statistics?

GDPR compliance may be a concern with all the statistical instruments and databases managed by the Unit.

Great hope has been expressed on the (future) constitution of the Social Science and Humanities Institute.

There is an urgent need to put in place an easy-access

and confidential system for reporting staff and student concerns relating social welfare, harassment, bullying and discrimination. Personal safety and security are central to a good research environment.

The main complaint is the centralisation of administrative support, which makes daily tasks difficult and a waste of time. This was a strong and recurrent complaint across the Faculty.

Funding

The Unit obtains substantial funding from diverse, competitive and prestigious sources.

The reflection on funding is sound and shows the faculty and management has had a serious thought about it. The funding perspectives are nowhere rosy in Europe. There does not seem to be massive menace on the resources in the specific case of the Unit, but scarcity will continue.

Collaboration

As said above, the collaboration with political stakeholders is in many cases intense and deep. This is at the root of strong and relevant impact, of powerful interventions, and real positive effects on Finnish society. This should be commended.

Perhaps looking towards industry as a complementary source of funding and data would be an interesting venture.

Connections with 'other constellations'

The report suggests some frustration with HELDIG. That is clearly a problem as social data science is becoming a strategic issue. HELSUS seems an interesting venture that could attract more funds too.

Societal and contextual factors

The lack of trust towards the University leadership (following the Big Wheel and the restrictions) is worrying.

Social Sciences Panel

SOCIETY AND CHANGE (SOC UNIT 38)

Faculty of Social Sciences

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of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

The Unit called 'Society and Change' is made up of the following disciplines: Economic and Social History, Development Studies, Political History, Social and Cultural Anthropology, which, with the cross-disciplinary high-profile Centre for European Studies, form the core of the Unit. Each discipline has a mix of teaching and research staff, post-docs and doctoral students, and the total number of staff is nearly 80, with a numerical bias towards the lower end. Its wide intellectual range and ambition gives it the capacity to sustain and grow its national, European and global profile. It has an international, and generally well gender-balanced staff profile. The Unit is clearly described in its SAR.

The Unit was recently formed on the 'basis of teaching collaboration' while its four constituent disciplines are empowered to continue to exist as separate research units. Constructed for the purposes of this assessment, much work has now been done to give the Unit an intellectual framework, and to build it as a cohesive and cooperative group as well as maintaining the intellectual distinctiveness of the disciplines. It is on the whole, highly research active, with the majority of staff in each of the disciplines contributing at a high level to the work reported in the self-assessment.

There are very impressive achievements in external research funding with over five current major EU and international awards, 11 other research projects, and funding from 15 other private sources, 10 government ministries and with two international networks, (over 57% of the budget of over seven million euros is externally generated).

The subject matter of the key research is of major intellectual and societal concern both nationally and internationally and this is very commendable. Scholars deploy innovative research techniques as well as measured intellectual arguments and interrogations. At the same time, the range of research across the four disciplines that constitute the Unit is broad. Retaining disciplinary distinctiveness and visibility alongside research collaborations that cross disciplinary lines, while reaching out to an international audience is demanding. A continuing strategic approach that identifies common research goals within the Unit, or for the Unit as a whole, may over time give stimulation to these research ambitions both within and between some of the disciplines, without flattening these out or homogenising them. Intensive staff support at all levels of the academic community may help the Unit to achieve the aims over the longer period.

Recommendations

Scientific quality

The outstanding scientific quality of the work produced in the Unit is reflected in a number of outputs published in the disciplines' top-ranked journals. It is also recognised in the impressive success in securing prestigious large grants from ERC and Academy of Finland.

Recommend that the Unit should:

- Prioritise areas of research focus within the Unit to allow it to build upon research grant successes, and then request additional specialised senior staff if required to reinforce a balanced and innovative research community.
- Develop and review research deliverables and output dissemination strategy within the Unit.
- Articulate clear research objectives and ambitions to current staff/ researchers at all levels, and encourage meaningful collaboration within but also beyond the Unit to generate blue-skies research.

Societal impact

Consider the kinds of societal impact sought and prioritise these. Reported impact is thus far principally Finland-

focused, where there have been a series of successes in shaping government policy.

Recommend that the Unit should:

- Nominate a senior staff member as Impact lead.
- Consider strategically what kinds of societal impact it is best placed to deliver while keeping research agendas in place.
- Reflect on the different interactions and relationships possible between the Unit and wider societal audiences that can enhance research and public profile.

Research environment and Unit viability

This is a very new Unit and is still in the process of

establishing new ways of working, so the emphasis in the self-assessment report is mainly on operational issues. Efforts are clearly underway to exploit the opportunities for new research directions while sustaining existing disciplinary excellence. In time, the Unit could benefit from the addition of a more forward-looking strategic plan.

Recommend that the Unit should:

- With cooperation of staff at all levels, develop a forward-looking plan that explicitly identifies principal research goals and how these will continue to be achieved organically, given the accepted intellectual diversity within the Unit.

- Expand international participation, profile and contribution
- Enhance systems for staff support and development, particularly for inter-disciplinary methods research training; and to secure balanced research/administrative/teaching workloads for all staff.
- Ensure that early career and other researchers are given adequate knowledge about provision of guidance, pastoral and career advice, discrimination and harassment. procedures; access to seed corn funds for seminar initiatives within and across Units
- Benchmark against comparators and use benchmark to drive own research performance.

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The evidence for outstandingly strong research rests chiefly in the successes achieved in the highly competitive ERC and Academy of Finland grant applications, where the standard for success requires grant applications of world leading quality; and in those published outputs of the Unit's research that appear in top tier journals and publishing houses. Conceptually innovative and original research is also evident in the accounts provided in the self-assessment narrative (in section 2.1.1) but is not universally persuasive across all four disciplines.

Strengths here lie in the record of publication with international journals and publishers, where quality standards for acceptance are generally robust and likely to be an indicator of scientific quality. Four of the five of the 'key achievements' reported for the assessment period 2012–2018 refer to funded research projects and one to journal editorship.

Evidence is offered in the self-assessment of research that is predominantly **Excellent**.

GRADING: EXCELLENT

Research goals

The Unit covers a very wide range of research areas and disciplines. All four disciplines already have substantial achievements and exciting currently funded projects. There are four research themes: 'Borders and locating regimes'; 'Environmental change and natural resource examination'; 'Identities and narratives of political culture and law'; 'Nordic welfare model and global inequality'. The above narrative themes are largely descriptive, and no doubt result from the creation of the Unit itself, and the specialisms already there.

Research goals are not evenly evident in all four summaries, although it is still early days to observe these. Some of the disciplinary summaries identify potential research connections across disciplinary boundaries but others do not.

Further, there remain groups with specialisms in the four identified disciplines which have a high and continuing independent, national profile and research output in their own areas. This is crucially important as scholars must be able to sustain their national and international reputation with scholars in more specialised departments. There are many research links already in existence between them, which it is not necessary to rehearse again here:

1. Political History has very strong research elements for welfare history, Cold War and post-Cold War history. The Nordic welfare model lies at the heart of Finland's national and international contribution to public policy. Outstanding record in securing external funding, and good book and peer-reviewed publications.
2. Economic and Social History scholars work thematically, theoretically and at the micro-history level, on equality, public policy issues, as well as global (Japan) areas.
3. Development Studies has a wide research range, with eight funded projects, existing research links across the Faculty, and publishes in peer reviewed articles and chapters.
4. Social and Cultural Anthropology has both a European and global focus and an emphasis on cultural explorations with 'Crosslocations'. Outstanding record in securing external funding and impressive publication record in books and peer-reviewed articles.
5. Additionally, the Centre for European Studies should be able to play a major uniting, interdisciplinary and dissemination role that could well reach beyond the Unit, and relate to other parts of the Faculty and University.

For a country that joined the EU in 1995, the range of policy and philosophical issues that Finnish membership of the EU raises, defies an easy place under one or other of the given headings, while its interdisciplinary 'umbrella' gives it an ambition which also includes a focus upon, for example, the legal-historical dimension of European integrative behaviour. (cf. Max Planck, Frankfurt.) Outstanding external grant-securing success. Strong and diverse publication profile

Additionally, Finnish-Soviet/Russian relations have an existential significance for Finland's past, present and future, but this is as yet not easily grouped under one of the broader research headings. Overall, this range of research is quite remarkable.

- Clearer, more explicitly articulated research goals elaborated within and between the disciplines may prove to be very fruitful
- Some prioritisation of research areas. Currently prioritised research goals are those externally funded through large grants and how these will be carried forward beyond the current grant phases is unclear. Strategies for the sustainability of other research areas which are not externally funded should be clarified.

Research results

Unit 38 describes research results by listing key grants under each of the four disciplines as well as some key publications. The Centre for European Studies is also included here as an additional and separate unit. All five summaries once again privilege externally funded projects as the most significant 'research results' during the assessment period. Economic and Social History also lists 'funded projects' but unlike the other four summaries does not mention the funder. All five

summaries list selected publications. No explicit rationale is offered for why these projects and publications are included as the Unit's 'most important [research] results'. It would be useful here for further explicit self-reflection on what counts as research success for the Unit, how this varies (or not) for each discipline and how the different indicators (status of the funder, amount of money awarded, quantity/quality of outputs, form of output [article, book, grey literature, publisher] are ranked and valued in each discipline (i.e. beyond the JUFO rankings). It is not clear whether the significance of the 'results' have been self-assessed according to these criteria (originality, impact, further applicability of methods). The excellence of the scientific quality is chiefly made visible in the self-assessment of 'research results' through the status of the funder (EU, ERC, Academy of Finland, NordForsk) and by place of publication which impressively includes a number of books with Oxford and Cambridge University Presses and commercial presses such as Routledge, Palgrave and Brill, in addition to top-tier journals such as *International Journal of Urban and Regional Research*, *Journal of Latin American Studies*, *Anthropological Theory* and *Annual Review of Anthropology*.

Analysis on research outputs

Self-assessment metric data (Appendix 1) reports that JUFO level 3 publications in the Unit doubled across the assessment period and the Unit might reflect on how to build on this by reflecting on the factors that contributed to this improvement in research quality. Level 2 publications doubled between 2012 and 2016 but then dropped back again to 'stabilise' around the same lower numbers across the years. Further reflection might identify how to sustain the higher rate.

The top ten outputs in self-assessment (Appendix 3)

are impressive, almost all in top-tier international journals.

The bibliometric analysis shows that the number of publications is rising but that Web of Science coverage is low. Perhaps a balance needs to be struck here between quantity and quality. Introducing a dissemination strategy for each of the four disciplines in the Unit would be one response to this issue.

Number of Doctoral degrees (and Masters) has been more or less stable and consistent across the assessment period.

The self-assessment anticipates that the Unit's research will consolidate around the existing themes as outlined earlier in the self-assessment narrative and there is

evidence in the document that it is moving in this direction.

At the same time, it anticipates both greater interdisciplinary working and comparative research of global scope, not 'limited to a regional focus'.

In its analysis of research outputs, the Unit's self-assessment correctly recognises that it has 'a high interdisciplinary potential' that will enable it to respond to new research opportunities, increase collaboration in its wider research environment and contribute to the Helsinki Institute for Social Sciences and Humanities when this is launched. It would be useful to elaborate and reflect further on the specifics of what this might entail and how it could be achieved and supported by the Unit itself as well as by

the Faculty and wider University.

A key strategic question for the Unit is the balance it wants to strike between disciplinarity and interdisciplinarity since it is challenging to excel at both.

International benchmark(s)

Benchmarks are specified for each discipline in the Unit, some of which are discipline-specific benchmarks and some which are models for interdisciplinarity. Benchmarks are likely to be useful where they also have other differences and similarities to University of Helsinki (UH): position in world rankings; size of institution; predominantly research and/or teaching; source of funding.

2.2 Societal impact

Strengths and development areas

- The Unit has identified some potential beneficiaries of its research.
- Its current strengths are in delivering public policy impact.
- It does not always have a clear understanding of how to evidence these impacts.
- Unit performance on impact is lumpy, with some disciplines better positioned than others.

GRADING: VERY GOOD

The Unit recognises the importance of what its scholars can contribute to knowledge about Finland itself, and its history

(which is so important to an understanding of its future), policies, culture and place in the international system. Political history, Economic and Social History, as well as Development work have specifically relevant tools to contribute here. It is noted that newspaper articles, for example, are a regular feature of the Unit's output, but numbers are not given. Some components of the Unit have a very good understanding of how research has the potential to deliver non-academic, societal impact, particularly in the public policy domain.

Among the most impressive forms of societal impact reported in the self-assessment are the numerous expert hearings that take place in the Finnish parliament which the self-assessment claims have had significant impact on the

preparation of laws by parliamentary committees. This could be strengthened still further by providing some evidence of this 'significant impact' (that is, how do they know it had impact?); by specifying more explicitly what that impact was and by relating it to some specific research project or body of research. For instance, research findings have been made available to the Ministry of Foreign Affairs, but how was the Ministry engaged and through what events? In this respect, the high level workshop on water management offers a useful example and template; although this too would be made more robust by evidencing the 'direct impact on the country's policy' that is claimed here. It is clear that the external impact in these areas of government/

media and elite institutions is effective, although it would have helpful to have precise numbers of interventions and their potential result in relation to policy. The rationale for such work is largely shaped by external events, and the Unit might think about proactively targeting groups in Finnish society – new migrants; schools; training centres etc given the Unit’s own wide range of expertise, or indeed, work with other Units (Education, Media, perhaps) to develop this.

Recommendations

- Reflect on the different interactions and relationships possible between the Unit and the wider societal audiences (e.g. societal impact, knowledge transfer/

exchange, public engagement, outreach) and the divergent but overlapping means of achieving and evidencing these.

- The Unit’s societal impact would be enhanced by more innovative and creative forms of research dissemination beyond those currently deployed.
- Target audiences are civil society, policy makers and business but some specific examples here would be helpful for the Unit when thinking through what impact in these domains might entail, how evidence in each domain is similar or different, and how a pathway to societal impact in each might overlap or diverge. Keep detailed records on impact events.

- The Unit may find it helpful to reflect further on impact and to identify the different kinds of ‘Societal impact’ sought: academic impact; public policy impact; popularisation of research findings – and to distinguish different kinds of impact and its relationship to public engagement. Exposing the public to academic research (e.g. through radio, newspapers, social media, public exhibitions) is valuable but in itself need not entail what we might consider ‘Societal Impact’ beyond a transfer of information.
- The disciplines within the Unit should develop some means of sharing good practice on impact across the Unit as a whole; Faculty might also play a role here.
- Consider nominating senior staff member as Impact lead.

2.3 Research environment and Unit viability

Strengths

- Substantial pockets of very high quality outputs across all four disciplines, upon which further highly-specialised research can still be based. These disciplinary groups are vital, as discipline specialisation can be crucial in international fora for top rank scholars to show individual progress and affiliations within their own discipline (e.g. for major conference presentations, journal boards and editorships, peer-reviewing etc).
- The Unit has extremely impressive number of substantial and prestigious research grant awards.
- A number of new high quality appointments have been made.

- Internationalisation of profile and research is a priority for some parts of the Unit.
- The Unit recognises and is addressing some key future challenges.
- Good evidence that the grant-securing talents of the senior staff could be deployed in further strategic thinking about disciplines, cross-disciplinarity and future Unit coherence-building, once the perils of re-organisation and position-securing have been put behind them.

Development areas

- Support structures for staff/doctoral student training, career development etc could be more developed.

- Absence of explicit objectives for publications, doctoral students, external income
- Individual disciplines are, of themselves, rather small, and therefore vulnerable to staff changes.
- There is an urgent need to put in place at Unit level (and beyond) an easy-access and confidential system for reporting staff and student concerns relating to social welfare, harassment, bullying and discrimination. Personal safety and security are central to a good research environment.

Taken as a whole, while appreciating that it has taken time to establish new structures and that in a year or two the

Unit's profile will develop further, the viability of the Unit is **Excellent/Very Good**. There is an extremely limited period across which aspects of the Unit's local research environment performance can be properly evaluated, so there remain elements of **Very Good**.

GRADING: EXCELLENT/VERY GOOD

Leadership, goal setting and follow-up

Governance seems a mix of hierarchical and democratic, with a democratically elected Faculty Council with staff and student representatives and a Head of Discipline and discipline-based director of research. Senior staff belong to Faculty Council and have oversight of research at discipline level, teaching at Unit level and hiring and firing at Faculty level. The self-assessment mentions increased informal research collaboration as a positive outcome of the recent restructuring and this promises benefits for future cross-Unit research project applications as processes bed down. The emphasis is on activity-focused (i.e. research, teaching, recruitment) *vertical* forms of management and goal-setting and little is said about more *horizontal* forms of communication and feedback that might nurture new leaders and empower less established staff.

Key Performance Indicators are set by Faculty. The two main KPIs are 'leading publications' (based on JUFO ranking) and competitive research funding. KPIs for impact are described by Faculty as 'more ambiguous' and this potentially explains some lack of clarity in the Unit's account of impact. The key challenges identified in the Faculty self-assessment are not addressed adequately in the Unit self-assessment. This may suggest a communication issue. For the Faculty, these challenges include the need to coordinate teaching and research at discipline level so that the two are

mutually enriching; the need to move from individual to collaborative research; and the need for leadership training.

Human resources, careers and recruitment

The Unit has been successful in recruiting internationally at all staff levels (4, 3, 2) and the percentage of international staff is well above that in the Faculty: overall 21% international in the Unit compared to 13% in the Faculty. One-fifth (20%) of the Unit's Level 4 Professors are International, compared to less than one-tenth (7%) of Faculty Professors.

There is a good balance of career stages among staff as indicated in self-assessment metric data (Appendix 1; though no indication of gender balance by stage of career) and the bottleneck for post-doctoral researchers has been resolved by current external income; vitality and viability in this context are thus clearly conditional on continued Unit funding successes. Introduction of tenure-track appointments has been a recent effective recruitment aide. Discipline away days are used to integrate, plan and co-ordinate research. All of these are strengths of the research environment. However, there is much taken-for-granted practice in the narrative and not much reflection on how things might be (and elsewhere are) done differently. And while critical elements of staff career development are included, details are sometimes absent: e.g. mentoring is listed but what does it consist of?; how is workload allocated to staff?; promotion process is not described; the Faculty provides research support for grant writing, completion of high quality publications and Open Access but staff training (for grant application, PhD supervision, teaching) is not elaborated.

Provision for sabbaticals and support for preparing research grant proposals appears to be informal rather than structured which sits uneasily with aspirations for global

research presence, and the ability to attract scholars from the global market.

Sustainability seems to be in the hands of the Faculty which recruits (and promotes?), rather than the Unit which ensures viability mainly through securing research funding.

Researcher education

The Unit collaborates with the Doctoral School in Humanities and Social Sciences as well as several other university programmes. Doctoral students have two supervisors and participate in doctoral seminars organised by the disciplines, while Doctoral programmes are shaped at Faculty level in co-operation with disciplines and student representatives. Unit self-assessment alludes to a tension here. Students are encouraged to broaden their networks by participation in international summer schools. The examining process is briefly described. As a means of Unit renewal and viability, PhD and post-doctoral researchers are mentored for high-level posts at UH.

More attention should be given to structuring pastoral/counselling provision; teaching loads/administrative chores etc; and career guidance framework for the Faculty, in which the Unit could participate. Small groups can provide a very supportive working environment, especially for early career researchers, with sensitivity to personnel, career and other issues if there is no obvious faculty wide provision for such issues gathered together in one place. Such provision could also involve collection and monitoring of statistics on gender, ethnic diversity, financial provisioning etc, for the Unit, if this is not already covered elsewhere.

Research infrastructure

The Unit has access to the Finnish Electronic Library and the Helsinki Institute for Social Sciences and Humanities (from 2020?) but little is said about their role or the added value they offer. Limited funding restricts allocation of space, particularly to PhD researchers who consequently are not well-integrated into the Unit's research environment. Some of the four disciplines describe hosting periodic seminars funded by the Unit and Faculty which provide a research focus for staff and students. So too do workshops and large conferences, several hosted in the assessment period, but these are usually organised by discipline-specific scientific societies. Cooperation between disciplines could be further promoted through these tools.

Funding

The funding of the Unit appears to be in good shape, both in relation to the amount of funding raised and also in relation to the sources. Most impressive is that ERC project success trebled between 2014 and 2018, a year which also saw the first Academy of Finland Centre of Excellence success. It will be essential here to maintain a pipeline of high quality funding applications and thought must be given as to how

to achieve this (in the Unit); and how to support it (in the Faculty). The Faculty has set a target of 5 ERC grants in 2017–20 and Euro 1.5–2m. other EU funding annually.

External funding success within the Unit has generally outpaced the aggregate of the Faculty in some key respects. This is especially notable in the Unit's EU funding success, which is twice the percentage this constitutes in the Faculty as a whole. However, there should not be over-optimistic expectations that grant funding can easily be sustained simply because of such a striking success. The Unit's core funding percentage is less than for the Faculty overall, which makes these successes all the more impressive. However, current staff structure seems very dependent on external funding, particularly for early career researchers.

Collaboration

Collaboration is strong, both across Norden, but also globally, and in purely academic fields, as well as those which are more policy-focused. The Unit also has a good range of collaborations within the University, nationally and internationally as well as a history of hosting PhD summer schools for students and staff of a dozen universities. The NordWel network for comparative welfare state research

is clearly a Unit strength. Not all of the collaborations mentioned have specified outcomes, outputs or benefits beside them.

When planning future collaborations, the Unit could perhaps reflect further on what it and its various disciplines want to be known for. For example, any connections to FMA, FIIA, Swedish Institute for International Affairs etc. should be fully recorded and developed. Benchmark universities are mentioned earlier in the assessment but are not deployed to any purpose and their possible utility is not explored.

Societal and contextual factors

This section is the most explicitly self-evaluative. It points out that restructuring and devolution of increasing tasks to academics has impeded performance and resulted in work-arounds just to sustain the level of research quality that already exists. The reduction across the Faculty of 'Other Staff' (presumably academic support staff?) from 70 staff to 34 between 2013 and 2017 (Self-assessment metric data, Appendix 1) would seem to support the claim that academics must increasingly assume additional tasks to make the recent restructuring work in practice and to maintain research viability.

Social Sciences Panel

SWEDISH SCHOOL OF SOCIAL SCIENCE (SOC UNIT 39)

1 SUMMARY

1.1 Description of the use of criteria

The Social Sciences Panel has in the assessment of each Unit had at its starting point the basic stance underlying the research assessment exercise, namely that the ultimate purpose of the assessment is to enhance the future competitiveness of the Units and, in the last instance, all of the University of Helsinki. This future-orientated outlook affects the assessments of all Units and all of the three overarching assessment themes.

Concerning the first of these three themes, that of *scientific quality*, the Panel has examined the substantive and thematic objectives formulated by each Unit as well as the range of institutes that a given Unit in its SAR has highlighted as relevant for a comparison. In several cases this led to a fruitful exchange of views and to new insights. The Panel has also taken note of the extent to which each Unit has articulated its objectives. In this case as well as the probing, useful questions concerning the further articulation of objectives were raised. The Panel has also, often in minute detail, studied the publication records of every Unit. In this part of the assessment, the Social Sciences Panel has made extensive use of the bibliometric data supplied but not so as to simply copy the outcome of the bibliometric analysis but in order to establish a reasonable point of comparison.

The Panel has been fortunate enough to have had members who have a firm grasp of the given international standards in the fields of the Units covered. Several members have also had a long-standing familiarity with the

University of Helsinki and the academic system of Finland. Eminent examples of this are provided, for instance, by the assessments of Units 31 and 35, but it applies to various degrees to all Units.

Societal impact refers to the performance and capacity of a Unit to produce research that may come to have an impact in societal terms. In making an assessment of the performance of a Unit it was necessary to enquire into the extent to which research conducted within a Unit was of relevance to stakeholders and audiences in the given fields but also to examine how explicitly each Unit has identified groups of such stakeholders and formulated a strategy to reach them. Needless to say, it is more difficult, but in our case not impossible, to establish if and how results have exerted an influence on the courses of actions of different authorities and stakeholders. It goes without saying that it is even more difficult to clarify what changes have in the last instance occurred in societal conditions.

On the whole, the social sciences Panel has been able to assess the societal visibility of the research findings of different Units and to a considerable extent also their impact. In fact, virtually all the Units have, by international standards, been remarkably successful in identifying stakeholders and actual or potential recipients of their findings. In several cases, including Units 33, 34, 35 and 37, there are also well-established institutionalised linkages, in other cases there are well-established forms of contacts (as with Units 32 and 39).

In the case of Finland, such linkages appear to be remarkably well developed in an international perspective. At the same time, some of the assessments, for instance of Unit 34, show how the very strength of a link should also be considered in the light of possible, alternative linkages that have perhaps been seen to be of somewhat less importance to develop. Thus the criterion of societal impact should be thought of in relative rather than absolute terms.

Research environment and Unit viability is a criterion that refers to the future potential of a Unit. This is to some extent a function of the other two criteria but not exclusively so. The Panel members have devoted much attention to forming a well-grounded view of the future viability of a Unit and has for most Units expressed a high degree of confidence in their viability. This optimism, however, is contingent upon Units undertaking a further clarification of their strategies and in some cases also their internal procedures.

Finally, there is one other issue that the Panel had to address from the start. Thus, even if the set of general themes and the specific conditions for assigning a certain grade are clear, the Panel has had to establish a common understanding about the detailed assignment of grades. This was possible and the members of the Social Sciences Panel have used the range of grades to express their varying degrees of appreciation and concern. The result is a spread of final assessment grades that the Panel feels appropriately describes the achievements and future potential of the different Units.

1.2 Assessment summary

The Swedish School of Social Science, in Swedish *Svenska social- och kommunalhögskolan*, (hereafter the SSKH), is an autonomous Unit at the University of Helsinki (UH), to some extent comparable to a faculty. Compared to most faculties at the UH, it is a fairly small Unit with 53 staff members. Teaching and research is organised across six disciplines: journalism and communication, legal studies, political science and administration, social psychology, social work and social policy, and sociology. The SSKH has a legal responsibility to deliver scientific and vocational training in Swedish in social sciences, particularly in public administration, journalism and social work as well as conduct scientific research in these disciplines. The School has the national responsibility to educate Swedish-speaking social workers in collaboration with the Faculty of Social Sciences. The SSKH has a factual national responsibility within Social Psychology and Journalism, as no other university provides education in Swedish in these disciplines in Finland. Collaboration between the Faculty and SSKH also occurs across other disciplines at the School. SSKH is responsible for education at the bachelor level, whilst education on the master level is carried out in collaboration with the Faculty of Social Sciences. At the UH the SSKH is the only Unit which has Swedish as the main teaching and administrative language.

The SSKH has a unique educational role in Finland. The *Svenska medborgarhögskolan* was founded in 1943 as a private college offering a Bachelor of Social Services (socionom) programme to serve the needs of the Swedish-speaking population. In 1984 it became integrated with the

UH, and since 2017, the SSKH has been offering Master's level education in a Swedish-language Master of Social Science programme in collaboration with the Faculty of Social Sciences. Today the SSKH is actively involved in research and has a rector and a board of its own.

During the assessment period research intensiveness has increased: external funding has doubled, more articles are published in high-quality journals and the SSKH has a formulated a sound and realistic research strategy. There is a strong focus in research on ethnic relations and immigration. Research topics are academically and socially relevant and in line with global trends in social research. The organisation and decision-making processes are clearly defined. There are some limits to career development within the Unit because of the small size. The SSKH does not have a right to issue doctoral degrees but has a number of doctoral students who are very well integrated into the Unit.

Strengths

- Extensive autonomy at the UH; and, a special status in Finland
- Strong emphasis on inter- and multidisciplinary in research
- Small Unit with a good working atmosphere: all are included
- High social relevance of educational and research goals set by the Unit
- Topical and timely research: migration and ethnic relations, the Nordic welfare state, vulnerability, participation, citizenship

- Increase in research funding is a positive sign of a stronger research orientation

Development areas

- Research has gained a stronger foothold compared to earlier years; there are however differences between disciplines in research outcomes
- The small size of the Unit is a benefit and a challenge: the number of researchers and professors might be too little to sustain critical mass in all five thematic research groups, most particularly the number of professors is relatively small (5)
- Research funding has doubled during the assessment period; however, new efforts are needed to maintain a steady external stream of fundings
- The overall profile of the SSKH is in line with the Strategic Research Council and its research themes
- The goal of making the SSKH a prominent Nordic centre for education and research in *social sciences* needs further specification

Recommendations

1. To sustain the critical mass the SSKH needs a strong engagement with the joint operational research units, the new institutes for Social Sciences and Humanities and Inequality, Wellbeing and Security (INEQ) network, and should collaborate with other countries; collaboration might serve as an excellent avenue to advance research activities and top-level research publications

2. Collaboration with Foundations could be strengthened to raise new funds for research and professorships
3. There should be a more concrete action plan for the

Nordic component: What exactly can be achieved and advanced in this area of education and research at the UH and in Norden? This field of research is very competitive

4. The SAR did not specify national responsibilities and divisions of work in education and research for instance in relation to Åbo Akademi

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

The Unit has made very good progress in research outputs. There are good prospects for “welfare and ethnicity” to become a flagship of the Unit. The Unit participated in a Nordic Centre of Excellence (NordWel) but has not participated in CoEs funded by the Academy of Finland. There is good originality in research (in the field of ethnic relations and migration). The Unit is not reaching the most highly ranked journals in all sub-groups. There is large sub-group variation in publication strategies.

GRADING: VERY GOOD/GOOD

Research goals

The SSKH has become much more research oriented than before. There are, however, some difficulties to balance the vocational training responsibility with excellent research performance. High academic and social relevance of research goals have been set by the Unit: to provide research and expertise for the benefit of society and to

make the SSKH a prominent Nordic centre for education and research in social science. The latter goal is a bit unclear and unspecified: what exactly is the Nordic component in this context? The SSKH also wants to increase engagement in the UH’s strategic research areas and the joint operational research Units: the new institute for Social Sciences and Humanities and the INEQ, the Inequality, Wellbeing and Security network. This type of collaboration is very important for a small Unit. The SSKH also wants to uphold and strengthen the position of Swedish in the academia and in society: the position of a Swedish-language hub particularly in doctoral training will be given a stronger emphasis. The SSKH has done good work in its research strategy. It has to work further to define even more clearly the focus, profile and purpose set for the international and global interaction including the Nordic dimension.

Research results

External research funding for the Unit doubled during

the assessment period, from 0.6 to 1.2 million € yearly; the Unit has reached a stronger position in the Nordic research community, e.g. by participating in the work of the Nordic Centre of Excellence (NordWel/NordForsk) and by arranging international conferences (Nordic Social Work Conference 2018). Inter- and multidisciplinary is taken seriously and might bring into being new research findings and designs. The Unit has recently reorganised research activities in five interdisciplinary thematic research groups that bring together researchers from different disciplines. It is, however, too early to assess the results of the reorganisation. There are some very promising overarching research themes in the area of migrants and ethnic relations in the Nordic welfare state context: e.g. the focus on street-level migrant citizenisation practices, the evolution of Ingrian Finnish migrants’ values, transnationalism among immigrant groups and mediatisation of migration policies. New insights in research include, for instance, the attitudes of various vulnerable groups, the basic income experiment,

and inclusive and participatory practices of media. While there is a new focus on vulnerability, it is important to avoid language that might strengthen vulnerable people's vulnerability rather than their emancipation.

Analysis on research outputs

The SSKH is a fairly small Unit and is thus vulnerable to changes in assessing research outputs. The quantity of publications varies to some extent year by year, and there is room for improvement as recognised in the SAR. The average quality of publications in terms of level of publication channels by and large meets the expectations at the SSKH: 14% of the classified publications (312) at the Unit are rated as being at the highest JUFO level; 26% at the leading and 59% at the basic level. In addition, there are 105 publications out of a total of 525 that have not received

a basic-level rating (JUFO). The publication language is 20% in Swedish, 20% in Finnish, and the remaining 60% in English. Except for social psychology, social scientists often publish articles as book chapters rather than in international journals. Here social psychology comes out strongly in the metric analysis and has a strong showing in international journals.

The SSKH is not authorised to issue doctoral degrees, and this might have some influence on the volume and quality of publication. To some extent doctoral students' publications are, however, counted to the benefit of the SSKH (if they are working for instance in research projects run by staff members). One of the Unit's "goals during the assessment period was to become a prominent centre of research and education in social sciences in a Nordic context and to create a more coherent research profile in the field

of welfare and ethnicity". This goal needs more investment and collaboration with Nordic researchers. There are good prospects for "welfare and ethnicity" to become the research flagship in the Unit.

International benchmark(s)

The SSKH has selected some international benchmarks. The Faculty of Social Sciences in Lund University is mentioned in the first place. It is a much larger research community but to some extent comparable to the SSKH (social work and social policy). Three other benchmarks have to do with the language minority position: Université Laval in Canada and the University of Canterbury New Zealand have a fairly similar selection of disciplines; and the Free University of Bozen-Bolzano shares a multilingual environment. This selection reflects the special status of the SSKH.

2.2 Societal impact

The social relevance of the research at the Unit is high and the social impact is impressive in many ways. The Unit has defined relevant and clear target areas and goals for its societal impact. Researchers play an active role in the public media and in different stakeholder communities. The Unit has a long history of being a prominent professional education institution for Swedish-speaking communities. This is certainly of benefit in promoting social impact activities. It is very important that there are increasingly global networks and international research activities, such

as capacity building and curriculum development in Zambia and Tanzania.

GRADING: EXCELLENT/VERY GOOD

Target areas, audiences, research questions and goals

The SSKH has a strong mission to provide research-based knowledge for policy-making and stakeholders. According to the Unit's Target Programme "the aim of the research is

to provide society and particularly the Swedish-speaking population with relevant analyses of changes in society". As said above, the research goals set by the Unit have a strong social impact dimension. In addition, the SSKH and its history has a strong social impact, e.g. educating students for public administration, social work and (public) media professions.

The Unit understands that the results need to be communicated to the international academic community but also to relevant societal stakeholders and policy makers.

The staff members seem to make a fairly active contribution to public debates (also in the social media). There are good relations with Swedish-language institutions in Finland. Research on migration and ethnic relations plays a central role in outreach activities.

Activities and outcomes

Most of the research conducted in the SSKH is socially and societally very relevant. Research on social work, journalism & communication, political science & administration

are connected to specific professional groups and their professional competences in society. There is also more direct interactions with relevant actors and bodies (that are often professionals). MediaLab has been in operation since 2012. It is an educational hub that promotes research in areas important to the SSKH and provides a meeting arena for students, teachers, researchers and people working in the media, journalism and communications. The most active form of participation is embedded in research projects that have strong social impact elements: e.g. research done in

Zambia and Tanzania (capacity building and curriculum development), around the North South Journalism network (journalism education in three African countries) and the Finland-Swedish Centre of Excellence (social services development in bilingual Finland). The downside of active participation and engagement in public debate is that it may happen at a personal cost of even safety threats (e.g. concerning migration issues).

2.3 Research environment and Unit viability

The organisation of the Unit operates very well: all sections of the Unit are well presented in the decision-making and planning procedures. A bottom-up governance model is very much in evidence. The Unit has been selected as the best work community in the UH. Synergies are nicely brought together to enhance research outputs.

The Unit could have even more extensive collaboration with Nordic partners and a more concrete plan to hire leading Nordic scholars. There are fairly few full professors, which might be an obstacle in developing the Unit into a more viable research community with some leading research groups. There are some good new practices such as the visiting professor programme. Research collaboration could be based on a more strategic plan at the central level.

The Panel sees there is an urgent need to put in place

at Unit level (and beyond) an easy-access and confidential system for reporting staff and student concerns relating to social welfare, harassment, bullying and discrimination. Personal safety and security are central to a good research environment.

The Panel also recommends paying attention to how to sustain a critical mass of researchers in a small Unit and how PhDs can be engaged more formally (as degree students of the SSKH).

GRADING: EXCELLENT/VERY GOOD

Leadership, goal setting and follow-up

The SSKH has its own board and rector and two vice-rectors (teaching and research), a research council (leaders of 5 thematic research groups, 2 other professors, one from

the Faculty and two researchers – no representatives from stakeholder or professional communities). The SSKH has fairly strong autonomy, although it lost its own administration. The small size of SSKH allows the entire staff to be heard, to run the most important issues through staff meetings and planning seminars. There seems to be a kind of bottom based decision-making culture (the best work community in the UH). According to the Research assessment 2005-2010 recommendations the SSKH reorganised its research activities into five thematic groups. This has been a fruitful and wise reorganisation.

Human resources, careers and recruitment

The small size of the SSKH with its vocational training task is followed with a fairly low number of full professors and comparatively high number of level 3 positions

(senior lecturers) limiting at least to some extent career advancement. There is now a stronger emphasis given to research: one period out of four is free of teaching, every fifth year a six-month research period is given. Concerning recruitment there is a limited group of Swedish-speaking scholars in Finland. This is one reason to hire more foreign employees, especially scholars from the Nordic countries. There are some plans for new positions: one professor together with the Faculty of Social Science; three new university lecturer positions in areas that support the research profile; international readers (under work); and visiting professors for periods of 1-2 years.

Researcher education

The SSKH does not have the right to issue doctoral degree. It actively contributes to doctoral education and supervision. Since the 2017 open call, two doctoral students were recruited. Doctoral students can be affiliated with the SSKH; all doctoral students are given the right to a working space and affiliated doctoral students on grants are provided with funding to participate in conferences. The SSKH is active in researcher education and invests in resources for this purpose.

Funding

The stream of external funding has increased during the assessment period and is expected to remain reasonably steady in the future (from 795,000 to 1,200,000€ per year). The current funding streams of the SSKH consist of 66% basic funding and 34 % external funding; the corresponding

figures in 2015 were 86% and 14%. There have been dramatic cuts in the basic university funding to be compensated for by external funding. The Unit should be even more active in applying for money from the EU Framework Programme Horizon 2020, the Academy of Finland, the Strategic Research Council, Foundations and other sources. SSKH (Prof. Blomberg) is a consortium partner in the project Tackling Inequalities in Time of Austerity (TITA), financed by the Strategic Research Council by totally 6,6 million euros (funding period 2015- 2021). The overall profile of the SSKH very well fits into research instruments of SRC.

Collaboration

There are relatively few external research collaborations organised centrally; collaboration is organised through individual researchers and research groups. Most particularly collaboration with Nordic institutions is to be strengthened in the future. The SSKH has an action plan to advance international collaboration (readers and visiting professors to be invited).

Connections with 'other constellations'

The Centre for Nordic Studies (the UH operational unit), the INEQ network (critical knowledge of inequality, wellbeing and security), UH profile area investment, and the Helsinki Institute for Social Sciences and Humanities.

Societal and contextual factors

These factors include a thorough reform and re-organisation of the organisation, structures and research activities

in the University of Helsinki; cuts in funding; a profound reorganisation of the SSKH's administration; newly established Bachelor's and Master's programmes; and a re-organisation of research activities and structures. This is an exceptionally turbulent period, yet the SSKH has managed to make some significant advances, including a new MA programme with the Faculty of Social Sciences and increase in external funding. These are positive signs in the SSKH's life span. There are also some threats: the ever-increasing competition for external funding, and the University's emphasis on very large project entities, international external funding and centres of excellence in research. For a small Unit these strategic goals might be difficult to meet. The other side of the coin is that the SSKH is needed to provide high-level education for professionals. The newly elected university leadership emphasises bilingualism and the importance of the Nordic dimension as part of its overall strategies. These goals are promising for the SSKH.

Since 2017, the School has offered master's level education in a Swedish-language Master of Social Science program that is organised in collaboration with the Faculty of Social Sciences of the UH. SSKH provides for the majority of the teaching within the program, but the Faculty of Social Sciences has the formal right to issue MA degrees to students who successfully complete the program. The SSKH is thus responsible for providing vocational training (e.g. social worker education in Swedish), and its duty is to educate Swedish-speaking administrators, researchers and other professionals.

LIST OF ABBREVIATIONS IN THE ASSESSMENT REPORTS

3 ASSESSMENT REPORTS

LIST OF ABBREVIATIONS IN THE ASSESSMENT REPORTS

AAAI	Association for the Advancement of Artificial Intelligence
ACM	Association for Computing Machinery
AF, AoF	Academy of Finland
AI	Artificial intelligence
ATLAS	A Toroidal LHC Apparatus, a general-purpose detector at the Large Hadron Collider
BSc	Bachelor of Science
CERN	European Organization for Nuclear Research
CLARIN	European Research Infrastructure for Language Resources and Technology
CMS	Compact Muon Solenoid, a general-purpose detector at the Large Hadron Collider
CoE	Academy of Finland Centre of Excellence
COST	European Cooperation in Science and Technology
CSO	Civil Society Organization
CWTS	Centre for Science and Technology Studies, Leiden University
DVM	Doctor of Veterinary Medicine
ERC	European Research Council
ESA	European Space Agency
ESFRI	The European Strategy Forum on Research Infrastructures
ESO	European Southern Observatory
ESRF	European Synchrotron Radiation Facility
FAIR	Facility for Antiproton and Ion Research in Europe
FAIR data	Findable, Accessible, Interoperable, Reusable data
FAO	Food and Agriculture Organization of the United Nations
FIIA	Finnish Institute of International Affairs
FinBIF	Finnish Biodiversity Information Facility
FTE	Full-Time Equivalent
GDPR	General Data Protection Regulation (by EU)
HCAS	Helsinki Collegium for Advanced Studies
HELDIG	Helsinki Centre for Digital Humanities
HELSUS	Helsinki Institute of Sustainability Science

HIDATA	Helsinki Centre for Data Science
HIIT	Helsinki Institute for Information Technology
HiLIFE	Helsinki Institute of Life Science
HULib	Helsinki University Library
IEEE	Institute of Electrical and Electronics Engineers
IF	Impact Factor
INAR	Institute for Atmospheric and Earth System Research
IPCC	Intergovernmental Panel on Climate Change
ITER	International Thermonuclear Experimental Reactor
IUFRO	International Union of Forest Research Organizations
JET	Joint European Torus
JUFO	Julkaisufoorumi - Publication Forum, a classification of publication channels created by the Finnish scientific community to support the quality assessment of academic research
LERU	League of European Research Universities
LHC	Large Hadron Collider
LIGO/VIRGO	Laser Interferometer Gravitational-Wave Observatory
LISA	Laser Interferometer Space Antenna
LUKE	Natural Resources Institute Finland
LUMA Centre Finland	A network of Finnish universities to inspire and motivate children and youth into mathematics, science and technology
MNCS	Mean Normalized Citation Score
MNJS	Mean Normalized Journal Score
MOOC	Massive open online course
MSc	Master of Science
NGO	Non-governmental organisation
NLP	Neuro-Linguistic Programming
NOVA	The Nordic Forestry, Veterinary and Agricultural University Network
ORC	Optical Character Recognition
P	Number of publications in international journals of the unit of analysis in the period
P'	Number of publications using fractional counting at the level of organizations.

3 ASSESSMENT REPORTS

LIST OF ABBREVIATIONS IN THE ASSESSMENT REPORTS

PhD	Doctor of Philosophy
PI	Principal Investigator
PNAS	Proceedings of the National Academy of Sciences
PP (Intl collab)	The proportion of a university's publications that have been co-authored by two or more countries
PP10%	The proportion of highly cited publications. The proportion of publications by a unit among the upper top 10% percentile of the citation distribution for papers belonging to the same field
PROFI	Academy of Finland competitive funding to strengthen university research profiles
RAUH	Research Assessment 2018-2019 - University of Helsinki
SAB	Scientific Advisory Board
SAR	Self-Assessment Report
SMEAR	Stations for Measuring Ecosystem-Atmosphere Relations

SRC	Academy of Finland - Strategic Research Council
STOC	Symposium on Theory of Computing
SWOT	Analysis on Strengths, Weaknesses, Opportunities, Threats
SYKE	Finnish Environment Institute
TEKES	Finnish Funding Agency for Technology and Innovation (currently Business Finland)
THE Rankings	The Times Higher Education Rankings
UH	University of Helsinki
UNESCO	United Nations Educational, Scientific and Cultural Organization
URBARIA	Helsinki Institute of Urban and Regional Studies
VATT	VATT Institute for Economic Research
VERIFIN	Finnish institute for verification of the chemical weapons convention
VTT	Technical Research Centre of Finland Ltd

RESEARCH ASSESSMENT 2018–19 UNIVERSITY OF HELSINKI (RAUH)

II Assessment method

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PURPOSE AND AIM

Research assessment of the University of Helsinki was carried out in 2018–2019 according to the assessment plan (see Appendix I). The aim of the assessment was to produce an overview of the quality and impact of the research performed at the University, to assist in identifying future research opportunities and support research renewal.

The aim was to provide input for the UH 2021–2030 strategy process and produce comprehensive picture of the University to support the development work at all levels. The assessment covered all research carried out at the University. Unit and Panel level initial results were delivered to the Units, Faculties and Independent Institutes in May 2019 when the annual development seminar for Faculty leadership took place.

Organisation of the assessment

The assessment was carried out by international peer-review Panels. The assessment process was managed by the Research Assessment Office (RAO) and led by the assessment Steering Group.

The Units of Assessment (Unit) were defined to be Faculties, Institutes, Departments, disciplines or combinations of disciplines, where common goals and

development plans are, or could be, established. The Unit structure was discussed and agreed on in cooperation with the Faculties in early 2018. In the end, 39 Units were identified for the assessment purposes, mainly based on existing administrative units where available. The assessed Units covered all research activities at UH.

Review Panels

The assessment was organised in four review Panels, defined by their respective research areas/disciplines. The Panels representing the areas of assessment (number of Units in brackets) were:

- Humanities (9)
- Life Sciences (15)
- Natural Sciences (6)
- Social Sciences (9)

Each of the four Panels consisted of highly regarded international experts suggested by the Units. In addition to a Chair (in the Life Science Panel also a Co-Chair), each Panel consisted of a group of 10–15 experts. The number of experts, including the Chairs, was in the end 46. Each Panel also included at least one representative familiar with the

Finnish higher education sector who could assist in matters that require context-specific knowledge and insight.

Assessment themes

The three themes for the assessment were:

1. Scientific quality
 - Scientific quality was approached by looking at the past performance based on scientific outputs created by the current members of the Unit.
2. Societal impact
 - Societal impact referred to the interaction between the Unit and the wider societal audiences.
3. Research environment and viability
 - Research environment and unit viability considered the future prospects and operating culture of the Unit and how they support development and renewal.

Each theme was assessed on a scale of weak – good – very good – excellent, with the RAUH criteria given in Appendix IV.

ASSESSMENT APPROACH

Enhancement-led approach was chosen to support the aim of the assessment – to improve operations. This means the assessment was strongly based on the self-assessment of

the Units describing their goals and recognizing their own strengths and development areas.

ASSESSMENT MATERIAL

Collection of the assessment material

Definitions for the assessment material were agreed upon in the Steering Group in January-April 2018 and the collection was executed by RAO and the Units, supported by Helsinki University Library (HULib) in April-September 2019. In total, the self-assessment documents consisted of about 1150 pages, including the metric data. The assessment material was submitted to the Panels in January 2019.

Self-assessment

Self-assessment refers to the Unit's own assessment of its operations and development work. The Units were provided with and instructed to use a self-assessment report template and to follow the guidelines given in it. The Research Assessment Office (RAO) provided Key figures (metric data) and reviewed that the guidelines on the content and structure were followed. Units were fully responsible for the content of their report text.

The self-assessment followed the thematic structure

of the assessment: scientific quality, societal impact and research environment and Unit viability. In the end, the self-assessment consisted of the Unit's responses to the guiding questions on their research profile and goals for scientific and societal impact as well as reflection on their results and activities. The Unit was also asked to describe its leadership and management practices e.g. goal-setting procedures, follow-up measures, HR and recruitment practices, funding and collaborations.

In accordance with enhancement-led evaluation, self-assessment is primarily a tool for improving operations. Recognising the Unit's own strengths and areas in need of development was an integral part of the self-assessment process. The Unit's capability of critical self-reflection was also taken into account in the assessment carried out by the Panels. This means that the Panels were asked to focus on the Unit's readiness to deal with possible deficiencies, e.g., by describing already taken or planned actions, rather than the deficiencies per se.

Metric data

The assessment period extended from 2012 to 2018. Staff, funding, degree and selected projects statistics were produced for 2013–2017 and publication statistics for 2012–2017. Bibliometric analysis was based on 2012–2016 publications. Staff and funding were estimated for 2018, as the data collection was performed already in the spring of 2018. The source for all data was UH databases. HULib was responsible for processing publication data and RAO other data.

Bibliometric analysis of the publications was performed by the Center of Science and Technology Studies (CWTS), Leiden University. This analysis was performed for those Units where this kind of analysis was considered to provide relevant results, including sufficient coverage of publications of the Unit. HULib analysed publication activity by alternative means for those Units where bibliometric analysis was not performed.

The performance of the Unit was measured

against the mission and goals set by the Unit. Metric data and indicators were used to support qualitative expert assessment. For each set of metric data, the value,

limitations and the context of use were recognised in each Unit. This approach is in line with the Leiden Manifesto for research metrics.

PANELS

Four international peer-review Panels carried out the assessment. The Units proposed suggestions for international and national experts to be invited to the Panels. The recruitment process (the selection of the candidates and invitations) was managed by the Research Assessment Office in co-operation with the Units. In total 46 panellists (including the Chairs) participated in the assessment.

Humanities Panel

Claire Warwick, Durham University (Chair)
 Kirsten Busch Nielsen, University of Copenhagen
 Nello Cristianini, University of Bristol
 Irene Dingel, Leibniz-Institut für Europäische Geschichte
 Martin Halliwell, University of Leicester
 Kristian Kristiansen, University of Gothenburg
 Christian Mair, University of Freiburg
 Urpo Nikanne, Åbo Akademi University
 Sonja Smets, University of Amsterdam
 Jan von Bonsdorff, Uppsala University
 Peter Waldron, University of East Anglia, School of History

Life Sciences Panel

Sven Frøkjær, University of Copenhagen (Chair)
 Paul Stewart, University of Leeds (Vice-Chair)
 Brian Charlesworth, The University of Edinburgh
 Ola Eriksson, Swedish University of Agricultural Sciences (SLU)
 Peter Hufnagl, Charité University Hospital Berlin
 Ulf Magnusson, Swedish University of Agricultural Sciences (SLU)
 Anne Magurran, University of St Andrews
 Martin Parry, Lancaster University
 Véronique Préat, Université catholique de Louvain
 Carlo Sala, CNR Institute of Neuroscience, Milan
 Paul Schulze-Lefert, Max Planck Institute for Plant Breeding Research
 Karin Schwarz, Kiel University
 Kjetil Tasken, University of Oslo
 René van der Wal, University of Aberdeen
 Maarten van Lohuizen, Netherlands Cancer Institute
 Gunilla Westergren-Thorsson, Lund University

Natural Sciences Panel

Ralph Eichler, ETH Zürich (Chair)

Lars Bergström, Stockholm University
 Robert Elliman, Australian National University
 Maria J.Esteban, CEREMADE University of Paris-Dauphine
 Øystein Hov, The Norwegian Meteorological Institute
 Mehdi Jazayeri, University of Lugano
 Pedro Larrañaga, Technical University of Madrid
 Christina Moberg, KTH Royal Institute of Technology
 Kathryn Whaler, The University of Edinburgh

Social Sciences Panel

Björn Wittrock, Uppsala University and Swedish Collegium for Advanced Study (Chair)
 Anneli Anttonen, University of Tampere
 Anne Deighton, University of Oxford
 Hastings Donnan, Queens University Belfast
 Anneli Eteläpelto, University of Jyväskylä
 Hans Petter Graver, University of Oslo
 Martin Jones, Staffordshire University
 Saadi Lahlou, The London School of Economics and Political Science
 Timo Teräsvirta, Aarhus University
 Lena Wängnerud, University of Gothenburg

ADMINISTRATION

Steering group

The rector appointed the Steering Group for the assessment on 21 November 2017 and assigned it to draw up the assessment plan and monitor the implementation of the assessment. The Steering Group decided on the assessment questions, the assessment material and its use, the Panels, the Units of Assessment, and their allocation to the Panels. The term of the Steering Group ends on 31 December 2019.

The Steering Group members:

Chair (21 Nov 2017–31 July 2018), Vice-Rector for Research,
Professor Jouko Väänänen
Chair (1 August 2018–31 Dec 2019), Vice-Rector for Research,
Professor Paula Eerola
Professor Jaakko Kaprio
Professor Pauli Kettunen
Professor Atte Korhola
Professor Jouko Lindstedt
Professor Anne Pitkäranta, Vice-Chair
Professor Marja-Liisa Riekkola
Director of Research Affairs Ritva Dammert

Research Assessment Office

The Research Assessment Office operated under University Services' Research Services and was responsible for carrying out the assessment project. The Research Assessment Office consisted of Project Manager Anssi Mälkki, Senior Advisors Johanna Kolhinen and Riitta Väänänen, and Project Coordinator Maiju Raassina. The Project Manager reported to the Vice-Rector for Research.

Appendix I

ASSESSMENT PLAN

Accepted at Steering Group meeting 27 February 2018

The research of the University of Helsinki (UH) is assessed at regular intervals. The upcoming assessment will take place in 2018–2019; previous assessments were executed in 1999, 2005 and 2012. The assessment will focus on the academic quality of University units as well as their future potential and opportunities to develop operations, and the assessment covers all research performed at the University. Unit-level results will be available in spring 2019,

and the University-level report will be available by the end of 2019.

The purpose of the Research Assessment of the University of Helsinki (RAUH) is to reveal and confirm the quality and impact of research, assist in recognising future research prospects, and support renewal.

The aim of the assessment is to produce information that can be used for enhancing quality and supporting strategic decision-making at the University of Helsinki on

unit, faculty and university levels. The assessment will give vital input to the UH 2021–2024 strategy process.

The assessment focuses on overall research activities in *Units of Assessment* (Unit), not on the performance of individual researchers.

The assessment will be carried out by international peer review panels. The assessment process is managed by Research Assessment Office (RAO) and led by the Steering Group.

Assessment themes and questions

The assessment themes are

1. Scientific quality
2. Societal impact
3. Research environment and Unit viability

The subject of the assessment is the Unit's overall research activities, including the management and leadership by the unit in promoting the high quality and impact of research. Scientific Quality will be approached by looking at the past performance between 2012 and 2017, based on the scientific outputs of the current members of the Unit. Societal Impact refers to the interaction between the Unit and wider societal audiences. Research Environment and Unit Viability consider the future prospects and operating culture of the Unit, with the aim of supporting development and renewal.

Scientific quality

The assessment of the scientific quality of the unit's research is based on the quality of the outputs during the assessment period (2012 – 2017). The criteria for assessing the quality of outputs are *originality and novelty, significance, and rigour*.

Originality and novelty are understood as the extent to which the output introduces a new way of thinking about a subject, or its distinctive or transformative nature compared to previous work. Significance implies the influence on an academic field or application, while rigour defines to what extent the purpose of the work is clearly articulated, the methodology is appropriately developed and/or applied, and compelling evidence has shown that the purpose has been achieved.

A variety of outputs, including producing and developing new concepts, methodologies, infrastructures

and other contributions to the research community will also be considered.

Each panel will explain within their reports how they have applied the criteria.

Societal impact

Research can make contributions and have many different kinds of effects and impact depending on the discipline. The expectations of society concerning the contributions of science are also different for different disciplines. The point is to assess contributions in areas that the Unit has itself designated as target areas.

The panel will assess how the Unit positions its research vis-à-vis broader issues, extending also beyond academia: whether potential stakeholders and audiences have been identified, and which research questions or results are

immediately relevant or could be relevant later. Other criteria, with different meanings in different disciplines, are the Unit's activities on valorisation (activities aimed at making results available and suitable for application) and dissemination and communication (activities aimed at making results widely known or providing stakeholders and different actors in civil society a window to current research and novel results). The Unit's approach to supporting and enabling the impact of its activities will also be considered.

Research environment and Unit viability

The assessment theme Research Environment and Unit Viability is approached here as a combination of the operating culture and the sustainability of the research base. The panel assesses the strategy that the Unit intends to pursue in the years ahead and the extent to which it is estimated to be capable of meeting its targets in research and society during this period.

The assessment considers the Unit's goal setting,

the actions taken to reach the goals and the follow-up measures. The sustainability of the research base refers to the analysis of the balance between the resources available and the goals and the strategies in the Unit. The assessment provides information on the renewal potential of the research carried out in the Unit.

Process and timetable

The assessment will be carried out during 2018–2019. The Research Assessment Office (RAO) schedules and manages the process, and gathers metric data. Unit-level results will be available for the UH 2021–2024 strategy process in spring 2019. The final report will be published by the end of year 2019.

WHAT?	WHO?	WHEN?
Data (metric) gathered from university data bases, e.g., TUHAT	RAO	3–5/2018
Analysis of data	RAO	3–5/2018
Data provided with a self-assessment template to the Units of Assessment	RAO	4–5/2018
Quality control of data	Unit & RAO	4–5/2018
Completion of the self-assessment	Unit	5–9/2018
Metric data and self-assessment reports delivered to the panels	RAO	9–11/2018
Consideration of assessment material, panel meeting and site visit, report drafts written	Panels	12/2018–2/2019
Assessment reports and recommendations compiled (Unit level, UH level)	RAO	2–4/2019
Strategic planning and decision-making, development work	Unit/Faculty/UH	3–6/2019

Assessment material

Metric data

Background data will be provided on the Unit's funding, personnel, publications and doctoral education. Those data will contribute to all assessment themes. The metric data will be compiled by the RAO and checked and completed in collaboration with the Unit before being submitted to the panels.

The performance of the Unit is measured against the mission and goals set by the Unit. Metric data and indicators are used to support qualitative expert assessment. For each set of metric data, the value, limitations and the context of use are recognised. This approach is in line with the Leiden Manifesto for research metrics.

Self-assessment

Self-assessment refers to the Unit's own assessment of its operations and development work. The Unit is asked open questions to guide them to reflect upon the research environment and unit viability. The Units will carry out the self-assessment by completing the self-assessment report in a template provided by RAO.

The self-assessment entails questions on the Unit's research profile and goals for scientific and societal impact. The Unit is also asked to describe its goal-setting procedures and follow-up measures. A part of the self-assessment is to discuss the support available for managing the research in the unit.

Recognising the Unit's own strengths and areas in need of development is a part of the self-assessment process. Following the enhancement-led philosophy, the Unit's capability of critical self-reflection will also be taken into account in the assessment carried out by the panels.

Site visit

The panel will conduct a site visit to UH, including an orientation, Unit interviews and a wrap-up meeting.

Units of Assessment

Units of Assessment (Unit) are deemed to be a collection of divisions or research groups, where common goals and development plans are, or could be, established. The results of the assessment should serve future decision-making in

the current organisation, and the organisational structures of today are thus proposed to be considered as the base for assessment.

Units will be defined and agreed upon in cooperation with the faculty/independent institute/joint operational unit management. The Units will cover all research fields and activities in the University of Helsinki.

Use of the results

The Units, Faculties and the University's leadership will review the reports and recommendations. After this, the Faculties and Independent Institutes will discuss development plans with the University's leadership. Further

actions will be agreed on the basis of these discussions. Follow-up measures are recommended to acquire feedback on the implementation of the assessment and its impact.

Management of the assessment project

Steering group and its mandate

The rector appointed the Steering Group on 21 November 2017 and assigned it to draw up the assessment plan and monitor the implementation of the assessment. The Steering Group decides on the assessment questions, the assessment material and its use, the panels, the Units of Assessment, and their allocation to the panels. The term of the Steering Group ends on 31 December 2019.

The Steering Group members:

- Chair, Vice-Rector, Professor Jouko Väänänen (until 31 July 2018); Vice-Rector, Professor Paula Eerola (from 1 August 2018)
- Professor Jaakko Kaprio
- Professor Pauli Kettunen
- Professor Atte Korhola
- Professor Jouko Lindstedt
- Professor Anne Pitkäranta, Vice-Chair
- Professor Marja-Liisa Riekkola
- Director of Research Affairs Ritva Dammert

Research Assessment Office

The Research Assessment Office (RAO) operates under University Services' Research Services, and consists of Project Manager Anssi Mälkki, two Senior Advisors Johanna Kolhinen and Riitta Väänänen, and Project Coordinator Maiju Raassina (née Hara). The Project Manager reports to the Vice-Rector for Research.

Appendix II

TERMS OF REFERENCE

The Steering Group of Research Assessment 2018–19, University of Helsinki hereby issues the following terms of reference to the assessment panels.

1 Background

Established in 1640 by Queen Christina of Sweden, the University of Helsinki is Finland's largest, oldest and internationally most esteemed research university. The University of Helsinki is among the world's top 100 universities (56th in the Shanghai rankings, 81st in the Taiwan rankings and 90th in the Times rankings), featuring either as the best or second best multidisciplinary university in the Nordic countries. With an international scientific community of 40,000 members, the University of Helsinki is a founding member of the League of European Research Universities (LERU).

The University of Helsinki's prominent role within the national university system is visibly emphasised in the 2016 analysis of the Academy of Finland (AoF), accounting for 26% of all scientific publications (with the percentage ranging between 25% and 54% in 11 out of the 15 disciplines analysed) and receiving 29% of all competitive research funding. The University of Helsinki's scientific excellence

is corroborated by its success in the most prestigious national calls, hosting 12 out of the 32 Academy Professors in Finland, as well as coordinating 7 of the 12 newly selected 2018–2025 Centres of Excellence. Its scientific quality and impact is further evidenced with 64 ERC grants, which comprise about 53% of the ERC grants received in Finland, and by hosting 48% of the Thomson Reuters' highly cited researchers in Finland in 2017.

The University of Helsinki has 11 faculties, several research-oriented institutes as well as units attending to the duties of a national authority. Our annual budget is approximately €700 million, 60% of which is core funding. According to Biggar Economics, the University of Helsinki's contribution to the economy in 2016 was €3.3 billion gross value added and 31,100 jobs, "playing a vital role in supporting long-term economic growth and ensuring that Finland maintains its competitive position in the global economy".

Within 2014–2017, the University secured €48 million in donations (well exceeding the €25 million target), with the impact of these donations further boosted by the governmental matched-funding scheme (up to three euros per each euro donated). Notable University of Helsinki alumni include Linus Torvalds, creator of the Linux operating system, and Bengt Holmström, recipient of the 2016 Nobel Prize in Economics.

The research at the University of Helsinki is assessed at regular intervals. The current assessment will take place in 2018–2019, and previous assessments were executed in 1999, 2005 and 2012. The assessment will focus on the academic quality and impact potential of research performed at University units, as well as their future potential and opportunities to develop operations. The assessment covers all research activities in the University. Unit-level results will be available in spring 2019, and the University-level report by the end of 2019.

2 Purpose and aim of the assessment

The purpose of the Research Assessment of the University of Helsinki is to reveal and confirm the quality and impact of research, assist in recognising future research prospects, and support renewal.

The aim of the assessment is to produce information that can be used for enhancing quality and supporting strategic decision-making at the University of Helsinki on unit, faculty and University levels. The assessment will give

vital input to the University of Helsinki's strategy process for the period 2021–2024.

3 Organisation of the assessment

The assessment is carried out by international peer review panels. The assessment process is managed by the Research Assessment Office and led by a steering group.

3.1 Steering Group

The rector of the University appointed the Steering Group and assigned it to draw up the assessment plan and to monitor the implementation of the assessment. The Steering Group decides on the assessment questions, the assessment material and its use, the panels, the Units of Assessment, and their allocation to the panels. The term of the Steering Group ends on 31 December 2019.

The Steering Group members are the following:

- Chair, Vice-Rector, Professor Jouko Väänänen (until 31 July 2018); Vice-Rector, Professor Paula Eerola (from 1 August 2018)
- Professor Jaakko Kaprio
- Professor Pauli Kettunen

- Professor Atte Korhola
- Professor Jouko Lindstedt
- Professor Anne Pitkäranta, Vice-Chair
- Professor Marja-Liisa Riekkola
- Director of Research Services Ritva Dammert

3.2 Research Assessment Office

The Research Assessment Office operates under University Services' Research Services and is responsible for carrying out the assessment project. The Research Assessment Office consists of Project Manager Anssi Mälkki, Senior Advisors Johanna Kolhinen and Riitta Väänänen, and Project Coordinator Maiju Raassina (née Hara). The Project Manager reports to the Vice-Rector for Research.

3.3 Units of Assessment

The assessment focuses on overall research activities in the Units of Assessment (Units). Units have been defined and

agreed upon in cooperation with the faculty/independent institute/joint operational unit management. The Units cover all research fields and activities in the University of Helsinki. Altogether there are 39 Units divided into four panels.

By definition, the Units of Assessment represent a collection of divisions or research groups, where common goals and development plans are, or could be, established. They are broadly based on existing departments and administrative units in the faculties and independent research institutes.

Major changes have recently taken place in the organisational structure of the University of Helsinki. The structure varies between faculties also in the amount of autonomy within the organisation of the faculties. The results of the assessment should serve future decision-making in the current organisation, and the Units of Assessment have been agreed in a way that reflects the current situation and enables the assessment of future prospects for the University.

3.4 Review Panels

Each of the four panels consist of highly regarded international experts that assess the Units' research during a four-day panel meeting and site visit in Helsinki. Each panel has an international chair and a group of 10–15 experts. Each panel will also include at least one representative familiar with the Finnish higher education sector who can assist in matters that require context-specific knowledge and insight.

A local “panel guide” will support the panel in practical matters during the visit.

The panels representing the areas of assessment:

- Humanities
- Life Sciences
- Natural Sciences
- Social Sciences

The allocation of the Units to the four panels is described in Appendix 3.

4 Carrying out the assessment

As a member of the expert panel, you will be asked to assess the quality and impact of the research conducted by the Unit as well as its goals and the extent to which the Unit is equipped to achieve them. You should do so by judging the Unit's performance according to the three assessment criteria listed below. In your analysis, please take into account the profile and goals of the Unit, current international trends and developments in science at large and in the field(s) you are assessing specifically, as well as in society beyond academia.

4.1 Assessment criteria

The three criteria for the assessment:

1. Scientific quality

Scientific quality is approached by looking at the past performance based on scientific outputs created by the current members of the Unit.

2. Societal impact

Societal impact refers to the interaction between the Unit and the wider societal audiences.

3. Research environment and Unit viability

Research environment and unit viability considers the future prospects and operating culture of the Unit and how they support development and renewal.

For each of the criteria, the Unit will be assigned a performance category. For a description of the categories, see Appendix 4.

The subject of assessment is the Unit's overall research activities, including the role of the management and leadership of the Unit in promoting the high quality and impact of research.

4.2 The role of the Panel

The panel members will serve as experts, and as such will

- Review the assessment material,
- Take part in panel meetings including the site visit, and
- Write the assessment reports concerning the Units assigned to the panel.

Please provide a written assessment on each of the three criteria and assign the Unit to a particular category. Evaluative comments are more valuable than descriptive phrases. In each case, the consistency between the category that is assigned and the written comments is particularly important. Please also provide recommendations for improvement. In this assessment, research outputs such as new or improved instruments, methodologies or new infrastructure developed by the Unit contribute to the quality of research. The assessment will be written on a report template provided with instructions by the Research Assessment Office.

4.3 Method of assessment

The necessary documentation will be available on the Eduuni workspace (Word online-based collaborative writing platform) no less than six weeks prior to the site visit. The documents will include at least the following:

- The Unit's self-assessment with appendices (see the Self-assessment template in Appendix 5)
- Background information and metric data on the Unit and Faculty
- Background information on the University of Helsinki

The background information and metric data have served as a basis for the Unit's self-assessment, which aims for constructive, critical self-reflection. Please note that the performance of the Unit is assessed in the context of the profile and goals set in the Unit. Metric data and indicators

are used to support qualitative expert assessment, as per the principles described in the Leiden Manifesto¹. For each set of metric data, the value, limitations and the context of use are recognised.

4.4 Panel meeting and site visits

The panel meeting and site visits at the University of Helsinki will take place on 11–15 March 2019. We will contact you about practical matters by the end of year 2018.

4.5 Operating principles

The panel must comply with the following operating principles and ethical guidelines in its work:

- Impartiality and objectivity: Panel members must take an impartial and objective approach towards the Unit, as well as recognise their position of power and the

responsibility related to it.

- Transparent and evidence-based assessment: The assessment must be based on Research Assessment 2018–19, University of Helsinki criteria as well as on material collected in connection with the assessment.
- Confidentiality: All of the information acquired during the process, except for that published in the final report, is confidential.
- Interaction: The assessment is carried out through good cooperation and interaction with the Unit.

Before embarking on your assessment work, you will be asked to sign a statement of impartiality/confidentiality agreement. In this statement, you declare any direct relationship or connection with the University of Helsinki.

5 Assessment report

will ask you to report your findings on two levels: the Unit report for each Unit and a Panel summary combining and reviewing results from all Units within a panel (see Appendix 3 for the allocation of the Units to each panel). Please include also strategic recommendations for the area of the panel as a whole.

The reports are to be drawn up in accordance with the Research Assessment 2018–19, University of Helsinki criteria and assessment report format. The reports for each Unit are a result of the collective work of the panel. Each panellist will take part in writing and commenting on a Unit report as well as contributing to the Panel summary led by the chair.

You should send the complete draft reports to the University of Helsinki Research Assessment Office no more than six weeks after the site visit. The reports will be checked for factual inaccuracies; if such inaccuracies are detected, you will be asked to revise the report.

¹ Hicks, Wouters, Waltman, de Rijcke, Rafols (2015). The Leiden Manifesto for Research Metrics, *Nature*, April 23, 2015.

6 Use of the results

The results and recommendations of the Research Assessment are based on the reports of the external review assessing the quality and impact of research as well as the viability of the Units. The assessment uses metric data, self-

assessment reports and site visits.

The Units, faculties and the University's leadership will review the reports and recommendations. After this, the faculties and independent institutes will discuss

development plans with the University's leadership. Further actions will be agreed on the basis of these discussions. We aim to provide feedback to the panellists of the results of the assessment.

Appendix III

UNITS OF ASSESSMENT, CODES AND PANELS

UNIT OF ASSESSMENT	RAUH code	Panel
Aleksanteri Institute, Faculty of Arts	HUM Unit 01	Humanities
Department of Cultures, Faculty of Arts	HUM Unit 02	Humanities
Department of Digital Humanities, Faculty of Arts	HUM Unit 03	Humanities
Department of Finnish, Finno-Ugrian and Scandinavian Studies, Faculty of Arts	HUM Unit 04	Humanities
Department of Languages, Faculty of Arts	HUM Unit 05	Humanities
Department of Philosophy, History and Art Studies, Faculty of Arts	HUM Unit 06	Humanities
Philosophy, Faculty of Social Sciences and Faculty of Arts	HUM Unit 07	Humanities
Faculty of Theology	HUM Unit 08	Humanities
Helsinki Collegium for Advanced Studies	HUM Unit 09	Humanities
Department of Agricultural Sciences, Faculty of Agriculture and Forestry	LS Unit 10	Life Sciences
Department of Food and Nutrition, Faculty of Agriculture and Forestry	LS Unit 11	Life Sciences
Department of Forest Sciences, Faculty of Agriculture and Forestry	LS Unit 12	Life Sciences
Department of Microbiology, Faculty of Agriculture and Forestry	LS Unit 13	Life Sciences
Ecosystems and Environment Research Programme, Faculty of Biological and Environmental Sciences	LS Unit 14	Life Sciences
Molecular and Integrative Biosciences Research Programme, Faculty of Biological and Environmental Sciences	LS Unit 15	Life Sciences
Organismal and Evolutionary Biology Research Programme, Faculty of Biological and Environmental Sciences	LS Unit 16	Life Sciences
Faculty of Medicine	LS Unit 17	Life Sciences
Faculty of Pharmacy	LS Unit 18	Life Sciences
Faculty of Veterinary Medicine	LS Unit 19	Life Sciences
Finnish Museum of Natural History LUOMUS	LS Unit 20	Life Sciences

UNIT OF ASSESSMENT	RAUH code	Panel
HiLIFE Joint Activities and Infrastructure, HiLIFE Helsinki Institute of Life Science	LS Unit 21	Life Sciences
Institute for Molecular Medicine Finland (FIMM), HiLIFE Helsinki Institute of Life Science	LS Unit 22	Life Sciences
Institute of Biotechnology (BI), HiLIFE Helsinki Institute of Life Science	LS Unit 23	Life Sciences
Neuroscience Center (NC), HiLIFE Helsinki Institute of Life Science	LS Unit 24	Life Sciences
Department of Chemistry, Faculty of Science	NS Unit 25	Natural Sciences
Department of Computer Science, Faculty of Science	NS Unit 26	Natural Sciences
Department of Geosciences and Geography, Faculty of Science	NS Unit 27	Natural Sciences
Department of Mathematics and Statistics, Faculty of Science	NS Unit 28	Natural Sciences
Department of Physics and Helsinki Institute of Physics (HIP), Faculty of Science	NS Unit 29	Natural Sciences
Institute for Atmospheric and Earth System Research (INAR), Faculty of Science	NS Unit 30	Natural Sciences
Department of Economics and Management, Faculty of Agriculture and Forestry	SOC Unit 31	Social Sciences
Ruralia Institute, Faculty of Agriculture and Forestry	SOC Unit 32	Social Sciences
Faculty of Educational Sciences	SOC Unit 33	Social Sciences
Faculty of Law	SOC Unit 34	Social Sciences
Economics, Faculty of Social Sciences	SOC Unit 35	Social Sciences
Politics, Media and Communication, Faculty of Social Sciences	SOC Unit 36	Social Sciences
Social Research, Faculty of Social Sciences	SOC Unit 37	Social Sciences
Society and Change, Faculty of Social Sciences	SOC Unit 38	Social Sciences
Swedish School of Social Science	SOC Unit 39	Social Sciences

Appendix IV

ASSESSMENT CRITERIA

Category	Scientific quality	Societal impact	Research environment and Unit viability
EXCELLENT	The Unit has outstandingly strong research, with world leading qualities. The Unit has a track record of multiple discoveries, creative findings or conceptual openings.	In the Unit, there is clear understanding of the role and positioning of their research in society. The Unit has identified audiences and stakeholders as well as activities to reach them. The outcomes provide convincing evidence.	The Unit is excellently positioned for the future. Operations and procedures are of outstanding quality, transparent and comprehensively shared in the Unit.
VERY GOOD	The Unit conducts very good, also internationally recognised research. The Unit has a track record of solid discoveries, findings or openings.	In the Unit, there is understanding of the role and positioning of their research in society. The Unit has identified audiences and stakeholders. There are activities to reach them and proof of successful outcomes.	The Unit is very well positioned for the future. Operations and procedures are of very good quality, transparent and shared in the Unit.
GOOD	The Unit conducts good research in terms of scientific standard, mainly national but possessing potential of international recognition.	Activities and outcomes exist but not in a consistent manner. The Unit has not yet developed understanding of the role and positioning of their research in society or identified audiences and stakeholders.	The Unit is adequately positioned for the future. Operations and procedures are of good quality and shared occasionally in the Unit.
WEAK	The Unit does not achieve sufficient results in its field.	Audiences and stakeholders have not been identified and there is only little activity or outcomes. The Unit has not defined their role or positioning in society.	The Unit is not adequately positioned for the future. Operations and procedures are not systematic in the Unit.

Appendix V

SELF-ASSESSMENT REPORT TEMPLATE

INSTRUCTIONS

Self-assessment refers to the Unit of Assessment's (Unit) own assessment of its operations and their development. Within your Unit you can choose how to carry out your self-assessment and write the report.

The report must be structured according to the headings listed below, but you can freely decide on the use of any sub-headings.

In the report, you are expected to carry out as reflective a self-assessment as possible, identify areas in need of development and provide a concrete description of the operations and results.

The first part of the report focuses on background information. The core of the self-assessment is the second

part: the description of the organisation, profile, mission and goals of the unit. The Unit's performance and operations are primarily assessed against those measures. Self-assessment includes reflection on the strengths and weaknesses of the described actions. Supporting metric data will be provided on funding, personnel, publications and other outputs as well as on doctoral research (see Appendix 1*, *by Research Assessment Office latest on 15 August 2018*). In section three you will provide a short description of the self-assessment process in your Unit.

It is important to reflect upon the research and the research environment in a nuanced way in order to have a truly useful basis for further development. The panels will

also value the Unit's capacity for critical self-reflection. This means that the panels are asked to focus on the Unit's readiness to deal with possible deficiencies, e.g., by describing already taken or planned actions, rather than the deficiencies per se. In accordance with enhancement-led evaluation, self-evaluation is primarily a tool for improving operations.

The suggested length of the report is approximately in total 15 (-20) pages, depending on the complexity of the Unit, including the number of subunits. NB! Excluding pictures and Part I (Basic information)

* References to appendices in Self-assessment report template do not correspond with appendices in this publication.

1 BASIC INFORMATION (1-2 PAGES)

1.1 Organisation and profile

- a. Please outline the scientific profile of the Unit. What are the main contents and focus areas of the research carried out in your Unit? What is the rationale behind the choices? Please fill in the list of Professors in the Unit (Appendix 2) with keywords and areas of interest.
- b. Please provide a concise description of the Unit's organization and composition (departments, divisions, subunits, disciplines/sub disciplines, research centres, The Academy of Finland's Centres of Excellence etc.).
- c. Please specify any specific (national) tasks, roles or responsibilities the Unit has or which have an effect, e.g., on its priorities for research targets or resource allocation.
- d. Please provide a short summary of the history of the Unit.

1.2 Key figures

*(provided by Research Assessment Office)
(Key indicator information on funding, personnel,
publications, Academy Professors, Centres of Excellence and
ERC funded projects)*

1.3 Key achievements during the assessment period

Top five achievements in the Unit in 2012–2018, highlighting the scientific and societal impact of the Unit.

2 SELF-ASSESSMENT

(approximately 15 pages)

In this section you should focus on describing and self-assessing your Unit's activities following the three assessment themes: *scientific quality*, *societal impact*, and *research environment and Unit viability*. The descriptions and reflections on strengths and weaknesses will provide

a base for the external assessment carried out by the international panellists.

In the case of a recently reorganised or completely new organisation, the Unit can focus more on describing future plans or on-going work, including how to deal with issues if procedures are not yet in place. It is important to

give a realistic view of the activities or development plans for the external panellists to facilitate useful feedback for future development. This applies to all of the following self-assessment themes.

2.1 Scientific quality

In the Scientific quality part you should first *describe the main research goals set in or for the Unit*. The description may entail short-term and long-term goals and targets of the past, present and future depending on the history of your Unit. In the case of a new organisation, you can focus on describing future goals instead of past ones.

At the University of Helsinki the goals can be set on the Faculty level, Unit level or even the subunit/group level. If your Unit follows the goals set on the Faculty level, you can refer to the Faculty-level descriptions collected elsewhere. Please note also that the goal-setting **procedures** are described and analysed in Part 3: Research environment and Unit viability.

Secondly, you are asked to *provide a self-reflection on research results and the metric data considering the research outputs*, mainly publication activities, in relation to

your goals and level of ambition.

Thirdly, you should *provide an example of an international benchmark* unit or institute you wish to use and a short explanation of the choice.

Research goals

- a. What are the current research goals in your Unit? Where do you aspire to be in 5–10 years' time with your research? Please take also into consideration the University of Helsinki Strategy 2017–2020 in your current goal description. What were the main goals before the current strategy period (if applicable)?
- b. Please explain the rationale for the selection of your goals, in terms of contribution to the scientific body of knowledge.

Research results

Name and describe some of the most important results of the research carried out in your Unit during the assessment period and provide relevant justifications on why those have been selected. Results are often answers to a research problem or research question. You can assess the significance of a result (Why is the result significant?), for example, from the perspective of scientific novelty, societal impact and/or relevance, or the further use and applicability of the data/methods.

The effects and impact of the results are described in more detail under the section Societal impact.

Scientific and other publications, IPRs and other outcomes related to the results are reported separately in Question 3 in the section Scientific quality and Question 2

in the section Societal impact. In this section, it is enough to refer to the outputs reported in the following questions when applicable.

Analysis on research outputs

Please refer to the metric data in the analysis.

- a. Comment upon your research outputs and indicators (research articles, scientific/scholarly books as listed in Appendix 1) with regard to productivity, citations and publication channels as well as the number of doctoral degrees. Please feel free to provide other field-specific

indicator information here, if relevant. Noticeable changes over time? Potential for improvement?

- b. Please provide examples of the top publications in your Unit in the assessment period 2012–2017, with a link to the publication if possible. Please use Appendix 3 for the list of top 10 publications. Here you can choose a maximum of 10 publications that showcase the scientific output of your Unit.
- c. Assessed against your own goals, how well do the outputs match your goals and level of ambition?

International benchmark(s)

Provide an example from an institution outside of Finland you appreciate and would consider appropriate as a benchmark for your Unit in terms of activities, profile and standing in the scientific community. Include a short explanation of your choice.

2.2 Societal impact

In Part 2.2 Societal impact you should *provide a description of your target areas for societal impact, the potential stakeholders and audiences as well as the research questions relevant to them*. Research can make contributions and have many different kinds of effects and impacts depending on the discipline. The point is to assess contributions in areas that the Unit has itself designated as target areas. Here you are also asked to *describe the goals set in the Unit for societal impact*.

After that you should *describe the activities* aimed at making the Unit's research available to wider audiences beyond academia. Finally, you should *present the main outcomes of such activities*.

Please note that this part requires some data collection in your Unit. Answering the questions below may involve indicator, output and outcome information not collected

jointly at the University of Helsinki at the moment. Please ask the Research Assessment Office for supporting data if needed.

Target areas, audiences, research questions and goals

- a. What are the target areas set for societal impact in your Unit?
- b. Who are the potential stakeholders and audiences beyond academia that you have identified could benefit from your research results and skills?
- c. Which research questions in your research areas have you recognised as being or having the potential to become relevant to the identified stakeholders and audiences?
- d. What are the goals related to your societal impact target areas? Consider also the past and future long-term targets in the Unit (if applicable).

- e. Please explain the rationale for your selection [of the Societal impact goals] in terms of their link to your research and its wider contribution and impact in society

Activities and outcomes

- a. What are the activities related to the valorisation, dissemination and communication of research outputs in your Unit? Please give examples and provide evidence/data from recent years as appropriate. Please ask for supporting data from the Research Assessment Office if needed.
- b. What are the key outcomes of your societal impact activities? (See Appendix 4 for examples.)
- c. Assessed against your own goals, how well do the outcomes match your goals and level of ambition?

2.3 Research environment and Unit viability

Recognising the Unit's own strengths and areas in need of development is a part of successful self-assessment. In Part 3: Research environment and Unit viability you should focus on describing and self-assessing the operating culture and sustainability of the research base. In short, this means the activities you have or plan to have in place for developing your research. At the core of the assessment is the balance between the resources available and the goals and strategies in the Unit. You should take into consideration the profile, organisational history and structure of the Unit, especially recent changes, when describing the activities.

Here you should provide a description of the *Unit's goal-setting procedures, the actions taken to reach the goals and the follow-up measures as well as development activities*. Please refer to previous research assessments at the University of Helsinki if suitable for your Unit. For assessing the sustainability of the research base, you should *describe and analyse the resources* (human, financial and infrastructure) of the Unit, as well as *collaborations and societal or contextual factors* effecting the Unit's performance.

Leadership, goal setting and follow-up

- a. Please describe how the formal and informal leadership and management practices are organised within the Unit and with the Faculty (if applicable). Explain the roles of different actors (boards, heads, leaders, informal structures etc.) in the organisation.
- b. What kind of support does the Faculty or the University of Helsinki provide to leadership in the Unit? What are the strengths and weaknesses of the support? What kind

of needs for support do you have?

- c. Please provide a description of the goal-setting procedures in the Unit. What are the strengths and weaknesses of the chosen procedures?
- d. What kind of procedures do you have to track the progress towards reaching the goals? Please give examples of methods of monitoring success and tracking development in the Unit. These can be quantitative (e.g., indicators) or qualitative measures (feedback methods, discussion events, seminars, regular meetings etc.). Here you can refer to the previous Research Assessment 2010–2012 findings and the actions taken after it, if suitable.
- e. What kind of development activities have you done in your Unit based on the follow-up measures? What are the strengths and weaknesses of your development activities?
- f. Please describe how individual researchers receive feedback on their performance.

Human resources, careers and recruitment

- a. Describe the personnel structure and the roles of each personnel group in the Unit. What are the strengths and weaknesses? Please refer to the metric data (Appendix 1) in the analysis.
- b. How are you working to support researchers in their career (researchers in all phases of their career)?

How are you currently working to ensure that recruitment contributes to the high quality and sustainability of research and renewal? How appealing are the career and

development possibilities in your unit for different personnel groups? How do you make sure your personnel structure is well prepared for the future?

Researcher education

- a. Please describe the practices of agreeing on the research topics and questions for doctoral thesis work. How are the doctoral students recruited and selected in your Unit?
- b. What is the role of doctoral students in the research of the Unit?

How do you integrate the doctoral students into the community and research activities? How do doctoral students receive feedback about their progress?

Research infrastructure (if applicable)

- a. Please describe the research infrastructure you have or that is available for the Unit. How well does the infrastructure serve your research purposes?
- b. How are you working to maintain and develop the research infrastructure in order to support high-quality research and renewal?

Funding

- a. Please describe your current funding situation and strategy. You can refer to the metric data in Appendix 1.
- b. On what basis is the portfolio of different funding sources selected? What are the strengths and weaknesses of the chosen strategies? How well balanced is the portfolio, considering the research goals of the Unit?

- c. How do you work to secure funding, including predictable and sustainable funding from different sources?

Collaboration

- a. Please describe what kind of research collaboration and networks there are in the Unit
- i. within the University of Helsinki,
 - ii. nationally with other Universities in Finland, and
 - iii. internationally.

These may include, e.g., cross-border and interdisciplinary collaborations.

- b. What kind of future plans have been made in relation to developing internal and external collaboration? What are the strengths and weaknesses of the current situation?

Connections with “other constellations” (optional, if applicable)

- a. Please describe the relationship and connections with relevant joint operational units (INAR, HELSUS), the Helsinki Institute of Life Sciences (HiLIFE), the Helsinki Collegium for Advanced Studies (HCAS) or other relevant constellations within the University of Helsinki (if applicable).

- b. What are the strengths and weaknesses of the cooperation?

Societal and contextual factors

- a. Please reflect on relevant factors/developments over the past five to six years. What kind of changes have or might influence the performance of the Unit in some way?
- b. Please give a forecast of the most important trends and developments for the coming years.

2.4 Organisation of the work of carrying out the self-assessment

Please describe briefly how you have organised the work of carrying out the self-assessment in the Unit.

Appendix VI

SELF-ASSESSMENT QUESTIONS FOR THE FACULTY

1 Organization

- Description of the Faculty's organization and composition (departments, divisions, subunits, disciplines/sub disciplines, research centres, etc.)
 - Short summary of the history of the Faculty's internal structure.
 - Specific (national) tasks, roles or responsibilities the Faculty has or which have an effect, e.g., on its priorities of research targets or resource allocation.
-

2 Scientific Quality: Goals

- Shared research goals in the Faculty – link to UH strategy.
-

3 Societal impact: Goals

- Shared goals related to societal impact in the Faculty.
-

4 Leadership, goal-setting and follow-up

- Description of the forms leadership and management practices within the Faculty, which are shared between the Units of Assessment. Explain the roles of different actors (discussion fora, preparatory groups, other academic leaders etc.).
- Description of the goal-setting procedures in the Faculty.
- What kind of procedures do you have for following progress towards reaching the goals? Please provide examples of ways of monitoring success and tracking development in the Faculty. Here you can refer to the previous Research Assessment 2010-2012 findings and actions taken after it, if suitable.

Appendix VII

UNIT ASSESSMENT REPORT

INSTRUCTIONS

This is the assessment report template for Research Assessment 2018 – 19 University of Helsinki. Please use the following structure in reporting the findings and recommendations for the Unit.

The structure of the report template follows the self-assessment report completed by the Unit. Please see

also the Terms of Reference and Criteria for more detailed instructions on carrying out the assessment.

The assessment work starts with reading and analysing the assessment material of the Unit. The first draft of the report is written based on the assessment material latest 1st of March 2019 on this template. The initial findings

of the report draft are confirmed and reassessed during the site-visit 11th – 15th of March 2019.

The final report should be completed no later than six weeks after the site-visit, by 1st of May 2019.

The suggested length of the report is approximately in total 5-10 pages

1 SUMMARY

1.1 Description of the use of criteria

Please describe how the RAUH criteria has been interpreted and used in the panel.

1.2 Assessment summary

A short and concise summary of the assessment of the Unit in general. The summary should be based on the three assessment themes and conclude the main remarks of each theme. The summary should include the key strengths and

areas of development of the Unit. Please provide also a set of recommendations for the Unit, how to improve their research activities, enhance quality and support renewal.

- Strengths
- Development areas
- Recommendations

2 ASSESSMENT OF THE UNIT

2.1 Scientific quality

Instructions

Scientific quality is approached by looking at the past performance of the staff, based on scientific outputs created by the current members of the Unit. The criteria for assessing the quality of outputs are originality and novelty, significance, and rigour. The key issues are:

- The extent to which the output introduces a new way of thinking about a subject, or its distinctive or transformative nature compared to previous work (originality and novelty),
- the influence on an academic field or application (significance),

- to what extent the purpose of the work is clearly articulated, the methodology is appropriately developed and/or applied, and compelling evidence has shown that the purpose has been achieved (rigour).

	EXCELLENT	VERY GOOD	GOOD	WEAK
SCIENTIFIC QUALITY	The Unit has outstandingly strong research, with world leading qualities. The Unit has a track record of multiple discoveries, creative findings or conceptual openings.	The Unit conducts very good, also internationally recognised research. The Unit has a track record of solid discoveries, findings or openings.	The Unit conducts good research in terms of scientific standard, mainly national but possessing potential of international recognition.	The Unit does not achieve sufficient results in its field.

Caption

- Main conclusions and rationale behind the grading
- Strengths and weaknesses of the Scientific quality

GRADING

Feedback of the Panel

Please analyse and reflect the following topics based on the assessment material and site-visit.

Research goals

- Research goals in the Unit (past, current, future)

- Rationale for the selection of the goals in the Unit

Research results

- Most important results chosen by the Unit
- Significance of the results e.g. from the perspective of scientific novelty, societal impact and/or relevance, or the further use and applicability of the data/methods.

NOTE: Scientific and other publications, IPRs and other outcomes related to the results are reported separately in self-assessment section *Analysis on research outputs* and *Activities and outcomes*.

Analysis on research outputs

- Research outputs and indicators (research articles, scientific/scholarly books, doctoral degrees etc. as listed in Appendix 1*) in the Unit
- Reflection on how well do the outputs match the Unit’s goals based on its self-reflection

International benchmark(s)

- Selection of benchmarks in the Unit
- Unit’s rationale behind the choices

2.2 Societal impact

Instructions

In this assessment, we understand societal impact referring to the interaction between the Unit and the wider societal audiences. The key issues are:

- Whether potential stakeholders and audiences have been

identified, and which research questions or results are immediately relevant or could be relevant later,

- the Unit’s activities on valorisation (activities aimed at making results available and suitable for application) and dissemination and communication (activities aimed at

making results widely known or providing stakeholders and different actors in civil society a window to current research and novel results),

- outcomes providing evidence of successful societal impact activities.

	EXCELLENT	VERY GOOD	GOOD	WEAK
SOCIETAL IMPACT	In the Unit, there is clear understanding of the role and positioning of their research in society. The Unit has identified audiences and stakeholders as well as activities to reach them. The outcomes provide convincing evidence.	In the Unit, there is understanding of the role and positioning of their research in society. The Unit has identified audiences and stakeholders. There are activities to reach them and proof of successful outcomes.	Activities and outcomes exist but not in a consistent manner. The Unit has not yet developed understanding of the role and positioning of their research in society or identified audiences and stakeholders.	Audiences and stakeholders have not been identified and there is only little activity or outcomes. The Unit has not defined their role or positioning in society.

* References to appendices in Unit Assessment report template do not correspond with appendices in this publication.

Caption

- Main conclusions and rationale behind the grading
- Strengths and weaknesses of the Societal impact

GRADING

Feedback of the Panel

Please analyse and reflect the following topics based on the assessment material and site-visit.

Target areas, audiences, research questions and goals

- Identifying target areas, audiences, research questions and goals
- Unit’s rationale for the selection of the choices

Activities and outcomes

- Activities of valorisation, dissemination and communication
- Societal impact outcomes as evidence

- Reflection on how well do the outcomes match the Unit’s goals based on its self-reflection

2.3 Research environment and Unit viability

Instructions

Research environment and unit viability considers the future prospects, by assessing the operating culture of the Unit and how they support development and renewal. The key issues are:

- The Unit’s goal setting, the actions taken to reach the goals and the follow-up measures
- the sustainability of the research base: analysis of the balance between the resources available and the goals and the strategies in the Unit,
- renewal potential of the research carried out in the Unit.

	EXCELLENT	VERY GOOD	GOOD	WEAK
RESEARCH ENVIRONMENT AND UNIT VIABILITY	The Unit is excellently positioned for the future. Operations and procedures are of outstanding quality, transparent and comprehensively shared in the Unit.	The Unit is very well positioned for the future. Operations and procedures are of very good quality, transparent and shared in the Unit.	The Unit is adequately positioned for the future. Operations and procedures are of good quality and shared occasionally in the Unit.	The Unit is not adequately positioned for the future. Operations and procedures are not systematic in the Unit.

Caption

- Main conclusions and rationale behind the grading
- Strengths and weaknesses of the Research environment and Unit viability

GRADING**Feedback of the Panel**

Please analyse and reflect the following topics based on the assessment material and site-visit.

Leadership, goal setting and follow-up

- Formal and informal management practices, roles of different actors
- Goal-setting and follow-up at the Unit level as well as the feedback and development activities
- Analysis of the Faculty/UH level support needs in the Unit

Human resources, careers and recruitment

- Personnel structure and the roles of each personnel group in the Unit (see metric data in Self-Assessment Appendix 1)

- Career support for researchers
- Recruitment practices

Researcher education

- Recruitment of doctoral students, the Unit's role, see also the Faculty level self-assessment report
- Agreeing on research topics and thesis work
- Integrating the doctoral students into the research community

Research infrastructure (if applicable)

- Unit's reflection on usability of the infrastructure
- Maintaining and developing the infrastructure

Funding

- Selection of funding sources, How well balanced is the portfolio, considering the research goals in the Unit (see metric data in Self-Assessment Appendix 1)
- Ways of securing the funding, including predictability and sustainability

Collaboration

- Different forms of collaboration (UH, national, international, cross-border, interdisciplinary), how well connected is the Unit in its field, strengths and weaknesses of the situation
- Plans to develop collaboration

Connections with 'other constellations' (optional, if applicable)

- Cooperation and relationship with relevant joint operational units and other constellations within UH
- Strengths and weaknesses of the cooperation

Societal and contextual factors

- Any other factors or changes the Unit mentions influencing the performance of the Unit in some way
- Units forecast on most important trends and developments for the coming years

Appendix VIII

PANEL ASSESSMENT REPORT

INSTRUCTIONS

This is the panel report template for Research Assessment 2018 – 19 University of Helsinki. Please use the following structure in reporting the findings and recommendations from the panel. The panel report should be understandable without reading the reports of the Units of Assessment (Units).

The final panel report should be completed no later than six weeks after the site-visit, by 1st of May 2019.

The suggested length of the report is approximately in total about 5-10 pages.

PANEL ASSESSMENT

1 Overall assessment

A short and concise summary of the assessment by the panel.

After a brief introductory statement and general conclusions, the overall assessment should also include the

main findings and conclusions across the Units, organised under the three assessment themes:

- Scientific quality
- Societal impact

- Research environment and viability

The overall assessment of each theme may include examples from and references to the Units as appropriate.

2 Strengths and development areas

Short introductory text to this section, including both sections 2.1 and 2.2. You can include brief introductions also or in those subsections if you wish.

2.1 Key strengths and highlights

Key strengths areas per assessment theme as recognised by the panel. You should aim at a synthesis of the findings

instead of repeating lists of observations.

- Scientific quality
- Societal impact
- Research environment and viability

2.2 Development areas

Key development areas per assessment theme as

recognised by the panel. You should aim at a synthesis of the findings instead of repeating lists of observations.

- Scientific quality
- Societal impact
- Research environment and viability

3 Good practices and recommendations

3.1 Good practices

Selection of good practices arising from the assessment material and site-visit.

A good practice can be a single event, process, procedure or a way of operating that enhances quality and renewal. The scale of the practice does not matter, small and

local ideas can be fruitful to the larger audiences, too. Please choose examples that have potential of enhancing learning between the Units.

3.2 Recommendations

Set of recommendations from the panel.

A recommendation is a suggestion of how to improve the research activities, enhance quality and support renewal in the Units within the panel. The number of recommendations is up to the panel to decide.

Appendix IX

ASSESSMENT GUIDELINES

1 PURPOSE AND AIM OF THE ASSESSMENT

The purpose of the Research Assessment of the University of Helsinki (UH) is to reveal and confirm the quality and impact of research, assist in recognising future research prospects, and support renewal. The aim of the assessment is to produce information that can be used for enhancing quality and supporting strategic decision-making at the University of Helsinki on unit, faculty and University levels. The assessment will give vital input to the University of

Helsinki's strategy process for the period 2021–2030.

The Units of Assessment (Unit) are Faculties, Institutes, Departments, disciplines or combinations of disciplines, where common goals and development plans are, or could be, established. They are mainly based on existing administrative units.

Background, purpose and aim, organisation and carrying out the assessment are described in detailed in

Terms of Reference and its appendices (see Annex 1)*.

As a member of the expert panel, you will be asked to assess the quality and impact of the research conducted by the Unit as well as its goals and the extent to which the Unit is equipped to achieve them. The three criteria for the assessment are scientific quality, societal impact and research environment and unit viability.

* References to annexes and appendices in Assessment guidelines document do not correspond with appendices in this publication.

2 UNIT ASSESSMENT MATERIAL, UNIVERSITY OF HELSINKI MATERIAL AND ADDITIONAL MATERIAL

2.1 List of the material

As a member of the expert panel, you will be asked to carefully read all assessment material for each Unit you assess. The assessment material for each Unit includes:

- Unit self-assessment report (SAR), including
 - Descriptive part (text)
 - Metric data (SAR Appendix 1)
 - List of professors (SAR Appendix 2)
 - List of TOP10 publications (SAR Appendix 3)
 - Optionally: additional Figures and Tables
- Publication analysis carried out by the
 - Center of Science and Technology Studies (CWTS), Leiden University, OR
 - Helsinki University Library (HULib), OR
 - both

- Faculty self-assessment report (SAR) for Units belonging to Faculties (see Annex 1 for Unit codes and names):
 - Life Sciences panel (LS) Units 10, 11, 12 and 13; Social Sciences panel (SOC) Units 31 and 32: Faculty of Agriculture and Forestry SAR
 - LS Units 14, 15 and 16: Faculty of Biological and Environmental Sciences SAR
 - Humanities panel (HUM) Units 01, 02, 03, 04, 05, 06 and 07: Faculty of Arts SAR
 - Natural Sciences panel (NS) Units 25, 26, 27, 28, 29 and 30: Faculty of Science SAR
 - SOC Units 35, 36, 37 and 38; HUM Unit 07: Faculty of Social Sciences SAR

- HiLIFE Helsinki Institute of Life Science self-assessment report for Units belonging to HiLIFE
 - LS Units 21, 22, 23 and 24

In addition, you will be asked to carefully read the UH material which includes:

- University of Helsinki General Information
- University of Helsinki Strategy 2017-2020

You will also get additional material which you can utilize at your own will. This material is provided mostly as a list of websites.

2.2 Unit self-assessment report

General remarks

The Units were instructed to use the self-assessment report template (See Annex 2) and to follow the guidelines given in it. The Research Assessment Office (RAO) provided Key figures and checked that all parts had been covered. Small variations in the structure were allowed. Units are fully responsible for the content of their report text.

Appendix 1 Metric data

The assessment period extends from 2012 to 2018. Staff, funding, degree and selected projects statistics were produced for 2013-2017 and publication statistics for 2012-17. Bibliometric analysis was based on 2012-16 publications. Staff and funding were estimated for 2018. The source of all data was UH databases. Helsinki University Library HULib was responsible for processing publication data and RAO other data.

The aim was to produce metric data to support the future-looking orientation of the assessment. Ideally data for the assessment period should be reliable, uniform and equal for all Units. However, during the assessment period the UH organization has changed. The Units mainly follow the new 2018 organization whereas UH statistics for the assessment period were available for the previous organization. As a result, staff, funding and affiliation-based publication statistics for the assessment period are not available for the changed or new Units. This applies to about 50% of the Units in the Faculties of Arts, Agriculture and Forestry, Biological and Environmental Sciences, Social Sciences and Science. To ensure data reliability over the assessment period, Faculty statistics are presented as past reference

data for all Units in the above-mentioned Faculties.

Statistics on selected projects and on author-based publications were compiled for each Unit. The Faculties of Theology, Medicine, Pharmacy and Veterinary Medicine, Independent Institutes Finnish Museum of Natural History LUOMUS and Helsinki Collegium for Advanced Studies, and the Swedish School of Social Science are each assessed as a single Unit. Internal organization changes at these Units did not impact metric data collection. Tables and Figures presenting staff, funding, affiliation-based publications and degree statistics refer to the Faculty or the Institute name, in order to separate them from statistics compiled separately for each Unit.

HiLIFE started as a new independent institute in 2017. Previously independent Institute of Biotechnology (BI), Institute of Molecular Medicine Finland (FIMM) and Neuroscience Center (NC) joined HiLIFE as operative units, and are here assessed as separate Units. Previously independent organizational unit Laboratory Animal Centre (LAC) joined HiLIFE as infrastructure. In this assessment it is a part of HiLIFE Joint Activities and Infrastructure Unit (LS Unit 21). BI, FIMM and NC were independently managed for the main part of the assessment period and Unit staff and funding statistics are presented for these Units separately. However, BI, FIMM and NC publication statistics for 2017 could not be extracted from HiLIFE statistics. Therefore, HiLIFE affiliation-based publication statistics are presented in addition to Unit author-based statistics for these units. Before 2017 HiLIFE Joint Activities and Infrastructure Unit staff statistics consist of LAC staff. Unit funding statistics

for 2013-2017 include LAC incomes, and for years 2015-2016 also funding for the forthcoming HiLIFE.

From 2018 on, data in UH databases are available for the current organization, i.e. the Units of this assessment except for HUM Unit 07 Philosophy, which is a Unit formed temporarily only for research assessment purposes. Staff and funding 2018 are presented for each Unit acknowledging that the figures are estimates, because data were collected before the end of the year. It is also acknowledged that figures for only one year give a limited representation of the Unit. Faculty figures are presented alongside Unit figures in cases when a Unit belongs to a Faculty. Correspondingly, HiLIFE figures 2018 are presented alongside the figures of its operational Units.

Staff categories and titles. UH has a human resources policy which defines staff titles. These are summarized in Unit SAR Appendix 1. Title Professor occurs at teaching and research staff Levels 3 and 4. Tenured professors are at Level 3 whereas full professors are at Level 4. In the metric data the job title of a Tenure track position is Assistant professor or Assistant professor, second term, translated from the Finnish terminology. The latter corresponds to Associate professor. Both titles are used in parallel in SARs. Category Other staff includes all others but teaching and research staff (e.g. IT, library, technical, administrative and other support and specialist staff). Research assistants and teaching assistants belong to this group.

Definition of Unit staff and Unit affiliated staff. Staff statistics for 2018 was generated based on the number of work contracts and co-employee contracts on 1st March

2018 at the Unit. At the UH, work contract has one unit even when the work of the person is divided between two or several units. Persons with affiliation in more than one unit were included in the staff 2018 lists of all involved Units. Information on double affiliation was collected from the Units and are presented as Unit affiliated staff in statistics. There is variation in the completeness of these data, and the statistics are not fully uniform across Units.

Co-employees are researchers who are not UH employees but are permitted to utilize UH facilities through signing a contract with the Faculty/unit. The figures of co-employees are less comprehensive than the figures of employees.

International staff. Other nationalities but Finnish were categorized as international staff. Staff members who now have Finnish or double nationality but previously have had other nationality than Finnish could not be identified as international staff.

Funding. The funding 2018 is the income budget for year 2018. The external funding budget was updated on 1st September 2018 and the governmental core funding budget on October 2017. At the UH, governmental core funding is administered at Faculty and Independent Institute level. Governmental core funding budget in Units belonging to a Faculty or HiLIFE is an estimate of expenses allocated to the Unit. The estimation was done by the Faculties and HiLIFE and the estimation method of Unit governmental core funding may vary.

Affiliation-based and author-based publication statistics. Two separate publication statistics are presented. For Unit publication statistic we used staff 2018 lists to compile the author-based publication statistic for 2012-17. This statistic includes publications 2012-17 of Unit staff 2018 (and Unit affiliated staff 2018 when applicable) where at least one author of the publication had a contract (or double affiliation when applicable) with the Unit on 1st March 2018, and the affiliation of the publication is UH. Faculty and Independent institute publication statistics include publications 2012-17 where the affiliation of at least one author is the Faculty or Independent institute, and is referred to as affiliation-based statistics.

Selected projects. Academy professors, ERC grants and Academy of Finland Centres of Excellence are regarded among the most prestigious funding instruments. Statistics on selected projects present the number of ongoing projects at the Unit. Academy of Finland Centres of Excellence figures include Centres of Excellence coordinated within the Unit. Units may host a research group that is a partner of Academy of Finland Centre of Excellence. These are not included in the figures because uniform data was not available.

Degrees and granted permits to pursue doctoral degree. At the UH, Faculties grant degrees and the permits to pursue degrees. These statistics are thus provided at Faculty level only. Some degree programs have a close linkage to a certain Unit. Units may present their own

estimate on degrees 'belonging' to their Unit. The Swedish School of Social Science only grants first-cycle degrees. At the UH, second-cycle Master's degree is 120 credits in scope except in Psychology, 150 credits. The second-cycle degree is Licentiate's degree in Medicine (360 credits), Dentistry (330 credits) and Veterinary Medicine (180 credits). First-cycle degrees are 180 credits in scope.

Appendix 2 List of professors

RAO provided a list of professors and assistant professors who had an employment contract with the UH at the Unit on 1st March 2018. Units updated the list to correspond the situation in September 2018.

Appendix 3 TOP10 publications

Each Unit was instructed to choose a maximum of 10 publications to showcase the scientific output of the Unit. There were no further instructions on how to make the selection and these need not be, e.g., the most cited publications. As a member of the expert panel, you are not expected to review them as they already are peer-reviewed. The term 'TOP10 publications' in here does not refer to the bibliometric top10-index.

Optionally: Figures and Tables

Figures and Tables provided by the Unit are appended to the end of the Unit SAR.

2.3 Publication analyses

The Units were provided with a publication analysis suitable to the publication culture of their discipline(s). The analyses were based on the same data which was used in the author-based publication statistics.

Bibliometric analysis of the publications was performed by the Center of Science and Technology Studies (CWTS), Leiden University. The applicability of bibliometric analysis depends on the publication traditions and practices in different fields of research. This analysis was performed for those Units where it was relevant and covered sufficient

percentage of publications of the Unit, i.e. all LS and NS Units except for NS Unit 26 Department of Computer Science. The analysis details are described in Annex 3a. Indicators used in the CWTS report are explained in Annex 3b.

HULib analysed the publication of those Units where bibliometric analysis was not relevant or covered an insufficient percentage of publications of the Unit. The HULib analysis was adjusted for the Humanities panel, Social Sciences panel, Natural Science panel and Department of

Computer Science Unit separately. These four separate analyses are described in detailed in Annexes 4a, 4b, 4c and 4d. Unlike any other assessment material, HULib analyses are spreadsheet files. Each file contains several sheets, one sheet for each analysis type.

Both CWTS bibliometric analysis and HULib analysis were provided for NS Unit 27 Department of Geosciences and Geography, and for all SOC Units 31-39. The Units chose which publication analyses are included in the assessment material for the panellists.

2.4 Faculty and HiLIFE self-assessment report

The Faculties of Arts, Agriculture and Forestry, Biological and Environmental Sciences, Social Sciences and Science, and HiLIFE were instructed to use a template (see Annex 5) for describing the Faculty/HiLIFE level procedures. This way the

Units that are a part of a Faculty or HiLIFE structure at UH do not have to repeat the descriptions of, for example, shared decision making processes in their self-assessment reports.

2.5 University of Helsinki material

University of Helsinki General Information

The purpose of the University of Helsinki General Information document is to provide contextual information about UH. The UH has undergone several changes during the assessment period, which affect the resources, organisation and management of the research at the Units.

The document is compiled by RAO and contains an overall view to UH, and the higher education field in Finland in the assessment period, as well as some key facts and achievements of UH.

University of Helsinki Strategy 2017-2020 document

UH strategy guides the strategic management of the research activities in the Faculties and Units. The Units have been asked to reflect their own planning and goalsetting against the UH strategy in their self-assessment reports.

2.6 Additional material

The UH official research portal ('TUHAT') contains information on UH researchers, research outputs, projects, activities etc. Researchers were instructed to upload their CV or corresponding information to the research portal. Website for the research portal will be provided.

Additional information on UH, higher education and research in Finland, Finnish research funding agencies etc. will be made available for optional background information and further reading.

3 WRITING THE ASSESSMENT REPORT

3.1 General remarks

The panel will provide their feedback to the Units in written form by using the assessment report template (see an example in Annex 6; actual working templates are in the online workspace). The assessment report template contains detailed assessment questions. The assessment report is structured as follows:

Summary

- Description of the use of criteria: written after the site-visit, explaining the internal calibration of the use of the criteria within the panel.

- Assessment summary: the key strengths and development areas of the Unit as well as recommendations.

Assessment of the Unit

- The assessment of the Unit based on the three assessment themes: scientific quality, societal impact and research environment and Unit viability (see next section 3.2 for more guidelines).

In the assessment report, you should identify the key

strengths and development areas of each theme, based on the evidence provided by the assessment material and site-visit. In addition to the grading (weak – good – very good – excellent, see Annex 1 for criteria) on each theme, you should also give written feedback to the Unit of each sub-theme to enhance future development and learning. This is in-line with the enhancement-led approach chosen to this assessment.

The assessment report should be understandable without reading the self-assessment report. A good assessment report contains a purposeful balance between descriptive and evaluative text.

3.2 How to interpret scientific quality, societal impact and research environment and Unit viability

The focus of the assessment is on the future competitiveness of the Unit within the three assessment themes: scientific quality, societal impact and research environment and Unit viability. This emphasis should be

taken into account in writing the assessment report.

Past performance is an important underpinning factor for future success, especially in scientific quality. On the other hand, in the themes of societal impact and research

environment and Unit viability, the past outcomes, practices and metric data provide supporting evidence when assessing the Unit's potential for future success.

Scientific quality

The scientific quality of the Unit should be assessed against the goals set in the Unit by looking at the research questions, activities, results and outputs of the Unit. Both quantity and quality of results and outputs should be considered. At the same time, they shall be compared to international standards within the fields of the research concerned. This applies also for any disciplines or activities that may have specific national tasks or roles within Finland.

At the UH, we are committed to the responsible use of metric data in research assessment, following the principles described in the Leiden Manifesto (see Annex 1 for full reference). The bibliometric data (where applicable) reflects the scientific impact of the research in the Unit and it is a good proxy for the scientific impact of earlier work. However, the metric data and indicators are meant to be used to support qualitative expert assessment. The indicators should not overly dominate the grading of scientific quality.

Societal impact

Societal impact in RAUH emphasizes the capacity and potential within the Unit to be a source for societal impact in the future. The potential for societal impact strongly depends on field of research, and in the long term, unexpected impact in an unpredictable and unforeseeable direction may be observed. The point is to assess contributions in areas that the Unit has itself designated as target areas and focus on factors that the Unit's academic community has full control over.

The aim thus is to assess how the following steps towards impact are implemented in the Unit: 1) identifying the target areas of the societal impact, 2) identifying potential audiences and which research questions or results

are or would be relevant to them, and 3) outreach and valorisation activities.

Societal impact stems from the core research areas and competences within the Unit. Through identifying those areas and competences, the Unit can position their research into a broader context and consider its potential relevance to non-academic audiences.

Only in rare cases, non-academic impact comes about through the actions of the academic actors only. For impact to develop, it is thus necessary that the research-based knowledge and skills reach the potential stakeholders beyond academia. Identifying relevant stakeholders and audiences is crucial for best success in outreach and valorisation.

The role of the examples of outcomes is to provide evidence of successful promotion of impact. The grading for societal Impact should be based primarily on the key factors for future success, and the examples of outcomes are there to support the conclusions. To reach either of the two highest grades, successful outcomes shall always be presented.

In the assessment, you should also consider the potential for identifying the relevant target areas and audiences in a realistic manner. The Unit may not have identified relevant societal/non-academic questions they could contribute to, or stakeholders/audiences for its research or for some parts of it. If the panel agrees they cannot identify potential audiences or uses for the specific research area either, societal impact for that part of work within the Unit should not be affected negatively. However, if the panel can identify questions/audiences or potential uses for the research and the Unit has not yet reached that kind of level of understanding, there probably is room for improvement.

Research environment and Unit viability

In this theme, the core of the assessment is the question how well the Unit is positioned for the future. The starting point for the assessment is the description and self-reflection provided by the Unit. In SAR the Unit assesses their own goal-setting procedures, leadership and management practices and resources. Metric data for example staff and funding is provided in SAR Appendix 1 at the Unit and/or Faculty/Independent institute level. Together the qualitative and quantitative data form a picture of the Unit's research environment and viability.

Research environment and Unit viability theme is strongly linked with the two other assessment themes, especially with the goal-setting in scientific quality and societal impact. In here, you should assess the alignment of the plans, goals and the Units capability of following and developing its own activities in a meaningful way.

Please note that in some Units, there are Faculty level practices for example concerning the decision making (e.g. Units of the Faculty of Arts) common to the Faculty. To get a complete picture of the Units' operations and to understand its limitations, you should also consider the Faculty level self-assessment description when available.

The Units assessed here have a varying history and positioning in the University structure. Some of the Units are Faculties with their own decision-making structure and a long history. Some have been just recently formed as a Unit within a Faculty, without a possibility to track or show full record of results and development history yet. The activities described in the SAR can be something the Unit already has had for a long time or plans to have in place in the future. The emphasis of the assessment should be on the reflection of such activities including the Unit's capability of recognising their own strengths and development areas.

In this theme, qualitative feedback is the most valuable outcome of the assessment to the Unit. Grading gives the overall idea of the 'development stage' but the written feedback allows to express more subtle nuances.

For example, the Unit can be in 'excellent' category even if the ways of operating are not fully shared yet but there is evidence of successful development activities existing in the Unit.

4 RAUH PANELS AND TASKS

Panels

- The assessment work is carried out in four panels covering the UH research areas
 - Humanities
 - Life Sciences
 - Natural Sciences
 - Social Sciences
- Each panel is responsible for assessing 9-15 Units (see Annex 1)
- Each Unit is assessed individually and receive an individual report
- RAO assigns the panellists to act as a primary and supporting reviewer of Units (see Annex 8)
- Each panellist will act as a primary reviewer to one or two Units
- Each panellist will act as a supporting reviewers to one or two other Units

Primary and supporting reviewers' tasks

The primary reviewer is responsible for

- preparing a Unit assessment report draft before the site-visit, by 1st March 2019
- delivering a mature Unit assessment report draft by the end of the site-visit, by 15th March 2019
- finalising the Unit assessment report after the site-visit.

The supporting reviewer is responsible for

- assisting the primary reviewer in the assessment by reading the Unit assessment report draft before the site-visit, by 1st March 2019
- contributing with comments during the site-visit,
- collaborating in writing the final Unit assessment report with the primary reviewer.

All reviewers

- are responsible for participating in the panel meetings
- are welcome to participate and contribute to the interviews according to their own interest and expertise.

Panel Chairs' tasks

The panel Chairs are responsible for coordinating the panel work, including

- reading the pre-visit assessment report drafts
- chairing the panel meetings and interviews
- overseeing the finalizing phase of the Unit assessment reports after the site-visit
- providing initial feedback on Friday 15th March 2019 for the UH Rectorate on behalf of the whole panel
- compiling the panel assessment report after the site-visit.

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