FUAS
FEDERATION
OF UNIVERSITIES
OF APPLIED SCIENCES

Integrating RDI Into Learning

An evaluation of research, development and innovation activities at FUAS institutions

A publication of Lahti University of Applied Sciences,
Series C Articles, reports and other current publications, part 149

Ulla Kotonen (ed.)

HAMK
HÄMEEN AMMATTIKORKEAKOULU
UNIVERSITY OF APPLIED SCIENCES

LAHDEN AMMATTIKORKEAKOULU
Lahti University of Applied Sciences

LAUREA
AMMATTIKORKEAKOULU
UNIVERSITY OF APPLIED SCIENCES

Ulla Kotonen (ed.)

Integrating RDI into Learning

An evaluation of research, development and innovation activities at FUAS institutions

Lahti University of Applied Sciences
Lahti 2013

Ulla Kotonen (ed.)
Integrating RDI into Learning
An evaluation of research, development
and innovation activities at FUAS institutions

The publication series of Lahti University of Applied Sciences
A Research reports
B Study material
C Articles, reports and other current publications

A publication of Lahti University of Applied Sciences
Series C Articles, reports and other current publications, part 149
Editor-in-chief: Ilkka Väänänen
Layout: Sanna Henttonen
ISSN 1457-8328
ISBN 978-951-827-197-3

Lahti 2013

Contents

Preface

The FUAS Research Review evaluation was prepared by the FUAS Research Review working group (FUAS RR Team) which consisted of representatives of all FUAS universities:

HAMK University of Applied Sciences

- Riitta Hakulinen, Head of Quality Assurance
- Helena Kautola, Deputy of the Education and Research unit of Technology, Director of research of the Unit of Technology

Laurea University of Applied Sciences

- Antti Vettenranta, Director, Business Services
- Tuija Hirvikoski, Director, Internationalisation of RDI

LUAS University of Applied Sciences

- Ilkka Väänänen, Director, Research

FUAS – Federation of Finnish Universities of Applied Sciences

- Ulla Kotonen, Development Manager, Research, Development and Innovations (from May 1, 2013)
- Sara Heikkilä, RR assistant/Quality assistant, FUAS Quality group

The FUAS RR Team divided its self-evaluation analysis into three main parts. First the team concentrated on RDI in the FUAS strategy 2011 – 2015 and FUAS focus areas. Second, the team focused on RDI culture in FUAS and the implementation of FUAS strategy by analysing FUAS RDI structures and resources, RDI practices, RDI integration into education, innovations and entrepreneurship as well as the regional influence of FUAS RDI activities. Furthermore, a wide range of RDI projects were presented in order to gain a better understanding of the forms, possibilities and problems of RDI at FUAS. Third, the SWOT analysis method was used to evaluate the strengths, weaknesses, opportunities and threats of FUAS RDI.

Thanks are due to our international FUAS Research Review Audit Board members, Dr Jack Spaapen, Dr Jordi Molas-Gallart and Dr Matti Lähdeniemi for their valuable contribution to the future development of FUAS research, development and innovation activities. Their findings and recommendations are very important for us, and the options they presented for the development of RDI have sparked good discussion at FUAS.

Thanks also to all FUAS Research Review Team members and other FUAS members for their valuable contribution to the evaluation process. This evaluation would not have been possible without them.

On behalf of the FUAS Research Review Team

Ulla Kotonen
Development Manager, Research, Development and Innovations
FUAS – Federation of Universities of Applied Sciences

Executive summary

In the FUAS Research Review, we as the audit board members assessed the RDI activities of three Universities (HAMK, LUAS and Laurea) working together in the Federation of Universities of Applied Sciences (FUAS). We looked at the vision and strategy developed by FUAS and the options for the continuous development of RDI activities in FUAS and its member universities. The RDI review is based on interviews with a broad range of individuals from the universities (ranging from the rectors via programme and focus group leaders through to researchers and students) and research client organisations, and on a review of documents including a self-evaluation report, the strategic document (Collaborate for success) and the Curriculum review.

The ambitions of FUAS are to become a strong player in the regional innovation ecosystem, and to enhance the connection with international, in particular European, research funders and partners. Our review committee supports this ambition. To succeed, it is necessary that FUAS and its universities further develop their collaborative links with public and private regional partners and enhance their RDI capacities to enable them to participate actively in international RDI activities. In other words, the central role that FUAS sees for itself as a prime mover in the regional system, needs to be underpinned by a strong set of international RDI activities. This is an extremely challenging task since international competition is becoming increasingly fierce.

Despite these difficulties, our review shows that there are many reasons to be confident about the development of RDI into a strong FUAS function. The leaders of the three UASs are determined to pursue this goal, there are high-quality and enthusiastic lecturers and students, and the four RDI focus areas are relevant and complement each other. These elements can be brought together to generate the necessary capacity to access European RDI funds. Furthermore, the emphasis of the Horizon 2020 programme on social challenges, and multi-disciplinary, problem-driven research, will place FUAS and its universities in a good position to participate in H2020 projects.

We think, however, that two areas need more attention in order to achieve this goal. First, more effort needs to be put into the development of a common agenda with the regional policy makers, and preferably with the business sector. Here also, the building blocks are there: government, private sector and the universities (the so-called golden triangle) have long experience in working together but have not set up a structured collaboration strategy for the region as a whole. A common agenda with regional partners should be part of the next FUAS strategy. Second, the possibilities that FUAS opens as an organisational structure should be exploited in the coming years. The three participating universities still remain independent entities, responsible for educational, RDI and regional development tasks in the region. Not only would a strong FUAS help the quality and visibility of RDI projects, but it could also enhance the chances of receiving European grants by, for instance allowing the three universities to pool their resources under a single contractual body.

Stressing the importance of RDI and pursuing international strategies does not mean breaking the current teaching-orientation of RDI activities at the three FUAS universities. The active link between RDI activities and teaching has contributed to strengthening the quality of its professional training. Yet, to what extent should RDI continue to be seen as subordinate to the teaching function? In our view, FUAS faces a choice between two main models on which to base its RDI strategy:

RDI as an activity supporting teaching

In this, RDI activities are seen mainly as an element of the teaching curricula providing students with direct experience of the challenges that they are likely to face in their professional lives when trying to develop new solutions for relevant practical problems. Projects that are best suited to this practice will be those related to innovation and entrepreneurship, and requiring moderate technical/research skills (small-step innovation). Projects calling for the application of sophisticated methodologies and developing state-of-the-art knowledge will be less suited to this kind of use. The challenge here is to provide a constant flow of RDI assignments with a profile that can enable the contribution of students (at either undergraduate or Masters level).

RDI as a self-determined function

RDI is seen as a set of activities that need to be pursued as an additional function of the UASs. In addition to teaching, RDI supports the Universities of Applied Sciences by providing relevant services to society, resources to the universities and enhancing the skills and knowledge of their academic staff. Not all RDI activities need to be directly related to teaching, but staff working in projects that develop or apply frontier knowledge and technologies are also likely to provide more up-to-date and relevant teaching. The research function can, from this perspective, reinforce teaching activities even when not all research projects are directly linked to teaching. This strategy would require some substantial changes in the current activities and practices of the universities integrating FUAS.

In the first option, the future of FUAS will be oriented mainly towards its regional role and RDI activities will aim at linking RDI assignments with substantial teaching activities and a focus on the needs of local and regional partners. Within this environment, it is still possible for the FUAS universities to engage in projects addressing basic and applied research problems, pushing the knowledge frontier, but these tasks will not constitute the core of FUAS RDI strategy. Also, international collaboration will still be an option, though chances of European funding will depend on the level of integration of the three universities within FUAS. This option relies on the traditional strengths of the three universities.

In the second option, RDI is developed as a function in its own right, seeking its own goals. This is not meant in the traditional blue sky or ivory tower sense. The RDI function will seek relevance by maintaining the current applied and problem-oriented focus that drives RDI at FUAS. Yet, it will engage with assignments that require state-of-the-art knowledge and capacities, even if this means that the involvement of undergraduate or Masters students in the projects is not feasible. To be able to do this, the academic staff has to be up-to-date with the latest developments in their fields and maintain a hands-on knowledge of the shifting requirements and needs of research stakeholders. This up-to-date knowledge can then be transferred to students. Furthermore, this would call for the establishment of a body of research students, preferably at doctoral level. Doctoral students contribute highly qualified expertise to research projects in all kinds of universities: whether technical or professional, or oriented to academic research. We believe that the possibilities for FUAS universities to develop a self-determined RDI function will depend on their ability to establish a doctoral programme. If allowed to do so, this could be organised through a central FUAS "research institute".

The two models described here clearly have different organisational consequences for FUAS. In the first option, the current state of affairs suffices. The three universities remain separate institutes with their own focus on innovative ways to integrate RDI in teaching, and gradually new collaborative patterns might develop including further attunement with partners in the region. The second option demands a new set of roles for FUAS to provide active support for the research function. This could be done through a "research institute" able to be a contractual partner on behalf of the three universities in research projects, offering an institutional base for a (possibly doctoral) research programme, and supporting the research activities of all interested lecturers at the three universities.

FUAS Research Review Audit Board
Jack Spaapen, Jordi Molas-Gallart & Matti Lähdeniemi

Chapter One

THE BACKGROUND TO THE FUAS RESEARCH REVIEW

The FUAS Federation

Finland's largest alliance of universities of applied sciences, FUAS – Federation of Universities of Applied Sciences[1] came out of a partnership between the HAMK, Lahti and Laurea universities of applied sciences. The FUAS Federation was established by HAMK, Lahti and Laurea Universities of Applied Sciences to serve students, business life and the public sector in an improved capacity as well as to seize the opportunities of a strongly internationalising operating environment. Each of the FUAS institutions maintains its independence and continues to be responsible for the educational, RDI and regional development tasks in the region.

HAMK University of Applied Sciences (HAMK)[2] is maintained by the Häme Municipal Federation for Professional Higher Education (HAKKY), formed by six member municipalities. HAMK employs approximately 700 personnel and has app. 8,600 students. HAMK has units in seven locations within a 100 km area of range. These units specialise in specific areas, namely culture; natural resources and the environment; natural sciences; social sciences, business and administration; social services, health and sport; technology, communication and transport; and professional teacher education. HAMK profiles itself as a future-oriented integrator of first-rate, diversified education, research and innovation (ERI), whose aim is to support the overall development of the region.

Lahti University of Applied Sciences (LUAS)[3] is one of the units in Päijät-Häme Educational Consortium owned by 13 municipalities in the region. LUAS is located in Lahti. LUAS is a regional centre of expertise with over 5,000 students and approximately 400 personnel. LUAS has two competence areas welfare and business and design and technology. LUAS's focus areas are design, environment, and the development of welfare services, and profiles are integrated pedagogy, practice-based innovation, and student entrepreneurship.

Laurea University of Applied Sciences (Laurea)[4] operates as a limited company (Laurea-ammattikorkeakoulu Oy). Laurea has seven campuses in Helsinki metropolitan area. Laurea employs approximately 500 personnel and has app. 8,000 students. Laurea's focus areas are service business, expertise in nursing and coping at home, in the form of general nursing education, security and

1. http://www.fuas.fi/Sivut/Etusivu.aspx
2. http://portal.hamk.fi/portal/page/portal/HAMK/In_English
3. http://www.lamk.fi/english/Sivut/default.aspx
4. http://www.laurea.fi/en/Pages/default.aspx

social responsibility, and student entrepreneurship. Laurea's profiles are service innovations and value networks, internationally acknowledged and productive research, development and innovation activity, an operating model Lbd (Learning by Developing) that promotes the development of working life by integrating learning and R&D.

The FUAS institutions have around 21,000 students, representing approx. 15% of Finland's university of applied sciences students and 1,700 staff. FUAS employs more than 170 qualified researchers. The R&D volume totals approximately EUR 23 million, which accounts for around 16% of the total R&D volume in Finnish Universities of Applied Sciences. The more detailed facts and figures of FUAS UASs are presented in Appendix 1 Facts and figures of HAMK, Appendix 2 Facts and figures of LUAS, and Appendix 3 Facts and figures of Laurea.

The FUAS federation is intended to ensure that the competence of three major universities of applied sciences brings advantage to the entire operating area. The FUAS institutions conduct applied research and development and offer education working closely with the labour sector, particularly with SMEs, public administration and the third sector. It intends to play an instrumental role in building the innovation environment of the Helsinki Metropolitan Area and supporting the development of top-level expertise.

The background to the FUAS research review

The need to evaluate research, development and innovation (RDI) activities in universities of applied sciences has been highlighted in numerous different documents (e.g. Ministry of Education and Culture 2012; Ministry of Education & the Ministry of Employment and the Economy 2009; Academy of Finland 2009). The Finnish Higher Education Evaluation Council (FINHEEC) conducted a sector-wide analysis of RDI activities at Finnish Universities of Applied Sciences during 2010–2012 (Maassen et al. 2012)

The aim of the evaluation conducted by FINHEEC was to produce qualitative and partially also quantitative evaluation data on the position, role, quality, effectiveness and impact of research, development and innovation work undertaken by the spectrum of Finland's universities of applied sciences. The task of the FINHEEC evaluation was to produce a wide-ranging picture of the position and role of RDI activities within Finnish universities of applied sciences as part of the national and regional innovation environment, to examine the integration of RDI activities and education within the universities of applied sciences, and to produce strategic evaluation data and data that will develop the activities. The main findings of FINHEEC evaluation are discussed briefly in the chapter "RDI activities of Finnish Universities of Applied Sciences".

In addition to the sector-wide analysis, a number of individual UASs, including Laurea University of Applied Sciences in 2010, HAMK University of Applied Sciences in 2011 and Lahti University of Applied Sciences in 2011 (Väänänen 2012), have conducted their individual evaluations of RDI activities, but FUAS-level RDI analysis was lacking.

FUAS Research Review is an evaluation of the research, development and innovation activities of FUAS Federation and its individual member UASs. FUAS Research Review includes a self-evaluation and audit by an international external Audit Board. Research Review is performed in order to get a clear picture of the current situation, to contextualise FUAS globally and to stimulate impulses for future development. The report written by the external Audit Board guides FUAS in the continuous development of the RDI activities and helps FUAS to reach its strategic aims. The strategic intent 2020 of FUAS is as follows:

> *The strategic intent of FUAS for 2020 is an internationally respected federation of independent higher education institutes that strengthens the international competitiveness of the Helsinki metropolitan area, offering all the higher education, research and regional development functions required by the metropolitan area's industry, commerce and population.*

The educational profile of FUAS is focused on being an international pioneer in workplace-oriented pedagogical solutions integrated into RDI.

Context of the FUAS RDI review

The development of FUAS and its RDI function must be seen against the backdrop of national higher education policy, European policy and international developments. Given the challenging and changing context of higher education in Europe and the rest of the world (see figure 1), all European governments feel the urgent need to adapt their higher education systems to stay competitive and meet the ambitions set by the EU for 2020. By then, the Finnish government wants the Higher Education System to provide higher-quality teaching and research, and to be more internationally efficient. To achieve this, several measures are being planned, including diversifying the UAS sector funding system, changing their operating licenses and a change in ownership from the regions to Limited Companies. These changes intend to provide the UASs with more flexibility and adaptability to their operating environments. The main assumption lying behind these measures is the belief that larger structures will enhance the quality and efficiency of the system, making it better able to meet the regional and national needs and improve its international competitiveness. The hope is also that this will lead to more external funding, be it from local and regional sources or from international (European) organisations. The Federation that the three UASs have formed is part of this larger restructuring process of the Finnish higher education system.

FIGURE 1. Challenging and changing environment. (Halonen, 2013)

Challenging and changing environment

CHANGING DRIVERS OF R&D&I&HEI-POLICIES	GLOBAL ENVIRONMENT Emerging economies, grand challanges, global networking		CHANGING MECHANISMS IN STI&HEI
• Globalisation, energing countries, emerging knowhow • Grand societal and Environmental Challenges • Financial crises • Need of broad based Innovation concept and multidisciplinary approach • National policies versus European policies? National versus regional policies? Local and organisational strategies? Lisbon Treaty	EUROPE • Financial crisis – coherence and quality? EU/ER(I)A • Joint efforts such as JTIs, ETPs, ERC, Horzon2020, Bologna –process/ European Higher Education Area POLICIES • A strategy for Smart, Sustainable and Inclusive Growth EU2020 Strategy Innovation Union flagship • Budget Review, Financial Regulations	Different actors and levels: • European, • national, • regional, • local, organisational	• Researcher careers / Tenure track • Research Infrastructures • Modern universities and RTOs • Joint programmes and joint degrees • Distribution of knowledge • Joint pooling of funding (virtual common posts, real common posts, others) • Joint evaluation and assessment activities • Virtual learning

As in many other European countries, the higher education network in Finland is still considered to be too fragmented, and stronger collaboration or even mergers (like the new Art University formed through the merger of the Sibelius Academy, the Academy of Fine Arts and the Theatre Academy) should be encouraged. Various steps are being taken to promote joint use of facility services and teacher resources across instituteal boundaries. Furthermore, from the beginning of 2014 the universities of applied sciences funding and regulatory structure will be adapted to improve the quality and impact of their operations. The operating licences of the universities of applied sciences will be reviewed from the beginning of 2014, and by the end of 2015 their admissions procedures and syllabi will have been revised in order to expedite entry into higher education.[5]

The cornerstone of the wider European context is formed by European research and innovation funding structures, in particular the Framework Programmes and their successor, the Horizon 2020 initiative starting in 2014, and the support given through Cohesion Policy funds (also known as Structural Funds). Just before the end of June 2013, an agreement was reached about the overall European budget for the coming years. The details about the various parts are not known at this moment, but it seems certain that about €70 billion is reserved for research and innovation in Horizon 2020. This initiative has three main targets, excellent science, competitive industries and a better society, and its main goal is to connect the three and thus enhance the innovative capacity of Europe. H2020 addresses six so-called Grand Societal

Challenges[6], which form an important orientation point for the UASs research strategy, next to the Cohesion policy or Structural Funds.

There has been a growing connection between the EU Framework Programmes and its Cohesion policy to boost innovation. In FP7, several programmes focused on enhancing the innovation capacity of the regions ('Regions of Knowledge', 'Research Potential' and 'Research Infrastructures'). For the next period, the EU has committed some €86 billion from Cohesion funds for actions supporting research and innovation. For the next programming period, Horizon 2020 will also contribute to research and innovation in the regions, mainly by improving policy support, in order to build efficient so called smart specialisation strategies in full cooperation with Cohesion policy. Regions are expected to develop a strategy to direct spending towards research, innovation and training (www.Research Europe.eu, 1 August, p. 5) Considerably more funding will be made available for innovation in the SME sector (4% of the total H2020 budget), and probably there will be a "fast track to innovation" (1% of the budget). While the increased focus of the new Cohesion policy funds on investments in research and innovation is in full accordance with the Europe 2020 Strategy and the Innovation Union flagship initiative, it is also the case that it specifically aims at assisting the less developed Member States (mainly the New Member States) and regions to climb the 'staircase to excellence'. (European Commission, 2013). Apparently, the New Member States are learning quickly to receive and absorb these funds, contrary to what the "innovation paradox" theory had predicted (Oughton et al. 2002).[7]

It is clear that a significant part of the overall European 2020 strategy is formed by emphasis on regional development through stronger collaboration between science, industry and society (the so-called 'golden triangle'), to increase innovative research and development. This offers opportunities for all regions in Europe, but there will also be stiffening competition, augmented by the New Members entering the competition and the current economic crisis, which forces countries to compete even more strongly for European funds. A strong collaboration within regions between universities, industry and public sector seems to be a more pressing necessity than ever before.

5. Although not part of our remit, the audit board feels slightly worried about the word 'expedite' in this context. If it refers to the reduction of bureaucracy associated with the admissions process, then of course this is something to support. If, however, it is interpreted as reducing the standards of admission, it is something to worry about, because that would ultimately weaken the position of UASs.
6. The 6 European Grand Societal Challenges are: 1. Health, demographic change and wellbeing; 2. Food security, sustainable agriculture, marine and maritime research, and the bio-economy; 3. Secure, clean and efficient energy; 4. Smart, green and integrated transport; 5. Inclusive, innovative and secure societies; 6. Climate action, resource efficiency and raw materials.
7. The so-called regional innovation paradox - the apparent contradiction between the comparatively greater need to spend on innovation in lagging regions and their relatively lower capacity to absorb public funds earmarked for the promotion of innovation and to invest in innovation-related activities compared to more advanced regions – does not hold for a number of the New Member States such as Bulgaria and Romania (European Commission, 2011, p. 93).

RDI activities at Finnish Universities of Applied Sciences

The Finnish University of Applied Science (UAS) sector was established at the beginning of the 1990s. Since 2003, it has been formally expected to develop Research & Development (R&D) activities, to which in 2010 an innovation function was added by the Ministry of Education and Culture.

According to the University of Applied Sciences Act (2003/351), the mission of universities of applied sciences in Finland is to provide higher education instruction based on the requirements of working life and its development, and on research and artistic premises in preparation for professional expert tasks. In addition, the universities of applied sciences must support individual professional growth and the practice of research and development, which serves in university education as well as supporting working life and regional development, and applied research and development work that takes into account the structure of industry in the region. Thus the mission of universities of applied sciences underscores links with business and industry and regional impact. The purpose of universities of applied sciences is to generate the expertise and innovations needed by the world of business, industry and public sector. The UASs are mainly multi-disciplinary and regional institutes of higher education, which are focusing their research and development activities on serving the economic and social development needs of their region. UASs emphasise in their instituteal goals the close link between their RDI and education activities.

The Ministry of Education and Culture emphasises stronger profiles and priorities in universities of applied sciences in serving the development needs in the regions; the universities of applied sciences need to develop their RDI activities to increase their capacity to cater for the needs of the SMEs and service sectors in their regions in a more planned way. RDI is an essential part in the job descriptions of teaching personnel. The Ministry of Education and Culture will seek to strengthen links between universities of applied sciences, regional development and working life. The RDI funding base is to be diversified by making more efficient use of funding allocated by the Finnish Funding Agency for Technology and Innovation (TEKES).

As a result of the sector-wide analysis of RDI activities at Finnish Universities of Applied Sciences conducted by The Finnish Higher Education Evaluation Council (FINHEEC), the evaluation team made following conclusions and recommendations for development of RDI at Finnish UASs (Maassen et al., 2012):

Funding of RDI in the UAS sector

- The funding for the RDI activities is fragmented and lacks transparency. The overall basic funding level for the RDI function is too low.
- The future development potential of the RDI function is reflected in the relatively rapid increase in competitive funding income, as well as in the success in acquiring EU structural development funds.
- The main Finnish agencies for the public funding of RDI activities lack a clear frame of reference to determine their role in funding, and therefore also in the further development of the RDI activities of the UAS sector. As a consequence these agencies operate rather conservatively in terms of their function with respect to the UAS sector.
- It is important to give a clear signal that the further development of UASs' role in RDI has political priority.

Integration of education and RDI in UAS

- With respect to the strategic orientation of RDI, there are convincing arguments for stimulating a better balance between RDI as an educational and pedagogical instrument and RDI as a more independent academic endeavour contributing to the application of new and existing knowledge for private and public sector problems. Such a balance should be firmly rooted in an explicit, transparent and clear RDI mission.
- Beyond an integration of RDI into the core curricular activities of regular Bachelor-level students, there are also other linkage mechanisms between RDI and education that could be further deployed. For example, the development of non-traditional educational programmes and courses based on the output of RDI activities. This could also be undertaken in international cooperation projects, for example, in the area of lifelong learning.
- The explication, quality assurance and reintegration of RDI results in teaching can be strengthening as an important element of organisational development and learning.
- The UAS sector is well-equipped and highly motivated to contribute to increasing the number of high growth-oriented entrepreneurs. The further dynamic development of the still underdeveloped innovation and start-up component in Finland is seen as a challenging task that could be enforced by the UAS sector on the basis of corresponding governmental support, for example in the form of a distinctive national entrepreneurship programme with the necessary financial resources.
- The development of basic RDI competences and skills for Bachelor-level students needs to be addressed and implemented systematically within the Bachelor programmes' curricula.

- The potential of Master programmes in the further development of the RDI function needs to be examined thoroughly. This potential can be expected to be developed with a strategic alignment of teaching (design of master programmes and their project works) and RDI. It can therefore be recommended to conduct a separate evaluation of the potential of, as well as the problems and challenges facing the Master programmes in becoming a more substantial part of RDI activities.

Human resources management in UAS

- A focus on the integration of the three statutory tasks (education, RDI, regional development) presupposes an important change of the academic culture.
- RDI skills, competences and knowledge development should be prioritised and emphasised in staff training and staff career development.
- Innovation competences, skills and knowledge requirements need to be further clarified for staff development.
- Integrating RDI into teaching changes the traditional way of curricula delivery and may create pressure to define the teachers' 1,600 hours from a totally new perspective.
- Identifying and disseminating good practices, methods, tools and processes about RDI practices is of great importance for the benefit of further staff development in the RDI area.
- Postgraduate studies are to be encouraged and enabled for academic staff. It is of the utmost importance that these postgraduate studies are oriented towards the specific RDI staff requirements of the UAS sector, instead of having a general researcher training character.

International dimension of RDI

- Depending on their overall profile and (scarce) resources, and the preferred relationship with the region they operate in, individual UASs should be more specific about their internationalisation strategy, amongst other things, when it comes to the nature and expected outcomes of internationalisation investments and activities, regional preferences and international RDI goals and targets.
- For further effective development of the RDI function, the participation in international RDI consortia that are successful in applying for EU RDI funding programmes should be intensified. .
- Despite a strong strategic focus on the enhancement of internationalisation on a national level, an effective support structure for stimulating the internationalisation of the RDI activities is lacking. The evaluation panel recommends the establishment of a national support scheme for the development of applications for international RDI funding.

- Since European RDI funding programmes often emphasise societal and economic challenges requiring relevant levels of expertise on a high, internationally competitive level, participation in such programmes can be considered as an indication for RDI quality. Consequently, special attention should be paid to increasing participation in such programmes (especially FP7 and Horizon 2020).
- EU structural funds are a very important instrument in the competitive funding of RDI activities, especially serving the demands of regional innovation systems. To foster regional innovation activities and technological development especially for the benefit of SMEs, the enlarged RDI funding opportunities of the upcoming structural development funds should be exploited thoroughly and used effectively.

Interaction with business and public sector

- UASs should become more visible for their environment, in particular regarding what they can offer potential clients.
- More attention should be paid to attuning the agendas and relevant partners in the environment, either through small-scale bridging mechanisms or longer-term collaborative practices.
- More effort should be directed towards learning how to collaborate with partners in society.

Indicators for RDI

- Given the premature stage of the development of the RDI function, indicators should be used to learn and improve, not to account and punish.
- A practical lead in the development RDI indicators can be found in recent European projects, in particular the EDU-prof and SIAMPI project. The key is to distinguish a number of main indicator categories (3 to 5), and then within these broad categories place a number of more specific indicators that are, on the one hand, representative of the general aspects of the RDI function and, on the other, leave enough room for specific differences
- In doing so, the current proposals for indicators (AMKtutka, ministry matrix) should be taken into account, but handled in the perspective of the above two-tier approach.
- It is also recommended to make use of the international (European) developments regarding indicators. The hard work needed to develop indicators and collect robust and reliable data cannot be underestimated.

The purpose of the FUAS Research Review

The aim of FUAS Research Review was to give a clear and realistic picture of the research, development and innovation activities of FUAS through assessing the RDI activities of each member institute and to produce strategic evaluation data that will develop the FUAS RDI activities.

The specific objectives of the FUAS Research Review were to:

1. Assess the RDI activities of the participating UASs (HAMK, LUAS and Laurea), taking into account their regional, national and international contexts.

2. Assess the FUAS 2011–2015 vision and strategy, addressing in particular the four focus areas that FUAS has defined.

3. Assess the RDI strengths of the participating UAS, identify areas for development and good practices to follow.

4. Help ensure the continuous development of the RDI activities of the FUAS member UASs.

Thus the evaluation looked into RDI activities from the perspective of the four focus areas of FUAS: 1) Ensuring welfare, 2) Technological competence and entrepreneurship, 3) Societal security and integrity, and 4) Environment and energy efficiency. In addition to observing the focus areas, FUAS Research Review produces and assesses information concerning:

- the role of RDI activities at FUAS
- the relation of RDI activities and education
- the international aspects of the RDI activities
- the profitability, quality and influence of the RDI activities.

The aim of Research Review was to highlight the strengths and areas requiring improvement through self-evaluation and an audit by an international external Audit Board. Research Review ensures the continuous development of the RDI activities of the FUAS member UASs. Furthermore, the FUAS Research Review provides information for the development of the FUAS quality system and for the forthcoming audit of the Finnish Higher Education Evaluation Council (FINHEEC).

The FUAS Research Review also has a link to FUAS Curriculum Review conducted in 2012.

The FUAS research review process

A decision of the FUAS Research Review was made in 2011. The planning of FUAS Research Review process started by the FUAS Quality Group in 2012 and continued by the FUAS Research Review working group (FUAS RR Team). The whole FUAS Research Review process is presented in Table 1.

TABLE 1. FUAS Research Review timetable.

TIME	TASK	ACTORS
2011	First plans of the Research Review	
2012	Updating the plans	FUAS Quality Group
2012 Nov-Dec	Gathering the FUAS Research Review working group (FUAS RR Team)	
2013 Jan-March	Defining the plans, collecting the data	FUAS RR Team
2013 March-May	Writing and finishing the self-evaluation Contacting the external Audit Board	FUAS RR Team
2013 May	Sending the pre-material to the external Audit Board Online meeting with the FUAS actors and Audit Board Collecting additional data to the Audit Board	FUAS RR Team, relevant FUAS actors, Audit Board
2013 June	The Research Review Audit visit	FUAS RR Team, relevant FUAS actors, Audit Board
2013 June-Aug	Writing the final report	Audit Board
2013 Sept	Debriefing Closure seminar "Voice of FUAS" and publishing the final report	FUAS RR Team, relevant FUAS actors, Audit Board
2013 Aug-Oct	Defining new areas of development according to the results of the report	RD&I steering group, relevant FUAS actors

Self-evaluation

The FUAS Research Review working group (FUAS RR Team) produced a project plan, which outlined the objectives and tasks of the evaluation, evaluation areas and methods utilised.

All work on the project was collaborative between HAMK, LUAS and Laurea. The FUAS Research Review Team consisted of representatives of all FUAS universities. The participants of the FUAS Research Review Team include quality, RDI and management level personnel.

HAMK University of Applied Sciences

- Riitta Hakulinen, Head of Quality Assurance
- Helena Kautola, Deputy of the Education and Research unit of Technology, Director of research of the Unit of Technology

Laurea University of Applied Sciences

- Antti Vettenranta, Director, Business Services
- Tuija Hirvikoski, Director, Internationalisation of RDI

LUAS University of Applied Sciences

- Ilkka Väänänen, Director, Research

FUAS

- Ulla Kotonen, Development Manager, Research, Development and Innovations
- Sara Heikkilä, RR assistant/Quality assistant, FUAS Quality group

The FUAS Research Review Team included a wide range of experience in research, development and innovations at universities of applied sciences. The FUAS RR Team divided its self-evaluation analysis in three main parts. First the RR Team concentrated on RDI in the FUAS strategy 2011 – 2015 and FUAS focus areas. Second, the RR Team focused on the RDI culture in FUAS and implementation of FUAS strategy by analysing FUAS RDI structures and resources, RDI practices, RDI integration into education, innovations and entrepreneurship as well as the regional influence of FUAS RDI activities. Furthermore, a wide range of RDI projects was presented in order to gain better understanding of the forms, possibilities and problems of RDI at FUAS. Third, a SWOT analysis was used to evaluate the strengths, weaknesses, opportunities and threats of FUAS RDI. In conclusion, based on the SWOT-analysis, the FUAS RR Team defined future success factors in which success must be achieved in FUAS RDI, what should be done in order to turn weaknesses into strengths, how current strengths can be used to react to threats, and what kind of crises may come to pass if RDI is not developed. In addition the development priorities of FUAS RDI defined by FUAS RD&I steering group were discussed.

As a result of the self-evaluation, the FUAS Research Review Team prepared a self-evaluation report. The main parts of the self-evaluation report are presented in chapters two and three of this publication.

The self-evaluation material was delivered to the external auditing team in mid-May 2013 and, in June 2013, the external evaluation team conducted the onsite visit to FUAS.

External evaluation

The Audit Board consisted of two international evaluators and one Finnish evaluator. The evaluators were Dr Jack Spaapen from The Royal Netherlands Academy of Arts and Sciences, Dr Jordi Molas-Gallart from INGENIO (CSIC-UPV) and Adj. Prof. Matti Lähdeniemi from Satakunta UAS. The Chairman of the Audit Board was Dr Jack Spaapen.

Dr Jack Spaapen is senior policy advisor at the Royal Netherlands Academy of Arts and Sciences and executive secretary for the Council for Humanities. His fields are research impact evaluation, humanities research and public-private partnerships between research and industry/society. He coordinated the FP7 SIAMPI project on social impact assessment (2009–2011). In this project, case studies were conducted in various research areas in the arts and sciences in Spain, France, the UK and the Netherlands (www.siampi.eu). He initiated a national project to develop methods for the assessment of the societal relevance of research (www.eric-project.nl). He represents the Academy in several national and European networks on R&D evaluation. He co-designed the national evaluation protocol for publicly funded research (SEP) and co-organised many instituteal evaluations in and outside the universities.

He was trained as a sociologist and cultural anthropologist at the University of Amsterdam with a Ph.D. in science and technology studies. His thesis (1995) focused on developing a method for the evaluation of research in the context of policy demands, i.e. how to assess the broader, societal value of research. Previously he worked as a research fellow at the University of California San Diego (UCSD), as a researcher and teacher in two departments at the University of Amsterdam (Science and Technology Dynamics and the Institute for Development Research), in a commercial bureau for industrial marketing in Amsterdam, and in a government office for urban planning in Lelystad. Between 1990 and 2003, he ran an advisory bureau on science and technology policy and evaluation, sci_Quest.

Professor Jordi Molas-Gallart is an economist with more than twenty years' experience as an analyst of science, technology and innovation policies. He is a Research Professor at INGENIO, a research institute of the Spanish Council for Scientific Research (CSIC) and the Polytechnic University of Valencia. Before joining INGENIO, Jordi worked for 13 years at SPRU, University of Sussex as Research Fellow and Senior Research Fellow. His research interests include science and technology policy evaluation and impact assessment, and university-industry relations. He has led and contributed to many evaluation studies for the UK Economic and Social Research Council, the European Commission, INSERM, CSIC, Queen Mary College, the Russell Group of Universities, and several Spanish regional governments among others, focusing mainly on the analysis of the non-academic impact of research programmes. He has been a member of the European Commission "Lisbon Expert Group" for the follow-up of the research aspects of the revised Lisbon strategy. He is the author of one book, and of more than 70 articles, book chapters, monographs and reports. He is co-editor of Research Evaluation.

Adj. Prof. Matti Lähdeniemi gained a Ph.D from the University of Turku, and is an Adjunct Professor at Tampere University of Technology and at the University of Turku. He is presently working as Research and Innovation Director at Satakunta University of Applied Sciences as an Accreditation Assessor. His special fields are automation, image processing, entrepreneurship, knowledge transfer, quality and impact evaluation and RDI processes. He is the director and consulting tutor of numerous industrial projects, and a member of several groups evaluating the impact of RDI and quality at universities on a national level and RDI measures on a national and European level. He has prepared and analysed the international evaluation of RDI activities at Finnish Universities of Applied Sciences. He has written about 180 articles on the above-mentioned topics. His previous positions include Vice president and Dean (Satakunta University of Applied Sciences), professorships (Tampere University of Technology, University of Turku, Humboldt-Foundation), project manager in different industrial projects in Finland, Sweden, Germany and Japan, and chairman or board member of several organisations and foundations.

In the first phase, the evaluation board concentrated on the FUAS Strategy 2011 – 2015 and the self-evaluation report produced by FUAS RR Team.

In the second phase, the onsite visit was organised at Laurea, Tikkurila on June 17 – 19, 2013. During the onsite visit, the evaluation board concentrated on the RDI activities of the FUAS Federation. The interviews were undertaken with representatives of the FUAS Federation, the presidents and vice presidents of FUAS UASs, the chairs of FUAS RDI focus areas as well as representatives of FUAS RDI experts, RDI services, funding institutes and external stakeholders. In addition, the Audit Board discussed with representatives including project managers, teachers, students and partners of four FUAS projects (ALDIGA, CONNECT, GUARANTEE and ENNE) in order to gain a better understanding of the forms, possibilities and problems of RDI in the FUAS Federation. The detailed onsite visit evaluation programme is presented in appendix 4.

The FUAS Research Review Audit Board submitted its report at the end of August 2013. The review report is included in this publication (Executive summary, Context of the FUAS RDI review, External evaluation, Options for the development of RDI at FUAS).

The main findings of self-evaluation and the results of external audit were discussed at the Voice of FUAS day on September 10, 2013. The findings will direct the implementation of the FUAS strategy as well as definition of RDI development priorities and activities by FUAS RD&I steering group.

Chapter Two

FUAS RDI STRATEGY

RDI in FUAS Strategy 2011 – 2015

At FUAS, RDI is defined according to the OECD's Proposed Standard Practice for Surveys on Research and Experimental Development as follows: "R&D comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications." The term R&D covers three activities: basic research, applied research and experimental development, including innovations. At FUAS innovations are more based on open demand and user-driven doing, using, interacting (DUI) methods than science and technology (STI). In R&D applied research at FUAS, experimental development and innovations are the major activities and basic research plays a minor role.

In RDI statistics FUAS follows the R&D definition of Statistics Finland. According to Statistics Finland, the defining criterion of R&D is that the purpose of the activity should have the presence of an appreciable element of novelty. Basic research is defined as work undertaken to acquire new knowledge, without any particular application in view. Applied research, on the other hand, primarily aims for a specific practical application. Product and process development (development work) is defined as systematic work that draws on existing knowledge gained from research and/or practical experience with the aim of producing new materials, products, production processes or methods and systems, or substantially improving existing ones. Innovation refers to all the measures that produce or aim to produce new or improved products or processes, i.e. innovations. Broadly defined, innovation refers to any measure that produces or aims to produce the adoption of innovations. (Statistic Finland 2009)

The strategic framework of FUAS RDI activities is based on the FUAS Strategy 2011 – 2015, EU's growth strategy Europe 2020 (European Commission 2010), Finland's National Programme (Valtiovarainministeriö 2012) and on A development plan of Education and Research 2011 – 2016 (Ministry of Education and Culture 2012). FUAS is a member of the regional innovation ecosystems (RIE) in the Greater Helsinki metropolitan area, which refers to the regions of Uusimaa, Päijät-Häme and Kanta-Häme. Hense FUAS Strategy also acknowledges the development areas of the Government report on metropolitan policy in education, RDI and regional impact.

FUAS RDI activities are based on synergic multi-actor activities and regional smart specialisation. The strategic intent of FUAS for 2020 is an internationally respected federation of independent higher education institutions that strengthens the international competitiveness of the Helsinki metropolitan area, offering all the higher education, research and regional development functions required by the metropolitan area's industry, commerce and population.

According to the FUAS Strategy 2011 – 2015, the Research Review produces information of the chosen focus areas and ensures that the operation is competitive and multi-disciplinary. The RDI activities in relation to the guidelines stated out in the strategy.

The FUAS strategy 2011 – 2015 emphasises:

- international and practical RDI activities
- aligning resources, innovation activities and practical development
- close connection to EU-level research and development programmes in order to expand sources of funding
- participating in projects covering all stages of the innovation chain a multi-disciplinary way.

According to the FUAS strategy, in 2015 FUAS will work actively and take initiative in both Finnish and international partnership networks. Within the focus areas, cooperation is boosted with the most internationally significant universities and companies, and top experts are recruited as researchers and lecturers. FUAS is a leading network operator in the Greater Helsinki metropolitan area, key partners including Aalto University and the University of Helsinki as well as the universities of applied sciences and vocational institutions in the region. In all its operations, FUAS works closely with the labour sector, particularly with SMEs, public administration and the third sector.

The educational profile of FUAS is focused on being an international pioneer in workplace oriented pedagogical solutions integrated into RDI. FUAS is an engine for applied research, pragmatic innovation and RDI integrated into student-oriented education in the wider metropolitan area, combining top national and international actors in joint projects. RDI emphasises integrated application, transfer into practice, utilisation and commercialisation of technological and social innovation. Municipalities in the region function as customer owners and increasingly stronger promoters of innovation. FUAS is a trailblazer in promoting student entrepreneurship in the wider metropolitan area. In cooperation with domestic and international operators, FUAS generates partial solutions for major global challenges. These include: Global warming and tightening supplies of energy, Water and food, Ageing societies and public health, and Pandemics and security.

FUAS addresses global challenges by forming multidisciplinary RDI consortia and high-quality degree programmes that creatively merge four FUAS focus areas 1) Ensuring welfare, 2) Technological competence and entrepreneurship, 3) Societal security and integrity, and 4) Environment and energy efficiency. Within these focus areas are several sub-themes (Table 2).

TABLE 2. FUAS focus areas.

ENSURING WELFARE	TECHNOLOGICAL COMPETENCE AND ENTREPRENEURSHIP	SOCIETAL SECURITY AND INTEGRITY	ENVIRONMENT AND ENERGY EFFICIENCY
• Ageing of the population • Independent living • Communality • Virtual services • Productivity • Service entrepreneurship	• Digitalisation • Development of international business operations • Diverse application of design	• Water and food • Built environment • Security of energy supply • Crisis management	• Metropolitan rural areas • Environmental technology • Environmental business operations

The strengths of FUAS institutions include training a competent labour force for the needs of business, industry and public administration, and RDI with a focus on developing the wider metropolitan area. In 2011 – 2015, FUAS will be targeting its strategic measures on the following RDI areas:

- FUAS significantly fortifies international, practical RDI, which also generates new, internationally competitive content for education.
- FUAS is an engine for renewing the foundations of the innovation system in the wider metropolitan area, emphasising the joining of forces in the merging of research, innovation and practical development.
- RDI of FUAS is closely linked to EU-level R&D programmes, increasing and diversifying the funding sources.
- RDI of FUAS is established on international consortia, which serve as the framework for implementing joint multidisciplinary projects that cover the entire innovation chain and are connected to authentic development environments.
- The RDI profile of FUAS is established on the production of partial services for global challenges.

In addition to these RDI specific targets, RDI is integrated into the other target areas as follows:

- FUAS supports the provision of education leading to a Master's degree and double degree, makes increasing use of international experts for the degrees and connects the degrees more closely to RDI.
- Internationalisation of degree programmes is developed through student mobility and international RDI integrated into learning.
- RDI integrated into learning is one of the key strategic objectives of FUAS in education.
- FUAS commits to strong cooperation with society, industry and business, and public administration in the Helsinki metropolitan area. Both education and RDI are established on this cooperation.
- FUAS supports RDI services produced in collaboration with other operators in the wider metropolitan area.

The FUAS strategy defines critical success factors and strategic indicators (Table 3), by which the fruitfulness and influence of activity are systematically assessed from a perspective of RDI services, among other things. Other FUAS RDI indicators are presented in paragraph Quality Management.

TABLE 3. RDI-related strategic indicators.

FUAS-STRATEGIC INDICATORS	
INTERNATIONAL RECOGNITION AND COMPETITIVENESS	Number of foreign experts (calendar year, international mobility, incoming, country, min 1 week/RDI-staff) International RDI income financing
REGIONAL IMPACT	Share of entrepreneurs compared to total number of graduates (degrees from a 5-year period) Division/specialisation of RDI and theses in the wider metropolitan area (calendar year)
COMPREHENSIVE EDUCATION AND RDI SERVICES	Share of nationally and internationally research funding (Academy of Finland, Tekes) of total funding (calendar year, agreement)
SHARED OPERATING CULTURE	Joint development: measures and results • Volume and quality of FUAS cooperation: • Advantages of shared services and acquisitions • Funding used for FUAS projects (external and internal)

The current state of these strategic indicators is analysed in the following chapters.

Chapter Three

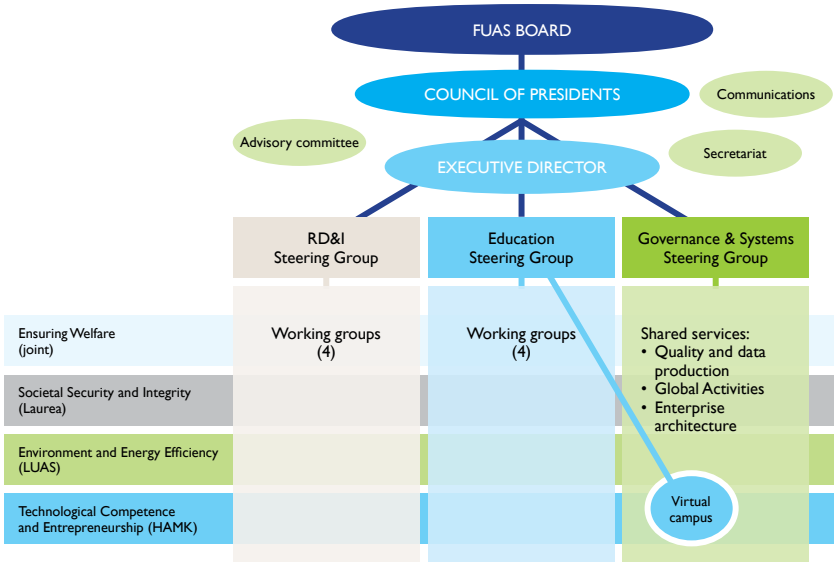
SELF-EVALUATION

FUAS RDI structures and resources

According to the FUAS strategy, FUAS significantly fortifies international, practical RDI, which also generates new, internationally competitive content for education. FUAS is an engine for renewing the foundations of the innovation system in the wider metropolitan area, emphasising the joining of forces in the merging of research, innovation and practical development. The RDI of FUAS is closely linked to EU-level R&D programmes, increasing and diversifying the funding sources. The RDI of FUAS is established on international consortia, which serve as the framework for implementing multidisciplinary joint projects that cover the entire innovation chain and are connected to authentic development environments. The RDI profile of FUAS is established on the production of partial services for global challenges.

The FUAS agreement defines the key principles of the activity and guidance of a FUAS university, as well as the power of decision of jointly agreed bodies and the basis of that power. The FUAS structure and steering system is described in Figure 2. A development manager has been appointed for joint functions like RDI (from 1 May 2013).

FIGURE 2. The management system of FUAS as of 10/2013.



The Rectors Collegium decides on the strategic policies of all joint functions as part of the operational and financial planning of FUAS. FUAS has thee strategic steering groups (RDI, Educational Responsibilities, and Governance and Systems), the key function of which is the execute FUAS strategic policies and develop activity in strategic sub-areas.

The job of the RD&I steering group is to execute the FUAS RDI-related strategic policies:

- International-level practical RDI
- Reform of the basic structures of the innovation system
- The diversification of sources of funding
- International consortia, joint multidisciplinary projects in authentic development environments
- the profile of RDI: the production of solutions for global challenges
- The strengthening of RDI services in the Metropolitan Area.

In addition, the RD&I steering group guides the activity of the RDI focus area groups, agrees on the common operating methods of member universities within the framework of its powers, sets the tasks and objectives of the development manager and acts as a steering group for /her work, decides on projects to be implemented, work groups and the activity of those work groups in relation to strategic objectives and, if necessary, makes proposals to the Rectors Collegium.

The function of the RDI development manager is

- to support the activity of the steering group in the development of the RDI sub-area
- to be responsible for the preparation of development measures and proposals in co-operation with the chairperson of the steering group
- to act as project manager in projects agreed on by the steering group
- to participate in the activity of the extended secretariat, and to ensure that decisions and possible commissions made in the Rectors Collegium and FUAS board proceed in the development of the RDI sub-area
- to act as secretary to the steering group.

The RDI development manager reports on her activities to the chairperson of the RDI steering group, to the expertise area director in charge of RDI at LUAS and her immediate subordinates and to the FUAS secretariat.

In addition to FUAS bodies, RDI development work also utilises the bodies and structures of each member university, as well as their best practices. RDI resources by FUAS UASs are presented in Table 4.

TABLE 4. RDI resources at FUAS UASs in 2012.

	HAMK	LUAS	LAUREA
Personnel man-years	120	73.9	111.4
Doctors, PhD	55	32	44.9
Licenciate, Lic	44	14	27

Development work is carried out as jointly agreed development projects: the development of learning and innovation environments as part of innovation clusters and regional innovation ecosystems, and the design and integration of a common service structure for RDI activity and entrepreneurship.

RDI in practice

The integration of RDI into pedagogy has been and will be strongly linked through students and teachers in all four FUAS focus areas. Environmental impact is also highlighted in these focus areas to promote entrepreneurship.

A total RDI volume in 2008–2012 in FUAS UASs is presented in Figure 3.

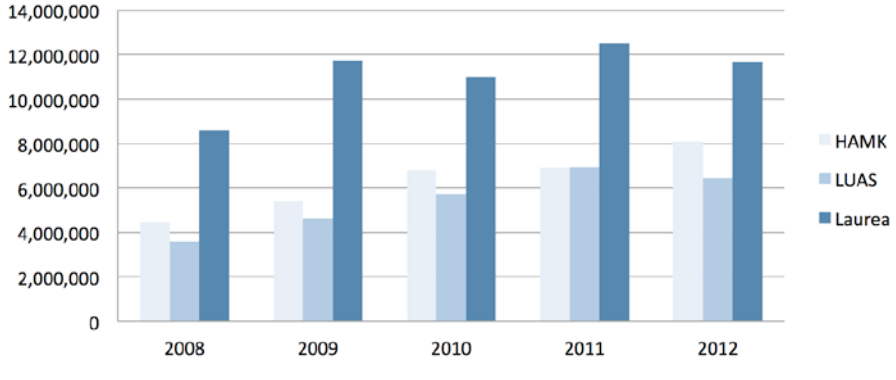


FIGURE 3. RDI volume (€) at FUAS UASs in 2008 – 2012.

The R&D projects among the FUAS consortium have been divided between four focus areas as shown below. The project budgets for the focus areas were €5.6 million in technology competence and entrepreneurship, €3.5 million in ensuring welfare, €1.8 million in environment and bioenergy and €1.6 million in societal security and integrity in 2012. When adding pedagogical projects of €0.6 million, the total budget was €13 million in 2012. All FUAS higher education institutes have a strong tendency to integrate all RDI work done into education performed by students and supervised by lecturers. The total turnover used in integration will more than double the sum used in only the projects here mentioned.

The volumes of FUAS RDI projects categorised in FUAS focus areas at the FUAS institutions HAMK, LUAS and Laurea in 2012 are presented below in Figures 4 – 6.

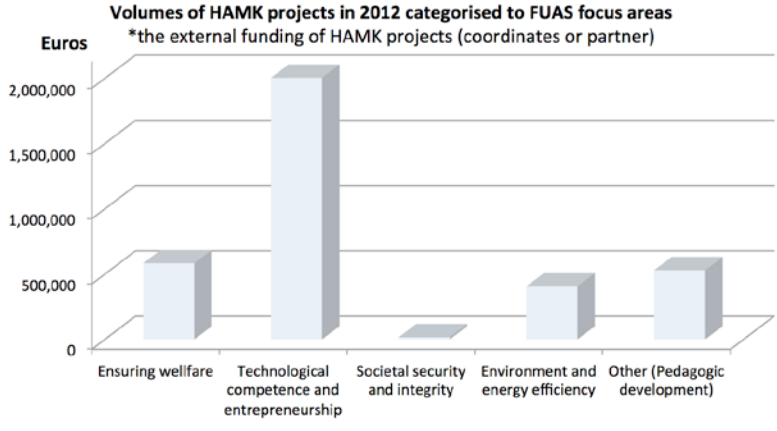


FIGURE 4. Volumes (€) of HAMK RDI projects in 2012.

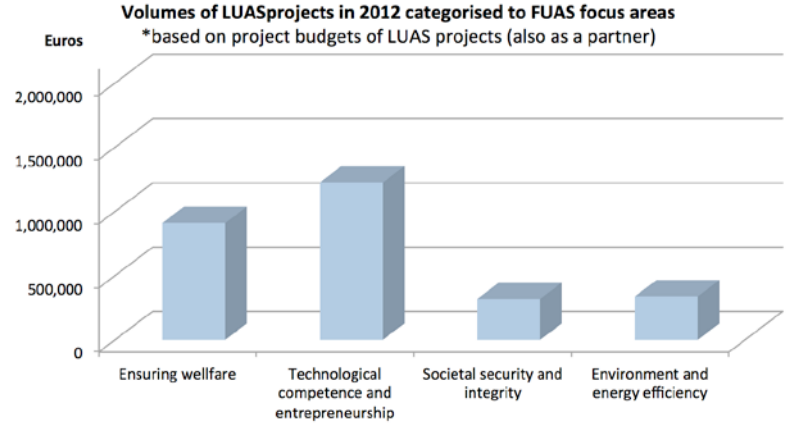


FIGURE 5. Volumes (€) of LUAS RDI projects in 2012.

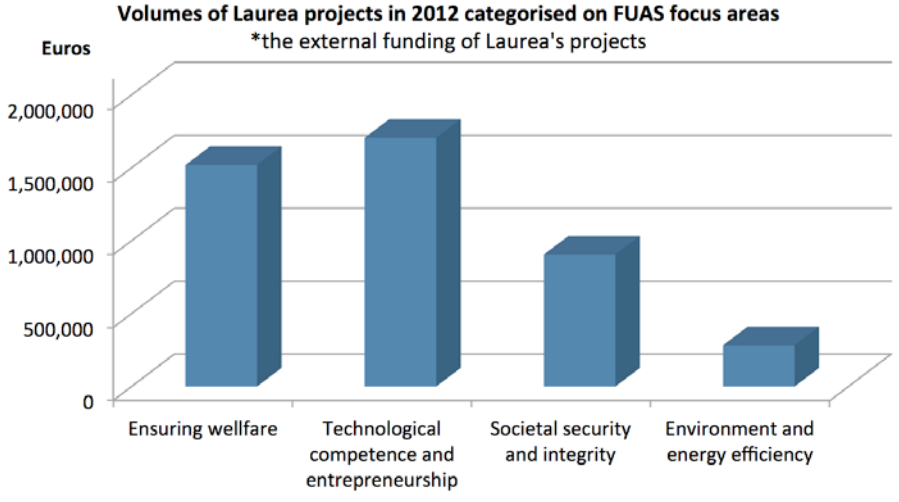


FIGURE 6. Volumes (€) of Laurea RDI projects in 2012.

Ensuring Welfare

The ensuring welfare focus area has some special themes. The ageing of the population concentrates on finding new ways of prolonging working life and improving the welfare of elderly people after working life, with efforts to help them live at home as long as possible. The research and development projects aim to improve the quality of life and enhance the independent living not only of elderly people but also of disabled and injured people. The eHealth services are developed in R&D projects focusing on strengthening self-care capabilities, monitoring and assessing vital functions, supporting networking and offering information channels. Productivity focuses on working abilities and service entrepreneurship on enhancing business growth, and helping new start-ups and SMEs to carry on.

The aim of maintaining welfare is to build national and transnational networks, and open new possibilities in an also international market for a better life through cooperation with different areas. The aim is to generate R&D projects, which are easy to integrate into education systems in the concept of FUAS. The more intense cooperation will create the prerequisites for more advanced projects also in the international world in cooperation with teachers and students.

Technological Competence and Entrepreneurship

Technological competence and entrepreneurship emphasises three main themes. Digitalisation concentrates on online services, e-learning & e-working and the virtual campus. The development of international business operations is the second highlight and the third is diverse application of design like industrial and service designs.

The aim of technological competence and the entrepreneurship focus group is to integrate the abovementioned methods into real life to promote entrepreneurial activity and technical information transfer for common use to support society, the environment and welfare, so that the borders between focus groups are not sharp and cooperation between the groups is intensive.

The technological competence and entrepreneurship focus team has in the past worked for several years in the framework of FUAS before FUAS existed. The work was incoherent before and now it is being concentrated more in certain topics to make the emphasis deeper and more practical. The freedom of new ideas and smaller development needs have also been saved.

The technological competence and entrepreneurship focus has the vision of promoting collaborative projects integrated into teachers' and students' learning, helping to understand the specific needs of different fields and to communicate and understand different cultures. The aim is to gain better skills to develop the region.

Societal Security and Integrity

Societal security and integrity emphasises four different main themes, namely water and food, the built environment, the security of energy supply and crisis management. Societal security and integrity focuses on elderly people and their security as part of the security of the living environment. Food chain safety and water safety are also the main focuses, also concentrating on the measurement possibilities to increase safety. All the projects will be integrated into the education of students and teachers.

Environment and Energy Efficiency

This focus area aims at developing solutions to two of the major challenges chosen by FUAS, namely global warming and dwindling energy supplies as well as water and food. Environment and energy efficiency has three main themes, Metropolitan rural areas, environmental technology and environmental business operations.

"Metropolitan rural areas" focuses on three specific themes: bio-economy and bio-energy, smart transport and healthy food. "Environmental technology" focuses both on waste streams and water management but also on the development of clean technology solutions (for example Green – ICT) aiming at more material- and energy-efficient production and services. One common theme is the managing of storm waters, which combines both bio-based and technology knowledge. Another important theme is energy efficiency which connects not only bio-economy and renewable energy technology but also urban and rural planning. "Environmental business operations" is part of the commercialisation of technology solutions, the developing of a low-carbon economy and responsible business.

Examples of FUAS RDI projects

The FUAS RR Team selected some projects (Appendix 5) as examples to show their methodology used, objectives, results, achievements and output in 2012. Some project themes (like Africa in Connect) have collected together similar projects with looking from different angles at the problems to be solved. The participation of students in the projects has been great, but there are also some projects where no student participated. These projects have been important to strongly impact the region, and also in these projects lecturers have been able to learn useful things for student assignments.

An important fact is that, among single projects, several belong to a long project chain (like ALDIGA, a project chain since 2001), which indicates that the work has been interesting and useful to working life, and industry and municipalities have been keen to join them as partners and also to partly finance them.

Integration of RDI into education

Integrating RDI into learning is one of the key strategic objectives of FUAS in the area of education, which is why student participation in different kinds of RDI projects is executed in many ways and is recognised as an important part of general RDI activities. FUAS has a strong strategic intent of "being an engine for applied research, pragmatic innovation and RDI integrated into student-oriented education in the wider metropolitan area, combining top national and international actors in joint projects" (FUAS Strategy 2011 – 2015), and the strategic focus areas of FUAS emphasise the development of learning environments. FUAS aims to fortify international, practical RDI projects, which also generates new, internationally competitive content for education.

In integrated learning model (Väänänen & Laitinen-Väänänen 2011) in regional knowledge production has developed, where students work and innovate as equal partners in an innovative ecosystem, with diverse partners such as other higher education institutions, businesses and the public sector. This integration enhances the interface between education and the world of work. The pedagogical RDI-integrated solutions, methods and environments in FUAS (e.g. LbD, Integrative Pedagogy, Living Lab, IDE) strengthen a creativity-based student-centred learning culture, which combines teaching and RDI activity, and promotes the commercialisation of innovation, and support the adoption of generic competences based on European Qualifications (EQF) and National Qualifications (NQF) Frameworks.

The LbD action models views learning as a tool for achieving competence, which in turn is demonstrated as new ways of action. Lbd provides students and lecturers with genuine encounters with the changing requirements of working life and a collaboration model for functioning as innovative partners" (Raij & Niinistö-Sivuranta, 2011, 6). The LbD model has been collectively developed and applied within Laurea and with its regional and international partners, and its development still continues as an educational, managerial or service innovation, depending on the context and viewpoint of its user.

The LbD model, in conjunction with the LivingLab approach is based on innovation co-creation among various stakeholders within the Helsinki Metropolitan area and internationally. Or, as Pirinen (2012) defines it: "the integrative model refers to the student-centred integration of higher education, research and development (R&D) and regional development in the viewpoint of actualisations of study units with funded R&D projects and within regional R&D actors such as the regional innovation system and clusters." Consequently, FUAS institutions became active participants in the international project field of ensuring welfare, technological competence and entrepreneurship, societal security and integrity as well as environmental and energy efficiency research. FUAS also offers a broad range of research related to the service business and is already prominent in the international forums of service design, user centricity and customer focus.

Participation in RDI activities offers students a chance to step into real life to meet potential employers and clients. The skills for the future work force (sense-making, social intelligence, novel and adaptive thinking, cross-cultural competency, computational thinking, new-media literacy, trans-disciplinarity, design mindset, cognitive load management and virtual collaboration) are worked out in network learning culture, where theory and practice are merged. At best, students have the opportunity to participate in RDI projects so that they may integrate theoretical and practical knowledge, test ideas, work together on specific problems and contribute to the mode-2 type of labelled knowledge production in multidisciplinary teams and in authentic learning environments.

The Integration of RDI into education was assessed for the first time as the FUAS curriculum development (FUAS Curriculum Review, FUAS CR) was evaluated in 2012. The audit report Collaborating to achieve a strategic vision - An evaluation of curriculum development in FUAS institutions summarises the findings. The evaluation supports the reality that FUAS institutions have clear evidence of integration of RDI activities and RDI as the Evaluation Team was convinced that all the programmes assessed took seriously their links with working life, and they recognised FUAS policy in this respect and that central to these links are RDI projects.

The FUAS CR Team got shown a wide variety of RDI projects, involving multidisciplinary cooperation between students, teachers and business life partners, at regional and national level and sometimes internationally. The staff of FUAS explained how the curricula and teaching blend theoretical foundations of content, project-based learning experiences, partnerships and strong links to the workplace, and competence development. All in all, how integration of RDI into education manifests itself; students' work placements, student's participation in RDI projects (direct participation or as sub-contractors in a larger project), students theses, students assignments, etc.

RDI focus is highlighted in Master's degree programmes, the FUAS Graduate School, in which learning assignments and the research-oriented development project of the Master's degree programmes are implemented closely with the student's own work/organisation and to the projects run by the universities. FUAS Graduate School also organises different RDI activities, for example seminars, symposiums and conferences (e.g. Responsible Business Management Symposium, COMBI2013 conference, Service Innovation and Design Seminar) which produce not only RDI credits but also publications.

The Curriculum Review self-evaluation report of one of the degree programmes reported that 'every student is involved in RDI activities'. Members of FUAS pointed out that students are more attractive in the labour market after graduation, and during RDI projects they develop personal networks with their co-learners and workplace partners.

The FINHEEC evaluation of UAS's RDI activities executed at the same time as the FUAS Curriculum review, found that there was a strong emphasis on Bachelor-level students in institutional RDI activities and that this is a major difference compared to research universities, where these activities are mainly conducted by PhD students and postdoctoral staff. The FUAS Curriculum Review Evaluation Board confirms that Bachelor students are widely involved in RDI activities in FUAS, making this a good asset for the students.

Figures 7 and 8 summarise all credits[8] carried out at FUAS institutions and the amount of RDI credits and theses commissioned by external organisations.

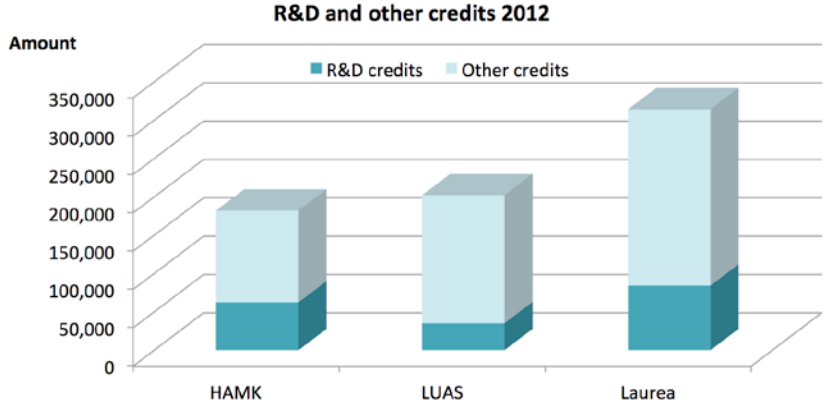


FIGURE 7. Total number of R&D credits and other credits at FUAS in 2012.

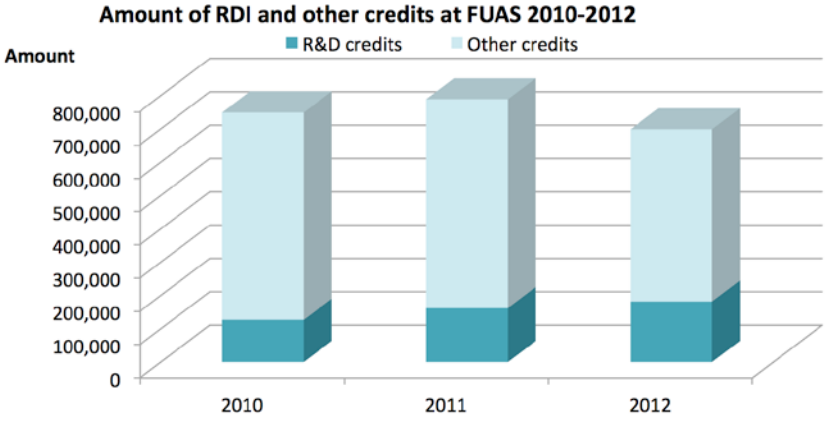


FIGURE 8. Number of R&D credits and other credits at FUAS institutions in 2012.

8. According to the Ministry of Education and Culture definition, the RDI credits include study credits gained through
   1. completing thesis for RDI projects funded internally or externally (agreed with separately beforehand)
   2. conducting practical training in RDI projects funded internally or externally (aims agreed with separately beforehand)
   3. participation otherwise in RDI projects funded internally or externally if connected to the studies, can be part of a study module (agreed separately)

all these can be performed in UAS or in business life.

FUAS is number one in Finland according the volume of the credits integrated into RDI.

In 2012, 84% (HAMK 89%, LUAS 76%, Laurea 84%) of the theses competed at FUAS institutions were commissioned for some external organisation that guided and assessed the thesis process. The assessment criteria of theses in all FUAS institutions requires the thesis to have an areal importance. The FUAS CR Team noted that the thesis and work placements are the most utilised ways of integrating RDI into education.

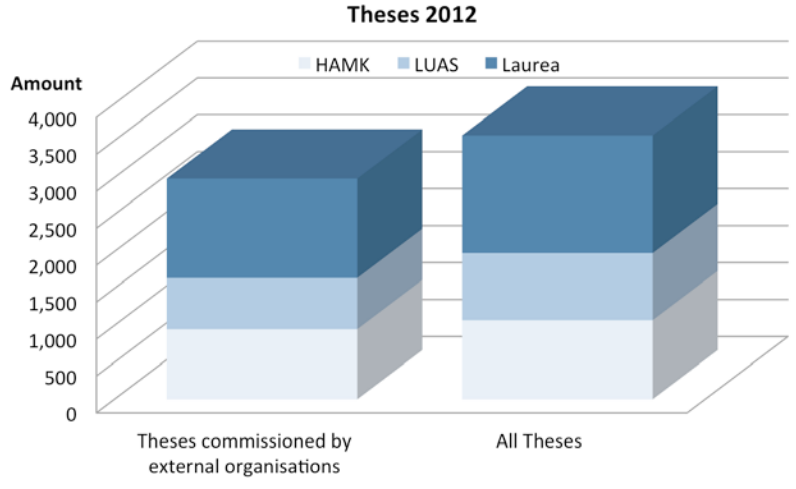


FIGURE 9. Number of theses commissioned by external organisations at FUAS institutions in 2012.

Considering the curriculum process, the FUAS CR Team reported evidence of the input of the business life partners and other stakeholders in the curriculum process through advisory groups, part-time lecturers, alumni visitors, theses partners, links to professional associations and other stakeholders. However, they noted that this cooperation is an area where more systemic efforts needs to be enhanced in order to create flexible and adaptive ways of curriculum and teaching that adapt to environmental changes. This could be one of the areas where the advantage of the critical mass of FUAS could be utilised better. The importance of developing FUAS pedagogy in close cooperation with operators in the metropolitan innovation environment is pointed out in FUAS strategy 2011–2015.

Though the FUAS CR Team was impressed, they noted that there was still progress to be made in the area of integrating RDI into education and, in addition, they noted that nearly all programmes evaluated mentioned the area of RDI as an area for development by themselves as well. Increasing international cooperation and projects, strengthening the connection of education and RDI, equalising the range of variation of students involvement (intensity and volume), gaining more external funding and solving the problems of recording RDI activity's impact were mentioned as areas of improvement concerning the integration of RDI into education.

The CR Team reported the difficulties of developing meaningful RDI indicators (at the European level as well). The Evaluation Team noted that the current indicators in use in Finland are based on assessing scientific research in universities, are not suitable to measure the realisation of certain policy goals and data collection in general is complex. They noted that the recording of the RDI impact should be improved. The Evaluation Board suggested increasing cooperation with traditional universities in analysing the material generated by RDI projects and producing joint academic articles. They saw that this kind of joint publications could assist FUAS in the demonstration of the impact of the RDI activities as well.

All in all, the integration of RDI into education was seen as a considerable strength of FUAS and the Evaluation Team was convinced that all the programmes assessed took their RDI work seriously and recognised the FUAS policy in this respect. The Evaluation Team reported progress in this area since previous reviews. The Evaluation Team reported that all the institutions have educational philosophies that are problem-oriented and student-centred and that they prepare students well to face the world of work.

Innovation and entrepreneurship

One of the four FUAS focus areas is Technological Competence and Entrepreneurship. Technology and entrepreneurship are also embedded in other focus areas, for example "Service entrepreneurship" in the focus area "Ensuring welfare". There is no clearly defined content within the FUAS focus areas, but the overall aim is for the combination of the focus areas to form few internationally competitive, multidisciplinary spearheads that combine top expertise in a novel way.

Societal needs and challenges

FUAS generates partial solutions for major global challenges, in cooperation with domestic and international operators. Of these challenges, many opportunities and possibilities arise, when it comes to creating innovations or entrepreneurship.

Building a successful domestic venture capital industry has been one of the leading policy objectives in Finland in recent years. The focus and public interest has been in developing so called fast-growth firms able to raise venture capital. According to prof. Kenney, building a successful domestic venture capital industry is difficult however, because there is unlikely to be sufficient deal-flow to ensure attractive investors. On the other hand, the VC industry is international in nature and Finland might consider developing strategy to encourage so-called nice-growth firms instead. These nice-growth firms include for example knowledge-intensive service businesses and non-capital intensive service firms that may draw upon many different knowledge bases in quite different industries in general. This would fit Finland`s profile and unique set of advantages and social values better. Undoubtedly it would also fit universities of applied sciences very well too, and is very much in line with the strategic guidelines of FUAS and its member universities.

Objectives

There are some defined critical success factors and strategic indicators concerning innovation and entrepreneurship in FUAS strategy. These measurement targets are included in Regional Impact factors (Innovation, entrepreneurship). The equivalent strategic indicators are the share of entrepreneurs compared to the total number of graduates (degrees from a 5-year period), and the division/specialisation of RDI (2012) in the wider metropolitan area (calendar year).

The strategic indicator concerning innovation is quite vaguely defined and difficult to operationalise. More direct indicators might be useful to be able to estimate both the quantitative and qualitative success of innovation activities. For example, the number of Innovation Disclosures might be one such indicator. The strategic indicator concerning entrepreneurship is concrete and quantitative in nature but deals with long-term success only; it might be useful to introduce some additional quantitative and qualitative indicators to be able to measure the more direct success factors of entrepreneurial operations.

Resources

The main resources of innovation and entrepreneurial actions and operations consist of human resources (student and employees), but also external experts. On the other hand, some financial resources are needed to be able to allocate the above-mentioned human resources to appropriate actions. Here are some indicators concerning the internal and external funding concerning innovation and entrepreneurship.

One of the main sources of external funding has been TULI/Tuoteväylä funding from the Foundation for Finnish Inventions. Other sources of funding include internal funding and external funding from other public sector organisations. It is difficult clearly to define which part of the financing is directly allocated to innovation and entrepreneurial activities. In 2012, TULI funding was €250,000 and other funding for innovations and entrepreneurial activities approximately €220,000 at FUAS. In terms of labour input, human resources were about 11.5 persons in 2012.

The core of the human resources consists of teachers and other employees, whose daily work is allocated to either teaching, or otherwise advancing innovation and entrepreneurial actions. Because of the integrative learning model used within FUAS, it is difficult to assess the total amount of resources allocated directly to innovation and entrepreneurial actions.

One key source of resources is undoubtedly student-driven networks, such as entrepreneur societies and alumni organisations. These networks not only provide important services, when it comes to, for example, organising different activating events, etc., but they also act as an invaluable peer-to-peer role model for the students, especially in entrepreneurial issues. Although these student-driven networks are quite active at all member universities within FUAS, the networking between them is still to be developed.

Actions

The most important joint RDI actions fostering innovation and entrepreneurship within FUAS are the TULI/Tuoteväylä programme, SENSE Business Idea Competition, Cambridge VentureCamp, and Innovation Express. TULI/Tuoteväylä, is a publicly funded development programme, targeted at promoting promising student-driven commercialisation cases within universities. By means of TULI, it is possible for universities to acquire outside business development services in order to advance the commercialisation process for promising innovation or business ideas. TULI funding is typically used in, for example, Business Model Development, market research operations, feasibility studies, building up test versions or prototypes of the innovation idea, etc.

Sense is a yearly business idea competition within FUAS, creating new ideas, developing innovative business ideas, inspiring and providing tools to create innovations. The purpose of the competition is to enhance students' understanding of the core of business activity, it enables participants to improve their interaction skills, and creates a framework for commercialising, developing and selling ideas. During the 2012–2013 competition, Sense received a record-breaking 260 ideas from over 700 students from FUAS member universities. The finale of the competition was a day-ong development workshop. At the end of the workshop. the best ideas and teams were chosen to face a panel of experts. The best ideas got TULI/Tuoteväylä funding and tablet computers. The runner-ups received smartphones.

Cambrige Venture Camp is an intensive two-week entrepreneurship camp in Cambridge, UK. The purpose of the trip is to accelerate business ideas in a top entrepreneurial environment with the students coached and mentored by world-class entrepreneurial experts. Cambridge has a long history of growth entrepreneurship and thus provides an excellent hub for developing world-class ideas. The goal of the camp is to get entrepreneurially-oriented students to understand and aspire to entrepreneurship on a global scale. About 20 students are yearly selected for each camp. The focus is on students who already have a concrete business plan but have not established a business yet. Every camp consists of multi-national students who share the same dream of becoming successful entrepreneurs. Students live in a communal atmosphere creating successful business ideas and relationships. The accommodation and programme are provided free of charge, and students need to cover travel expenses, eating and other normal living costs.

The first camp was completed in co-operation with the University of Cambridge (Centre for Entrepreneural Learning) in 2007. Since then, six camps has been completed. The camps in 2011 and 2012 were the first completed totally within the FUAS RDI umbrella. In 2012, there were 24 participants, 9 from Laurea, 7 from HAMK, 6 from LUAS, and two additional students from Aalto University. All the instructors and mentors come from either FUAS member universities or from the University of Cambridge. All the arrangements were taken care of by Laurea ES. Cambridge VentureCamp was also awarded first prize in its category by the Finnish Entrepreneurship and Innovation Network for Higher Institutions in 2012.

Innovation Express is a two-week trip through Europe, a kind of "mobile entrepreneurial boot camp". The participants visit four European cities, meet entrepreneurial professionals and build networks there. The target cities are destinations with a rich knowledge of entrepreneurship. The purpose of the trip is to accelerate business ideas in a top entrepreneurial environment with world-class coaches and mentors. The participants are provided with InterRail tickets, 8 nights of accommodation and a programme of activities, and the students need to cover flight expenses and other normal living costs. Before the trip, two preparatory workshop days were held to get the most out of Innovation Express. The feasibility of ideas was scrutinised and pitching skills were practised in workshops held by high- profile lecturers. Teams developed their projects while travelling. Each phase of the project was pitched at every stop to lecturers, mentors and other teams, so that students could gain confidence in their presentation skills.

Innovation Express was completed for the first time in 2012. The students and their instructors visited Brussels, Strasbourg, Nice (Sophia Antipolis) and Barcelona. During their visit to Brussels, a Young Entrepreneurs´ manifesto was presented to the European Commission. Innovation Express was funded not only by FUAS but also by EER. Altogether 17 students took part in the trip: 8 from Laurea, 5 from HAMK and 4 from LUAS. All the arrangements were taken care of by Laurea ES.

Output and results

The commercialisation process within FUAS consists roughly of the following phases: Activation, Idea recognition, Idea evaluation and development (funded by the TULI programme), and Commercialisation (start-ups). One way to evaluate the output of the entrepreneur and innovation activities is to measure the actual deal-flow of the process (i.e. the number of activation events and innovation ideas). The estimation of activation activities is difficult, however, because there is no follow-up system to cover this. In 2012, there were 240 business ideas in total. The TULI programme funded 25 business ideas and 6 start-ups. The number of Innovation disclosures was 10 and the total number of student-driven start-ups was 24 at FUAS in 2012.

Regional Impact (leading to welfare)

The objectives of the Innovation and Entrepreneur activities within FUAS mainly consist of the share of entrepreneurs compared to the total number of graduates (degrees from a 5-year period): 3.67%. The division/specialisation of RDI (2012) in the wider metropolitan area (calendar year) was 80.7%.

Regional influence

The fact that FUAS is a member of the regional innovation ecosystem (RIE) in the Greater Helsinki Region implicates that each of its member institution plays a pivotal role in the well-being of its regions by creating and transferring new knowledge to its students and regions, thereby increasing both the capacity of students and regions to absorb the latest knowledge and foster innovation.

To optimise both educational and RDI impacts, the Knowledge Triangle (KT) was launched by the EU and has been applied by FUAS members. KT is about creating and strengthening the interaction and synergy between research, education and innovation and paying due attention to the links between them. As KT required changes in the design and delivery of education programmes, new mechanisms and interfaces for collaboration among various regional stakeholders have been developed and applied by the FUAS members. Integrated learning model (LUAS) and Learning by Developing (LbD) (Laurea) has been developed and successfully applied together with the LivingLabs (LL), Service Innovation Design (SID) and doing, using and interacting (DUI) –models together with regional technology centres (Teknologiakeskus Innopark, Lahti Science and Business Park (Ladec Oy), Aviapolis, Otaniemi, TechVilla Ltd) and incubators (Starttihautomo, Spinno).

Laurea UAS has, for example, a nine-year continuous tenure as a Centre of Excellence as nominated by the National Evaluation Council due to its student-centred LbD action model integrating RDI with learning and regional development. HAMK is also one of the most awarded universities of applied sciences (FINHEEC) based on the criterion of regional influence. It has been building new kinds of regional development concepts and has been a significant trailblazer in terms of activity. HAMK estimates that, during its period of operation, it has received about €1 billion for investment in regional development and the training of personnel. With this money, many new products (such as thin-film- and designer products) have been designed and developed. New service solutions have also been created, for example in the fields of social welfare and care and natural resources.

In the Lahti region, the profile of R&D activity has been significantly affected by a lack of state research organisations in comparison to many other large urban regions. RDI expenditure per resident has been considerably lower than the national average. The number of innovations created in the region in relation to RDI expenditure is, however, amongst the highest in Finland. The regional specialities of expertise in Päijät-Häme (Environment, Design, Practical Innovation) form a cluster of regional smart specialisation which, when combined with the Living Lab concept, has been selected as a model European cluster, in which LUAS plays a key role.

FUAS members have played a crucial role in formulating and implementing regional innovation strategies (Metropolialueen kilpailukykystrategia) in partnership with local authorities, businesses and citizens. Moreover, they have contributed to open and user-driven innovation and the development of people-centred self-renewal societies and working organisations. Most importantly, tangible methods such as the user-driven Innobrokers programme, together with local SMEs, has been developed and implemented.

Metaphorically, the collaborative RDI projects operate as regional learning living laboratories, which can be associated with an orchestration table, around which the different players, such as public, corporate and third-sector actors, as well as universities together with end-users gather in order to swarm around common phenomena and problems. Apart from the actual RDI work, the integrative process consists of social interaction, knowledge sharing, collective intelligence, learning and problem solving, and the build-up of related shared meanings. In the Living Labs, the co-creation of innovation and innovative activities bring the concepts of science close to citizens and the users' real-life expertise close to researchers, designers and politicians. Also, the stakeholders' roles as designers, researchers, enablers, or users can vary depending on the project type (Hirvikoski 2013).

Throughout the feedback loops between the collaboration stages of interlinked university and UAS-driven RDI projects, commercialisation and innovation policy, additional, systemic learning and changes may follow both in the wider society or industrial clusters.

In all this, the students are equal partners, developing and creating new professional knowledge and skills whilst growing towards their own fullest potential as human beings. As there is a constant demand for self-organising actions, the model fosters creativity, entrepreneurial competences and critical thinking. Consequently, together they form the bases for learning regional Living labs and people-driven dynamic societies that do not shy away from challenges but rather organise themselves around them (Kantola & Hirvikoski, 2012).

It is in accordance with regional Smart Specialisation strategies that, through its internationally funded projects and by operating as an orchestration table, FUAS also offers its best co-operation capability to international partners and consequently access to one of the world's most competitive and advanced metropolitan areas. FUAS international partners include a) multinationals such as EADS, the European Aeronautic Defence and Space Company, b) leading universities and research centres (e.g. KU Leuven, University of Arizona, Tohoku Fukusi University, iMinds) in their cities and regions (such as Flanders, Cambridge, Arizona and Sendai regions) or c) networks and collaboration areas (such as the Service Design Network (SDN), the European Network of LivingLabs (ENoLL), Center for Identification Technology Research (CITeR), and the European Agency for the Management of Operational Cooper-

ation at the External Borders of the Member States of the European Union (Frontext)), Consortium of Institutes of Higher Education in Health and Rehabilitation in Europe (COHEHRE), International Society of Telemedicine and eHealth ja OECD IMHE (Sendai-Finland Wellbeing Centre).

FUAS aspires, together with its regional and international partners, to achieve better RDI results in its focus areas and to improve their commercialisation and usage in organisations and within society. The RDI results may be turned into innovative marketable products and services by the corporate sector, whereas the public sector may utilise them in their strategies and operations. Collaborative RDI project results are applicable in such multiple areas as:

- HAMK has been supporting development work related to environmental business in Southwest Häme. This has meant participation in development work done both with the region's companies and public bodies. The results are evident in, for example, the activity of a technology park focusing on the environmental business. This "Bright Green" business means the development of supply chain solutions for companies in the Forssa region, and finding new ideas in the spirit of sustainable development.
- The aim of Laurea's Saterisk project focusing on risk management in satellite positioning systems has been to increase the international competitiveness of Finnish companies in the security field, whereas the AIRBEAM project focuses on building a multi-platform approach to crisis management by integrating information from Unmanned Aerial Vehicles (UAVs), balloons, satellites and other remote sensing platforms.
- JADE, a pan-European project identified some of the barriers to widespread adoption of ambient assistive technology. It also recognised some of the regional strengths and opportunities in the clusters to overcome these barriers through the JADE SWOT and CROSS analyses. According to the White Paper, there is recognition that much of the impetus to overcome the barriers and deploy assistive technology at scale lies with the policy makers. There needs to be a paradigm shift in the way that health and social care is delivered. Programmes for Ambient Assistive technology need to be built into health and care pathways. In Finland the cross-analysis findings have led to the development of the Smart Hospital project. The Smart Hospital is a real user community in a hospital environment, where assistive technologies produced by enterprises will be in use and developed further with and for users (health care professionals, clients and their significant others).

- In accordance with the EU2020 Digital Agenda, many of the RDI projects' end-products are related to eServices, such as the CaringTV, Express to connect, the Virtual Elderly Care Services on the Baltic Islands (VIRTU), or Mobile Tools, which are applicable in preventive operations, (e.g. the prevention of dementia such as . the DAILY project) or eAPU solutions to support the well-being and mental health of young people in danger of being sidelined (the YHDESSÄ project).
- The special feature and strength of the Lahti region is its design-intensive industry, one of Europe's most respected institute's of design and the culture of applied design that results from it. The Institute of Design at LUAS combines applied design with product development and the construction of resource-efficient business models. The Institute of Design at LUAS has been honoured by FINHEEC, and has received many other international and national awards.
- The Lahti region is one of the most significant cleantech clusters in the Nordic countries. It is a pioneer in environmental urban thinking and investments in the cleantech business. LUAS is the only university in the area offering teaching in environmental technology. LUAS is also implementing several national and international RDI projects in the field of the environment in cooperation with the private and public sectors.
- The main aim of the Proaktiivisesti kohti rakennemuutosta (proactively towards structural change) (ENNE) is to learn to identify risks and factors in the areas leading to sudden structural changes which, by strengthening the realisation of the risks, can be prevented in advance. Methods typical of futures research are being developed in the project. The aim is good practice applicable in European regions to the forecasting of sudden structural changes.
- Lately, innovative public procurement has become a crucial instrument when creating business opportunities for the new RDI results, hence projects such as Nordic Innovation have been established to facilitate public-private collaboration in the region.
- Finally, from the point of view of the Metropolitan area's international competitiveness, FUAS members have created close collaboration or operate as owners within such national programmes as EIT, FIMECC-shok, RYM Ltd, Oy Energizing Urban Ecosystems (EUE) and Innovative Cities (INKA).

Based on the FUAS members' experiences since early 2000 and the related evaluation results, it is argued that collaborative RDI projects can be successfully orchestrated in a multi-stakeholder context. Most importantly, the student-centred model provides an attractive multi-dimensional learning environment for individuals, working organisations, regions and broader society and the model has provided UAS graduates with great employment and start-up opportunities.

Quality management

FUAS quality management forms around shared strategic intent and the implementation of a FUAS quality system supporting gaining the intent. The aim is to develop the shared culture of actions where the development of the quality is a regular part of everyday operations. Open communication, involvement and interaction (top-down and bottom-up) are basics of successful quality management. FUAS operates through networked operations model that enable collaboration and multidisciplinary actions comprising the strengths of all FUAS UASs. This creates a steady base for strengthening the culture of continuous development in FUAS.

The FUAS strategy 2011–2015 lines, according to which FUAS strengthens its network-based cooperation in the area of quality assurance and the international quality assurance system of FUAS, enables the significant development of the quality and impact of education and RDI operation. FUAS is currently developing a shared quality system. It will undergo international audit by FINHEEC in 2016.

The aim of the FUAS quality system is to:

- support the attainment of FUAS strategic intent and to steer the development of FUAS operations
- strengthen the quality of educational and RDI –operations
- produce information for development activities
- support the sharing of best practices inside FUAS, nationally and internationally
- unify and emphasise FUAS quality management
- strengthen the involvement and competence of members of FUAS in the field of quality
- promote the development of FUAS quality culture.

The FUAS quality management and system based on a continuous improvement cycle (Figure 10).

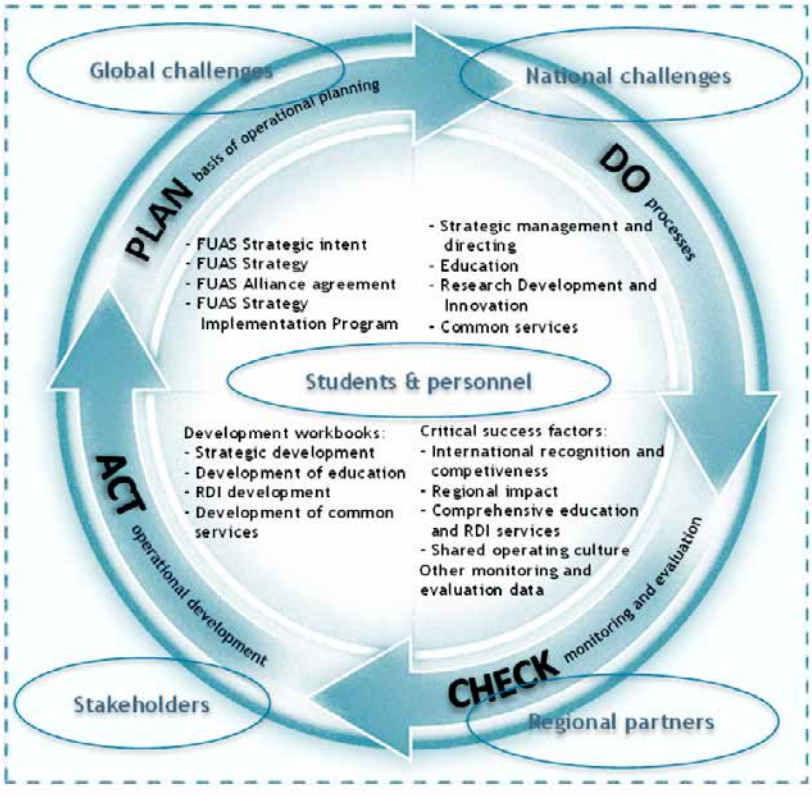


FIGURE 10. The continuous improvement cycle of the FUAS quality management and system.

Plan Basis of operational planning: Strategic intent, FUAS Strategy, Alliance Agreement and Strategy Implementation Programme.

Do Operations: Strategic management and directing, education, RDI and Common services (Governance, Communications, Quality Assurance, Information Management, Global Activities, Virtual Campus)

Check Monitoring and evaluation: Strategic indicators, other evaluating and monitoring data

Act Operational development: utilisation of monitoring and evaluation data through development workbooks.

The FUAS RDI activities being implemented are based on the FUAS Strategy and action plan drawn up annually. The RDI action plan is evaluated annually.

Quality management of RDI-activities

In addition to the FUAS strategic indicators, FUAS RDI activities are currently being evaluated and developed by following indicators and feedback procedures:

Ministry of Education and Culture agreement indicators 2013–2016, quantitative

- Publications
- Learning in R&D operation
- External R&D funding
- Services liable to a fee = *maksullinen palvelutoiminta*

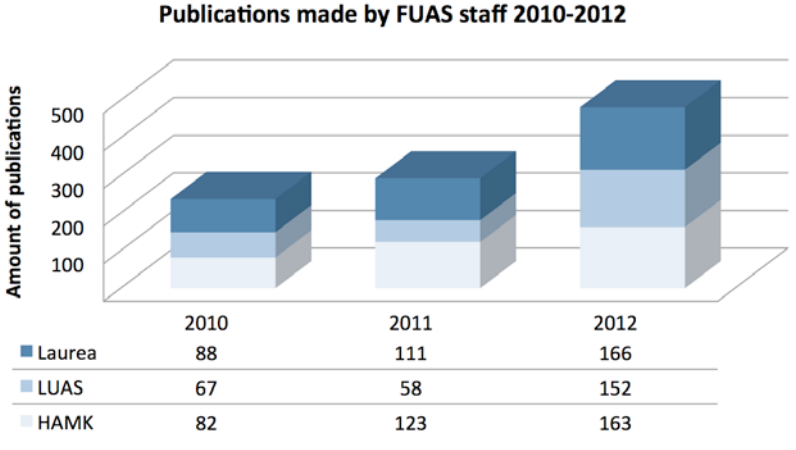


FIGURE 11. Number of publications by staff of FUAS institutions in 2012.

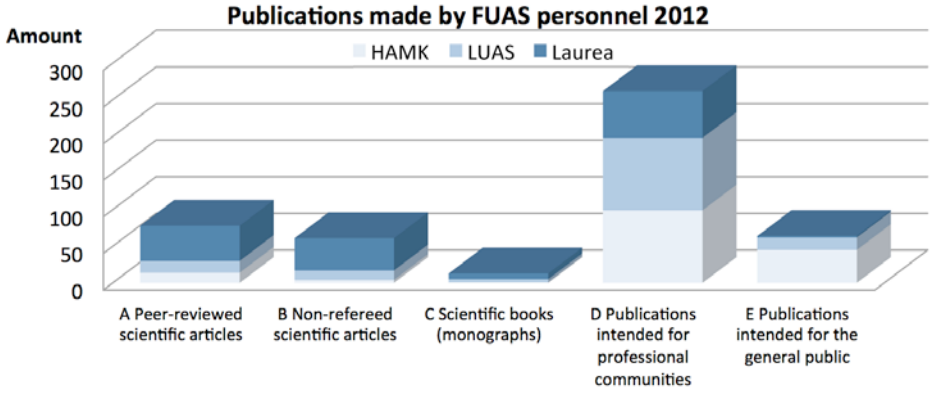


FIGURE 12. Publications by different publication groups at FUAS in 2012.

Operational evaluation feedback of RDI, qualitative

- Research Review
- Curriculum Review/RDI
- Quality feedback on education/RDI
- Feedback of graduates (OPALA)/RDI
- FUAS - KU Leuven Association benchmarking /RDI

Connection of RDI to the global and EU level

The strategic intent of FUAS for 2020 connects its aims to global and EU developments in two ways: (1) FUAS will be an internationally respected federation of independent higher education institutions; and (2) FUAS will strengthen the international competitiveness of the Helsinki metropolitan area.

To accomplish the first, FUAS has actively networked with other higher education alliances on a global level.

- FUAS has organised with other Finnish higher education alliances two conferences on alliance development in higher education with international guests.
- FUAS has organised a strategic workshop and undersigned a strategic alliance agreement with the KU Leuven Association based in Flanders, Belgium.
- FUAS participates in a European higher education alliance benchmarking project implemented by the RUOA Association in France.
- FUAS participates actively in the work of Association of Collaborative Leadership (Association for higher education consortium directors) based in North America and is in negotiations to organise a global workshop and conference for higher education alliance directors in Finland.

To accomplish the second, FUAS has formed focus groups consisting of its main RDI actors on focus areas (ensuring welfare, technological competence and entrepreneurship, social security and integrity, environment and energy efficiency). Their task is to involve top national and international actors in forming internationally competitive, multidisciplinary projects for the whole innovation chain that combine top expertise in a novel way. The aim is for each focus group to submit at least 4 financing applications for such projects in 2013.

FUAS's international collaboration in RDI has developed on four fronts:

- The focus groups use their own international contacts to build collaboration on an EU- and global level.
- FUAS strengthens collaboration with its strategic partners in order to facilitate RDI-development and financing. An example of this is the RDI-workshop concerning the new EU-programmes on November 6, 2012. At the workshop, a FUAS delegation presented 40 posters of international projects (and negotiated about collaboration). Several applications for financing have already been submitted for EU-programmes based originally on these negotiations.
- FUAS participates actively in building Helsinki Smart Region Pioneering for Europe 2020. The EU's flagship initiative Innovation Union and Digital Agenda for Europe have been at the forefront of this. For example, FUAS's virtual campus idea generation took place in relation to developing a local digital agenda and in global collaboration at the ACSI-camp 2011 (Aalto Camp for Societal Innovation), and has led to application for EU's Lifelong Learning programme. As part of the programme of the Helsinki Metropolitan region as the European Enterpreneurship region in 2012, FUAS students organised an Innovation Express train ride from Helsinki to Brussels, Strasbourg, Nice and Barcelona to promote young entrepreneurship.
- FUAS works closely with companies in the region to support their product development and penetration in global markets. As an example, the CONNECT project generates market entry for Finnish renewable energy SMEs into developing countries. There are 9 Helsinki Metropolitan region-based SMEs participating in the project.

As a result, FUAS will achieve the strategic aims for RDI that it set in the FUAS Strategy 2011 – 2015 and that are very closely linked with EU and global connections:

- FUAS significantly fortifies international, practical RDI, which also generates new, internationally competitive content for education.
- FUAS is an engine for renewing the foundations of the innovation system in the wider metropolitan area, emphasising the joining of forces in the merging of research, innovation and practical development.
- The RDI of FUAS is closely linked to EU-level R&D programmes, increasing and diversifying the funding sources.
- The RDI of FUAS is established in international consortia, which serve as the framework for implementing joint multidisciplinary projects that cover the entire innovation chain and are connected to authentic development environments.
- The RDI profile of FUAS is established on the production of partial services for global challenges.

SWOT-analysis of FUAS RDI activities

Higher education institutions (e.g. UASs) play an essential role in society: creating new knowledge, transferring it to students, re-training employees in firms and fostering innovations. "The third mission" of UASs centres specifically on the contribution to regional development. In order to fulfil this regional role, FUAS must engage with others in its regions. Stronger ties and connections between FUAS and the world of work are also necessary and needed in order to extend relationships into the partnerships. Such partnerships would start to accumulate with a common agenda.

Even though new mechanisms such as LbD and LivingLabs has been developed and implemented by individual UASs, present structures and processes in FUAS as a whole do not enable flexible and sufficiently quick responses to co-operation with private, public and third sector stakeholders. The integration of RDI into education differs between degree programmes too. In the future, RDI should be integrated into all study programmes and more students and staff should participate in RDI projects. This means that more flexible curricula, semesters and work schedules are needed.

FUAS is an essential actor with people and the private and public sectors in the Greater Helsinki metropolitan area`s innovation ecosystems. It links different sectors and orchestrates developing networks. The role of FUAS is very important in the transfer of knowledge, both regarding science-based knowledge and its practical application in the world of work, and the transfer of needs and problems from society to various RDI actors and funding bodies.

New knowledge is produced by higher education, research institutions and business, among others. FUAS is located in the Greater Helsinki metropolitan area, and is a multidisciplinary federation. In FUAS, the biggest difference compared to research at academic universities is the premise and execution of operations.

Based on the self-evaluation material and information gathered and, based on experiences, the RR Team conducted SWOT analysis of FUAS RDI and defined the following strengths, weaknesses, opportunities and threats of FUAS RDI.

TABLE 5. Four steps SWOT analysis of FUAS RDI.

STRENGTHS	WEAKNESSES
Internal strengths • FUAS covers all fields of education and business, and thus all areas of life → a good possibility diversely to influence metropolitan area development. • A large number of students (21,000) and 1,700 staff, which can be mobilised to develop the area • A large RDI volume • Entrepreneurship: jointly developed and implemented business models (Sense) • Student-driven entrepreneurship is increasing (positive trend) • FUAS partners already have a strong regional influence: HAMK and Laurea UASs have received many awards for regional impact (FINHEEC). *External strengths* • Geographical location a Finnish economic driver • A national need to create entrepreneurship • All FUAS institutions passed the audits of the quality systems of higher education institutions done by the Finnish Higher Education Evaluation Council.	*Internal Weaknesses* • Common structures and culture are emerging → slowness, inefficiency, potential not yet being exploited • Joint action plan and targets are limited only to quantitative targets • Joint activities do not yet have any development mechanisms • The Alliance-based organisational structure (the lack of a common legal person) in many cases prevents applying for jointly administered international projects • Slow reaction to changes in the operating environment • Research-driven entrepreneurship is modest • The content in and between FUAS focus areas is still unfocused • Mostly local, so not global (international RDI) *External Weaknesses* • Few companies and municipalities invest in joint RDI operations • Funding instruments often favour traditional universities and it is hard for the UASs to get funding • Exploitation of research results in society and enterprises is modest
OPPORTUNITIES	**THREATS**
Internal opportunities • Volume of students is high and means untapped potential. • Good opportunities for internationalisation → geographical location and educated staff. • A lot of staff with potential to grow into strong project players, (”Competence Net Share”), a possibility to develop method know-how and method banks • 170 qualified researchers → high RDI quality • A potential to develop and increase the internationally tendered income for RDI-operations • Multidisciplinary focus areas are in accordance with the needs of society *External opportunities* • The possibility to influence major metropolitan regional development • Education responsibility and its necessary structural changes/mechanisms • The possibility to take advantage of future trends, circumstances, etc.	*Internal threats* • Staff’s weak involvement and competition between three UASs • Narrow capital base *External threats* • Changes which influence the financial structure of projects/promotion of entrepreneurship • Competition in the financial funding of RDI activities will tighten – less funding, more applicants. • Changes in education policy and UASs’ role in it

Conclusions

The mission of UASs in Finland is to provide higher education instruction based on the requirements of working life and its development, and on research and artistic premises in preparation for professional expert tasks. In addition, the universities of applied sciences must support individual professional growth and the practice of research and development, which serves in university education as well as supporting working life and regional development, and applied research and development work that takes into account the structure of industry in the region (University of Applied Sciences Act 9.5.2003/351). In addressing this challenge, FUAS carries out sustainable applied research, development and innovation (RDI) that is in close collaboration with working life, supports regional development, takes into account the structure of regional industry, and reaches high European and international standards.

The goal of all FUAS operations, including RDI activities, is to increase the region's know-how and advance the development of individuals, culture, working life, and other societal factors in a changing and multifaceted operating environment. The support of small and medium-sized industry and service production, especially in traditional fields that undertake little or no research and development of their own, is emphasised in the RDI activities. The central concepts of FUAS RDI activities are efficacy, productivity and quality. The operational aim is to operate economically and with high quality as a member of the regional innovation ecosystems, whose operations advance economic growth.

FUAS RDI activities are based on the FUAS strategy, and the connection with regional strategies is very direct. The direction is clear and is closely linked to both the EU's and Finland's National Growth Strategy. The improvement of regional productivity and pioneering innovation are the leading goals. The national strategy of Finland is based, to a great extent, on research, innovation and success in key policy areas: education, science, technology and innovation. The main principles in this development are the prioritisation of operations, national and international profile-building and selective decision-making based on foresight.

TABLE 6. Summary of the current state of the RDI-related strategic indicators.

INTERNATIONAL RDI INCOME INANCING, €	2012	2011	2010	2009
HAMK	2,205,000	1,551,000	1,423,000	983,000
LUAS	1,405,000	1,672,000	1,190,000	598 000
Laurea	1,340,000	847,000	967,000	537,000
FUAS total	5,309,000	4,070,000	3,580,000	2,118,000
INTERNATIONAL RDI INCOME INANCING, €	**2012**	**2011**	**2010**	**2009**
HAMK	0.14	0.21	0.33	0.51
LUAS	0.34	0.34	0.65	0.56
Laurea	1.94	1.65	2.11	1.26
FUAS total	0.90	0.77	1.05	0.79
NATIONALLY COMPETED RESEARCH FUNDING (ACADEMY OF FINLAND, TEKES), €	**2012**	**2011**	**2010**	**2009**
HAMK	80,000	119,000	188,000	279,000
LUAS	208,000	138,000	254,000	212,000
Laurea	1,134 000	898,000	1,139,000	645,000
FUAS total	1,422,000	1,155,000	1,581,000	1,136,000
SHARE OF THESIS DONE IN THE WIDER METROPOLITAN AREA OF TOTAL THESIS (CALENDAR YEAR), %	**2012**	**2011**	**2010**	**2009**
HAMK	58.2	70.6	70.4	
LUAS	83.4	85.0	71.4	
Laurea	94.4	94.9	95.8	
FUAS total	80.7	84.8	80,8	
NUMBER OF THESES DONE IN THE WIDER METROPOLITAN AREA (CALENDAR YEAR	**2012**	**2011**	**2010**	**2009**
HAMK	623	721	711	
LUAS	757	639	585	
Laurea	1,502	1,362	1,151	
FUAS total	2,882	2,722	2,447	
SHARE OF FOREIGN EXPERTS OF TOTAL NUMBER OF TEACHING AND RDI STAFF	**2012**	**2011**	**2010**	**2009**
HAMK	0.29	0.19	0.28	0.22
LUAS	0.30	0.29	0.24	0.29
Laurea	0.26	0.17	0.16	0.20
FUAS total	0.28	0.21	0.22	0.23
SHARE OF ENTREPRENEURS COMPARED TO TOTAL NUMBER OF GRADUATES (DEGREES FROM A 5-YEAR PERIOD), % *	**2012**	**2011**	**2010**	**2009**
HAMK			4.79	5.09
LUAS			5.13	4.53
Laurea			1.98	1.84
FUAS total			3.67	3.53

** The last available information is from year 2010.*

Based on the FUAS strategy 2011 – 2015 and current state of FUAS RDI, the FUAS RD&I steering group has defined four development priorities and measures for them for 2013 as follows:

1. To launch new international RDI projects and to increase RDI activity and the volume of externally tendered RDI funding
   → at least four new strategic FUAS RDI projects

2. To develop the prerequisites to co-operate in the implementation of international RDI projects, improving the quality of RDI activity (FUAS Research Review)

3. To map the support service needs and structure required for international RDI activity, benchmarking and building a development plan for FUAS RDI activity

4. To strengthen RDI funding expertise, to make RDI administration more flexible, to increase transparency and to systematise RDI communications.

Based on these four steps, SWOT analysis of FUAS RDI presented in Chapter 4, the FUAS RR Team applied the principles of the 8 step- SWOT analysis and defined future success factors in which success must be achieved in FUAS RDI, what should be done in order to turn weaknesses into strengths, how current strengths can be used to react to threats, and what kind of crises can come to pass if RDI is not developed.

Future success factors in which success must be achieved:

- to promote the development of the RDI expertise of staff and students through common operating models, and to increase participation in FUAS RDI activity
- to build appropriate RDI services to support FUAS project planning and implementation
- to connect the region's organisations more strongly to the development of FUAS RDI activity

Reacting to weaknesses through opportunities

- to commit all staff, students and external interest groups to the development of RDI activity
- to utilise the reform of educational responsibility in the development of FUAS RDI activity, in particular the activity of RDI focus areas

Reacting to threats through strengths

- to build RDI operating models to support RDI activity required by strategy and the new funding model
- to invest in the development of RDI funding expertise and in project preparation expertise
- to increase the commitment of staff to RDI activity by taking advantage of strong regional impact and regional visibility

Crisis, if RDI activities are not developed

- The volume of RDI activity will stay the same/decline
  → funding will decline
- a rigid working hours planning model does not support the participation of staff in RDI activity
  → not possible to commit staff to RDI activity
- The results of RDI activity are not exploited
  → Confidence in FUAS' RDI activity weakens

Chapter Four

EXTERNAL EVALUATION

FUAS Strategy and the role of RDI

'Bigger is better'

Since 2011, three universities of applied sciences in the Greater Helsinki Metropolitan Area have been collaborating in a federation named FUAS. While the Finnish Government initially pushed this collaboration as part of the larger Higher Education Reform aiming at reducing the number of universities in both sectors of the binary system (Aarrevaara et al. 2009), the three (HAMK, Laurea and LUAS) are convinced that the federation will give them a stronger position both in relation to regional development and in the context of access to European and other international funding sources. The FUAS 2011 – 2015 strategy – Collaborate for Success – aims at enhancing its international profile, including improved access to EU-level R&D programmes; aligning resources, innovation activities and practical development; and participating in multi-disciplinary projects covering all stages of the innovation chain. Content-wise, FUAS focuses on 4 areas: Ensuring welfare, Technological competence and entrepreneurship, Societal security and integrity, and Environment and energy efficiency.

Altogether, FUAS strategy fits with the national educational policy aiming at reducing the number of colleges and universities of applied sciences to create larger and more influential organisational structures. As we have already mentioned, this policy can be seen as part of an international trend that has been visible over the last two decades. In the Netherlands, for example, the number of UASs has fallen by about 40% since 2000, while (interestingly enough) the number of UAS students grew by 35% in the same period (CBS Statline 2012). In addition to the reduction in organisational structures, we also see a tendency for institutes to distinguish themselves from other institutes (by choosing a sharper profile) and a tendency to reach out more to urban and regional stakeholders. To maintain or achieve a strong position in this newly emerging landscape, there seems to be a choice for higher educational institutes: either to specialise and be relatively small, or to merge and choose a clear set of priorities ('bigger is better'). FUAS seems to opt for the latter, but, arguably, the big challenge for the Federation will be to make it work. A significant number of our interviewees were still of the opinion that the three universities remain separate entities who operate "on their own" instead of working on further integration. They mentioned, for example, that the three universities continue to follow their own strategies with regard to integration of RDI into education, communication and the development of entrepreneurship. We also found, however, a growing support for the idea of FUAS, and a willingness to help develop the federation into a national player with international potential.

The role of RDI in the FUAS strategy

A central element in the FUAS strategy in all focus areas is the development of the concept and practice of RDI, both in terms of its quality and impact on society, and its integration into educational activities. FUAS aims at improving its role in regional and national markets (industry and public sector) and also internationally, in particular, although not only, by participating actively in Horizon 2020. As we have discussed, the link between Europe and the regions is one of the prime elements of the 2020 Strategy that Europe has initiated. In it, three main goals are defined to underpin the growth strategy for the coming decade: (i) to turn Europe into a world-class science performer; (ii) to remove obstacles to innovation – like expensive patenting, market fragmentation, slow standard-setting and skills shortages, which currently prevent ideas getting quickly to market; and (iii) to revolutionise the way public and private sectors work together, notably through Innovation Partnerships between the European institutes, national and regional authorities and business. In particular with respect to this last goal, FUAS sees itself as a prime mover in the regional innovation ecosystem where these innovation partnerships can be developed. Moreover, the FUAS rectors see a clear connection between the four FUAS focus areas and another spearhead of European research and innovation policy: the Grand Societal Challenges. It is the ambition of the FUAS rectors to develop the capacities in these four areas to a level of national excellence that, it is expected, will make FUAS more visible on an international level.

FUAS sees its role in the region as a network operator, providing links between the research universities (Aalto and Helsinki universities in the first place), other universities of applied sciences in the region and vocational schools, business communities (SMEs particularly) and public sector organisations (Collaborate for Success, p. 35). The successful integration of RDI into educational practices, including knowledge-intensive entrepreneurships, is a necessary condition to accomplish the goals of FUAS.

From the interviews, we learned that the development of RDI in the context of FUAS profits from the already existing knowledge and expertise at the three participating UASs. All three agree that the four focus areas that are chosen supplement each other to a large extent. Collaborating in FUAS will give them greater leverage in the Helsinki larger metropolitan area. FUAS also helps to develop a common agenda that can be more easily recognised within the region. We also learned from our interviews with the regional stakeholders that the regions are currently working on a common agenda, which consists of five priorities. It should be expected that the two sets of strategies (FUAS and regions) will come into alignment, with both sets of organisations working together towards a more integrated regional and national innovation system. At the moment, it seems that options for collaboration with FUAS in at

least three of the five priorities are being discussed at regional level, but that FUAS is not yet actively involved, although it is planning to participate shortly in these discussions.

No doubt it will take time to develop such a connection within the regional and national context, but it is of the utmost importance, not only because Finnish society would profit from such a connection, but also because it would enhance the strength of FUAS in the light of the European competition. While FUAS has organised conferences and projects with other UASs, there is still a lack of clear ideas of what the agenda could be in the context of regional and national needs. But some of our interviewees believe that now is the perfect time to rethink the FUAS strategy. In their eyes, the first version was written too quickly and not enough common thinking had been developed. As one of the interviewees stated, "we now have to make clearer choices for the future after 2016."

The urge to develop a common strategy for the future contrasts to a certain extent with the modesty we see in the development of FUAS as an organisational structure in the coming years. The three participating universities remain independent entities, responsible for educational, RDI, and regional development tasks in the region (self-evaluation, p. 32). General degree programmes focusing on regional needs (for instance, nursing, common engineering programmes, business administration) will remain the responsibility of the individual institutes. Other (rarer) programmes with a national or international orientation may be integrated (for instance, Summer studies, Graduate schools, International services, the Virtual Campus), but these remain outside the core teaching functions of the FUAS members. Furthermore, the FUAS strategy maintains that the integration of RDI into learning is one of the key educational objectives of FUAS. This goal is elaborated both in terms of renewing the innovation system in the Helsinki area and regarding international developments (EU and other). As the main teaching activities continue to be developed within the member universities, there is a centripetal force in operation: different FUAS universities may develop slightly different practices and processes to combine research with teaching, and this may make it difficult to build a coordinated research strategy. We will come back to these challenges later in the final chapter.

An important area where the three universities could and should profit from closer collaboration is communication. Good and clear communication is important for the successful development of RDI, both inside the institutes and towards the outside world. Successful RDI cases could then be promoted widely by FUAS, targeted to the right audiences, but also showing opportunities to potential customers. Yet, until now there has been no common strategy to this effect. Each UAS has its own publication series, which makes it hard to "sell" FUAS RDI to the outside world. Part of the problem has to do with current financial arrangements: the Ministry of Education subsidises individual UASs and not FUAS.

What is RDI?

At FUAS, RDI is defined according to the OECD's definition for Research and Experimental Development: "R&D comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications" (Proposed Standard Practice for Surveys on Research and Experimental Development). While this definition comprises both basic and applied research and experimental development, the FUAS concept of RDI clearly does not focus on basic science but on practical applications and interaction with users. In our interviews, it appeared that the terms R&D and RDI are used interchangeably and the most common description used by people is that RDI produces 'something new', either a product or a service, a method or material. To do that, RDI employs existing knowledge to produce (the adoption of) innovations. This concerns both technological and social innovation. In some cases, however, innovation was equated with entrepreneurial activities and the support of entrepreneurship (among students for instance) was seen as a form of innovation activity and, therefore, part of the overall RDI strategy.

The evaluation report of RDI activities in Finnish UASs concluded that there is a lack of consensus about what RDI exactly entails, both in terms of a conceptual definition and in terms of a common approach supported by a common steering and funding framework (Maassen et al, 2012:12). This has resulted in a varied picture of RDI activities, in which it is difficult to find continuity and strong links to the regional innovation processes, although some seem to be very well connected. The upcoming reform from 2014 onwards should offer a golden opportunity to improve this scattered and not particularly strong picture into a more coherent policy approach towards RDI.

Most of our interviewees had quite a clear view of what RDI entailed, and of its vital elements, although there were differences in emphasis. Some saw RDI as a way to bridge learning and practice in innovative ways (living labs, LbD, etc.), others as an instrument that can help society or industry to take the necessary steps to adapt to changing circumstances through mainly small steps, rather than radical impact innovations, and others still as a means to help students to become creative entrepreneurs. Most interviewees saw FUAS as focusing on development and innovation, not so much on research: making use of existing knowledge, yes, applying that in innovative ways in a societal context, yes, but conducting innovative research, less so, and at best on a modest scale. This might have to do with a lack of critical mass for research, both in terms of financial resources and in terms of the research experience of lecturers and students. It might also have to do with the weak links with research universities. The statistics show that in FUAS the ratio between RDI and other tasks is substantial: on average over 30% of the total academic FTE is invested in RDI activities, and about 18% of the total revenues are attributable to such activities (see table 7). This is less than in Finnish research universities where R&D FTE's ranges between 40% and 60% of total staff, but it remains a substantial commitment, sufficient enough to develop RDI as a relevant function.

TABLE 7. RDI personnel and volume ratio in 2012.

UAS	RDI FTE/YEAR	TOTAL TEACHERS/ LECTURERS	RDI VOLUME	TOTAL REVENUES
HAMK	120 (30%)	400	8.1 M€ (14%)	58.6 M€
LUAS	73.9 (30%)	249	6.4 M€ (16%)	40.8 M€
Laurea	111.4 (39%)	286.2	11.7 M€ (23%)	50.8 M€
Total	305.3 (33%)	935.2	26.2 M€ (18%)	150.2 M€

While these figures are quite impressive, we did not see a strong and coherent RDI structure within the FUAS context. Since FUAS universities primarily see the RDI function as an instrument to support the quality of the educational system, this might not come as a big surprise. We found that it is basically left to the individual universities to feed the RDI function back into student training. Having said that, it appears that the integration of RDI activities into education, is done in a number of promising and sometimes innovative ways. Most interviewees stressed that they appreciated the fact that FUAS partners promote RDI activities that are in essence multi-disciplinary and multi-actor activities in such attractive methods as Learning by Development (LbD) or Living labs, where the focus is on innovation as a joint process between UAS and external partners. The list of the RDI networks and strategic partners of FUAS has a strong international (European) signature (appendix 4). In the light of such promising assets for RDI in the FUAS context, it should be possible to use these elements as solid building blocks for a more distinctive RDI profile for FUAS that would enhance both internal strength and external visibility.

The integration of RDI into education

In the self-evaluation of FUAS we read that the educational profile of FUAS is "focused on being an international pioneer in workplace-oriented pedagogical solutions integrated into RDI". The integration of RDI into pedagogy has been and will be strongly linked through students and teachers in all four FUAS focus areas. All FUAS higher education institutes have a strong tendency to integrate all RDI work into educational activities, seeking the involvement of students under the supervision of lecturers in RDI activities. According to the Ministry of Education and Culture definition, students can gain RDI credits through (i) completing a thesis for RDI projects (ii) conducting practical training in RDI projects; and (iii) otherwise participating in RDI projects if connected to studies. All these options can be funded internally or externally, and performed within the university or through placements in the private or public sector.

FUAS is number one in Finland among UASs according the volume of the credits integrated into RDI. The assessment criteria of theses in all FUAS institutes require the thesis to have applied relevance. In 2012, 84% (HAMK 89%, LUAS 76%, Laurea 84%) of the theses completed at FUAS institutes were commissioned by some external organisation that guided and assessed the thesis process.

Integrating RDI into learning is a key strategic objective of FUAS, and many students participate in RDI activities of various kinds, for example by doing research in the context of dissertations or course assignments, or through seminars where invited experts are giving lectures about interesting research topics or students preparing conference papers under supervision. FUAS sees itself as "an engine for applied research, pragmatic innovation and RDI integrated into student-oriented education in the wider metropolitan area, combining top national and international actors in joint projects" (FUAS Strategy 2011 – 2015). The three UASs use different models to pursue this key strategic objective. Examples of integrated learning models where students work with partners from businesses, the public sector and other higher education institutes are LbD, Integrative Pedagogy, Living Lab, and IDE.

The LbD action model, for example, views learning as a tool for achieving competences that enable participants (students and teachers) to cope with the ever-changing requirements of working life. The LbD model has been collectively developed and applied within Laurea and in collaboration with its regional and international partners. Its development still continues as an educational, managerial and service innovation, taking into account the specific context and viewpoint of its stakeholders. The LbD model, in conjunction with the LivingLab approach is thus an example of co-creation among various stakeholders within the Helsinki Metropolitan area and internationally.

Participation in RDI activities offers students a chance to step into real life to meet potential employers and clients. The objective is to develop useful skills (sense-making, social intelligence, novel and adaptive thinking, cross-cultural competencies, new-media literacy, trans-disciplinarity, design mind set, virtual collaboration) in a real-life environment where theory and practice are merged. At best, students have the opportunity to participate in RDI projects so that they can contribute to the development of new theoretical knowledge with practical applications, test ideas in applied environments, and work together with practitioners on specific problems.

From the FUAS curriculum review in 2012, we learned about the many ways in which RDI is integrated into education practice; students are involved through work placements, participation in RDI projects (direct participation or as subcontractors in a larger project), theses, assignments, etc. The applied RDI focus is stressed in the Master's degree programmes and through the FUAS Graduate School, where learning assignments and the research-oriented development project of the Master's degree programmes are implemented closely with the student's own work/organisation and projects run by the universities. The FUAS Graduate School also organises different RDI activities, for example seminars, symposiums and conferences (e.g. Responsible Business Management Symposium, COMBI2013 conference, Service Innovation and Design Seminar), which produce not only RDI credits but also publications. Students can apply to participate in projects, or even create their own projects.

The R&D projects among the FUAS consortium have been divided between the four focus areas as shown in Table 2.

The four RDI focus groups have their counterparts in four focus groups in education. Since the development of these focus themes is relatively new, cooperation between these two areas is also in the early stages of development. A main challenge is combining existing knowledge and networks at the level of individuals or specific projects into truly joint initiatives, systematically integrating research and training in a way that is recognised and supported by FUAS. This will arguably enhance the chance of finding external funding which, according to most of our interviewees, is a crucial but difficult task in the development of RDI.

There are basically four main funding sources to develop RDI in FUAS: government/public organisations, research councils or other public organisations funding academic research, industry, and international organisations including the European Commission. They each offer not only opportunities but also a range of difficulties and challenges. The leading organisations funding academic research (TEKES, Academy of Finland) are primarily oriented towards the research universities, although some of our interviewees are hopeful that opportunities will improve, especially if they are able to team up with a research university. In the public sector (cities, regions) new initiatives are emerging to connect to the higher education sector, for example new centres of entrepreneurship or processes in which a clearer focus is pursued on specific topics through regional priority setting. With regard to industry, according to one of our interviewees, there are examples of successful connections, but much more can be done: "the problem with industry, more SMEs than larger industry, is that they often don't know exactly what they want and that they find it hard to find the right connection within the university sector." The connection of SMEs to university research is almost a universal problem. In the Netherlands for example, despite the so-called top sector policy that is meant to focus on SMEs, the results are still meagre. We believe that UASs that have overall a closer connection to the daily practice of businesses and public sector organisations than research universities have a very important role to play here by being an entrepreneurial go-between in the developing regional innovation system.

Obtaining international funding is becoming increasingly hard as competition increases with the reductions in national sources of funding that many European countries are experiencing in the current context of crisis. Increased international competition is triggering responses across many European universities. In Amsterdam, for instance, two major universities are in the process of merging their natural science and medical faculties into one big science faculty. One of the deans called it an absolute necessity to become bigger to be seen by the outside world, and he added, somewhat ominously, that "being excellent is no longer enough; you have to be big in the face of growing global competition (interview in the Amsterdam newspaper Het Parool, 2 July 2013).

While our committee recognises the fact that size does matter in some cases, in particular when larger grants or stakeholders are involved, we want to stress the fact that this is not always the case. Often it is much more important to make the right connection between people or groups, develop a common language, a common view and approach, and have the flexibility to adapt to changing requirements and local needs. Sometimes then size can even become an obstacle.

For the integration of RDI into education to be successful in this challenging environment, its quality and innovative capacity is of the utmost importance. RDI's function in education was recently assessed for the first time when the FUAS curriculum development (FUAS Curriculum Review, FUAS CR) was evaluated in 2012. The audit report Collaborating to achieve a strategic vision - An evaluation of curriculum development in FUAS institutes is quite positive about the FUAS approach to linking RDI and teaching (see, for instance, p. 55). We share this view. At the same time, the review emphasises the central role of collaborative learning and partnerships in the development of RDI, and the resulting focus on knowledge transfer. While this may serve both the students in their future careers, and the need of businesses or public organisations for a trained workforce, it does not necessarily provide the best conditions for developing a strong research and development capability within the FUAS RDI function. This is all the more so because, as both the Curriculum and a FINHEEC evaluation of UAS's RDI activities (2012) show, there is a strong emphasis on Bachelor-level students in institution RDI activities. This is a major difference compared to research universities, where the involvement of students and early career researchers in such activities takes place mainly through the involvement of PhD students and postdoctoral staff. It is our view that, for UASs to become a strong lynchpin between research universities and society and industry, they need to review the role that Master's students can play in contributing to the RDI function; considering for instance how graduate students can become involved in highly competitive research programmes such as those to be funded under the H2020 European initiative. Furthermore, a need may emerge for a more general review of the whole RDI function.

Discussions on the development of the UASs' RDI function tend to revolve around the need to strengthen its international position. While some interviewees stressed that the main function of UASs is the practical training of students, and that we cannot expect this objective to be compatible with the development of an independent research function, others are of the opinion that UASs are the missing link between academic research and daily practice and that they therefore can fulfil a pivotal role in the innovation system. Arguably, there is and should be a strong connection between research and education in UASs. These institutes' primary task is to offer high-quality professional training, with research having a clear practical orientation. Yet, it must be recognised that, for many professional jobs, it is important for graduates to have some experience of research and, perhaps more importantly, have a "research attitude"; that is, to be able to work in a complex and ever-changing environment and to research new options for new challenges whenever this is necessary. This distinguishes research in a UAS from research in a traditional university where students often are trained without a direct link to practice.[10] Not only is this a differentiating characteristic, however, but arguably it is also its strongest asset in the innovation system.

10. There are clear exceptions of course, in particular in academic fields that are connected to a societal practice such as law or medicine or architecture. But even in those fields, in academia, the prime focus is on training students to communicate with the scientific world, not societal practice.

External links: Regional vis-à-vis international dimensions

During the strategic process leading to the creation and consolidation of FUAS, the Federation analysed changes in its operational environment. FUAS is very much aware of the open and very dynamic environment underpinning Finland´s competence and welfare. Significant developments are occurring at all policy levels, from the international setting, revolving mainly around the European Union and its innovation strategy, to national and regional policies. At the same time, there are worries about the low level of internationalisation of the Finnish Higher Education and Innovation system (see for example, the Research and Innovation Policy Guidelines for 2011 – 2015 and The Strategy for Internationalisation of Higher Education Institutes in Finland 2009).

Linking regional interests and strengths with the international context is the main challenge for the higher education and innovation system in Finland, which is all the more daunting given the current economic and financial crisis creates and its effect on the international competition for funds and resources: most European countries see in the European Horizon 2020 programme a saviour for the pressing situation at home. To be successful in this situation, it is necessary to identify the right strategic priorities; this requires a solid analysis of strengths and weaknesses, novel approaches and the will to engage in far-reaching collaboration.

FUAS is focusing the development of its RDI activities and objectives on a specific region, the Helsinki area. This region itself has grown and come to include Uusimaa, Päijät-Häme and Kanta-Häme and, while the Helsinki area has strong business potential, it is also a large region with many higher education institutes and arguably sub-optimal relations among them. Witness the statement of the Metropolitan Areas Forum of University Presidents for the Finnish government, that higher education institutes in the Helsinki metropolitan area should streamline their profiles and strengthen cooperation. In this process, higher education cooperation structures must be created that are able to address European and global challenges. These new ventures are likely to be characterised by more specialisation than is now the case, and will require a new kind of dynamics revolving around mutual interaction among the region's Higher Education institutes, business and industry and the public sphere.

This Forum of University Presidents statement outlines the following strategic policy areas:

- Education
- Profiling and internationalisation of degree programmes
- Lifelong learning
- Developing the pedagogy of universities of applied sciences
- Education quality and impact
- RDI
- Development of wider metropolitan area
- Shared services.

Critical success factors are analysed from 4 perspectives with 24 targets and measured with 12 FUAS-strategic indicators. The main challenge here, as we stated above, will be to connect to the regional and the international level in developing these priorities. How well are regional policies aligned with international strategies/challenges, or are they pulling in different directions? What kind of mechanisms are at work in the regional RDI "ecosystem" and how successful are they in connecting these different operational levels? Collaboration with SMEs clearly is important, but the role that larger companies like Rautaruukki can play in connecting to international networks cannot be underestimated. How to make the right choices is a challenge for the whole system, but if we confine ourselves to the further development of the four FUAS focus areas, this will entail first an alignment with regional policy priorities and industrial capacities, and then seeing how these fit with the European Grand Societal Challenges. The options for collaboration with the research universities will also have to be explored.

At the regional level, there are good opportunities: many regional organisations of diverse nature see FUAS and its three UASs as reliable partners for the future. Some interviewees working in regional and local government organisations were extremely confident: "FUAS brings the most extensive and influential research, development and innovation services to the Metropolitan area". There are regular meetings between FUAS and regional operators, which is also a positive sign of the engagement between regional and local government organisations and FUAS. We found similar positive indications of engagement among firms, in particular revolving around teaching and the entrepreneurial activities of FUAS universities. New forms of engagement are required in the case of newly emerging knowledge intensive enterprises, perhaps entailing a deeper involvement in advanced research and development activities also in collaboration with research universities.

Opportunities for interaction between FUAS and its regional partners are ample, and one can build upon FUAS experience and capabilities. This collaboration, however, will have to be enhanced in the light of the new international context, which is becoming increasingly competitive. It is unlikely that capacities and modes of organisation that sufficed for operations in a local or regional environment will also be adequate to move to a more international setting and pursue advanced research projects.

One can see different solutions to this challenge. Some make a choice for "small is beautiful", others go for "bigger is better". The first option works in cases where an institute operates in a specialised field with a clear public or industry demand (like for example the Dutch chip machine builder ASML which, in collaboration with the City of Amsterdam, has just established a new research institute focusing on nanotechnology), or when an institute is world renowned and has few budgetary worries (Oxford and Cambridge universities, MIT, the Ivy league universities in the USA, ETH in Zurich, are by European standards "small" universities). To an extent, the two options are not mutually exclusive. First, while maintaining the current degree of specialisation and the relatively small size of the FUAS universities, the Federation can help build "critical mass" in the provision of research services, and develop a single communications strategy to build a brand name based on bigger, and therefore more recognisable organisation. Maintaining the universities at their current size can make them flexible and more attuned to the requirements of local and regional partners. Strong partnerships within regions are important, but it helps if some of the partners have a strong international reputation and visibility. That will most certainly help the 'branding' of the region as a whole, and most likely help collaboration within regional networks that are able to compete at the European level. In any case, a strong emphasis is needed on raising quality and on the applicability and relevance of research results.

We see the idea of FUAS and its strategic ambitions as a good first step in this regard, as they offer the prospect of supporting the generation of larger groups, with "critical mass" to enter European projects on a regular basis, underpinned by a professional, efficient management serving the three universities. This will help strengthen current research capabilities while enhancing their international reputations and their appeal to potential foreign research collaborators.

However, to increase the chances for success in the European context, FUAS needs to reconsider the correspondence between its four focus areas and both the regional demand and the European Grand Challenges. This might lead to adaptations in the current content of these areas, and entail exploring new connections with different networks of public and private bodies, and with other Finnish universities outside the metropolitan region.

It is important to note that, while we see the need for FUAS to develop its organisational strength with a clear international focus, this should not be done at the expense of regional and national objectives. Local SMEs, for instance, will remain very important for FUAS future development, and vice versa. But we strongly believe that a FUAS with an international outlook can help SMEs to grab opportunities in the global market. Internationalisation and an interest in the development of the local and regional environment should be seen as complementary rather than opposing goals.

Chapter Five

OPTIONS FOR THE DEVELOPMENT OF RDI AT FUAS

RDI strategies for FUAS

Towards a FUAS RDI strategy: alternative paths

During our meetings with staff from FUAS universities, we felt that they had clear views on the importance of RDI and their role within the universities. They were able to differentiate clearly between Research, Development and Innovation and, for researchers, to place their own work within these categories. Yet, we found that academic staff differed in their views on the role of research within academic practice and in their own work. Some saw research activities as a tool to support the core function of the universities: their teaching. This is in line with the current strategy in the three universities that form FUAS: their main function is seen as providing advanced professional education linked to the local and regional needs; research activities are subordinate to this role. RDI projects are applied, and often focus on innovative or entrepreneurial practices rather than involving R&D elements. The main role of research is to support teaching. Yet, when trying to move to more traditional research funding sources, this approach faces difficulties. The degree to which undergraduate or even Master's students could contribute meaningfully to complex R&D projects was also questioned by some interviewees and will depend on the context of each research assignment. In some cases, the involvement of students can fit the purposes of the research assignment, and the skills they contribute to the project may be adequate, but this will not always be the case. We encountered, for instance, tales of funding organisations being less than satisfied with the research reports submitted by FUAS universities, seeming to revolve around sets of student reports, and we learnt that there was a widespread perception that FUAS universities were struggling with reputational difficulties when trying to penetrate traditional research "markets".

Other academics we interviewed had a different perspective: they were either contract researchers or lecturers with a track record in academic research, and saw research as an activity valuable and interesting beyond their relationship with teaching. The research was in all cases applied or strategic, and oriented to the solution of technical challenges and societal problems. It was carried out in collaboration with researchers from other universities and, although there were links with their current university teaching activities, such links were not seen as the main objective and justification for the research. In one of the cases we reviewed, the links with teaching had remained, at best, tenuous throughout the research project.

These cases suggest two main models on which to base FUAS RDI strategy:

1. RDI as an activity supporting teaching. This is the continuation of the strategy that currently dominates RDI practice among FUAS universities. The main function of the Universities of Applied Science is seen as the training of new generations of practitioners and RDI activities are seen mainly as a teaching tool to help towards this goal. RDI activities are incorporated in the teaching curricula providing students with direct experience of the challenges that they are likely to face in their professional lives when trying to develop new solutions to relevant practical problems. The involvement of students in RDI project also helps to cover the full costs of such activities in those situations when, as in the case of many European Commission research programmes, funding sources do not fully support the costs of the research activity. Projects that are best suited to this practice will be those related to innovation and entrepreneurship, and requiring moderate technical/research skills. Projects calling for the application of sophisticated methodologies and developing state-of-the-art knowledge will be less suited to this kind of use. The challenge here is to provide a constant flow of RDI assignments with a profile that can enable the contribution of students (at either undergraduate or Master's level).

2. Developing RDI as a self-determined function. What we mean by this is that, although RDI activities continue to play a role in the teaching endeavours of the FUAS universities, RDI is also seen as a set of activities that need to be pursued as an additional function of the universities. In addition to teaching, RDI is seen to support the Universities of Applied Sciences by providing relevant services to society, resources for the universities and enhancing the skills and knowledge of their academic staff. Not all RDI activities need to be directly related to teaching, but staff working in projects that develop or apply frontier knowledge and technologies are also likely to provide more up-to-date and relevant teaching. The research function can, from this perspective, reinforce teaching activities even when they are not directly related through every research project. This strategy would require some substantial changes in the current activities and practices of the universities comprising FUAS.

These strategies lead to different challenges for university policy and suggest different goals for the management of RDI at the FUAS level. These are addressed in the following sections.

The Implications of different strategic choices

1. RDI as support for teaching

The three universities composing FUAS have systematically included into their teaching programmes activities stretching from research assignments to projects to support the development and implementation of public and private sector initiatives. The connections of lecturers to local and regional organisations facilitate a large variety of projects that provide the students with opportunities to develop hands-on experience of practical problems and situations. The innovative ways in which such experiences have been incorporated into the teaching curricula have won multiple recognitions and prizes for the FUAS universities and provide a distinctive element of their teaching offerings. The projects and the associated teaching revolve around applied problems that typically require an interdisciplinary approach, and such inter-disciplinarity is at the basis of both research and teaching at FUAS universities. The goal here would be to keep and build on these capacities.

The type of assignment that is normally the tool of such practices is of limited scope and involves local and regional partners. Some of the cases we reviewed involved projects in foreign countries, but they would always rely on local and regional collaborators providing either funding or research capacities or both. This reliance on local partners supports the regional role that the Universities of Applied Sciences are tasked with. This leads to a dominantly regional outlook for the FUAS universities RDI activities: linking RDI assignments with substantial teaching activities requires volume and environments that are not too demanding from a scientific and technological point of view. These are better achieved with local partners with which the universities will have established long-term relationships and are aware of and comfortable with the linkage between assignments and teaching that the universities operate. In other contexts, the fit with teaching is likely to be more difficult.

Within this environment, it is still possible for the FUAS universities to engage as they have already done in projects addressing basic and applied research problems pushing the knowledge frontier. This can be done with the support of central services at the FUAS level (in issues like contractual structures, information on opportunities, etc.), but these tasks will not constitute the core of FUAS RDI strategy. This will revolve around strengthening current activities and building up local and regional links to support innovative teaching practices. This type of activity is to be practised by a substantial and growing number of lecturers and is managed with a view towards developing and improving the teaching curricula of the FUAS universities. Traditional international and national sources of research support can be pursued by individual lecturers and researchers with a varying degree of links with teaching activities, but this will not constitute the focus of the universities' RDI strategy.

Although this approach does not require important changes in current practice and is based on current capabilities, it faces some relevant challenges. The strategy places the Universities concerned within a path where the development of research capacities is limited. As universities increasingly compete internationally for students, the research performance of their staff is becoming a crucial consideration in the implicit and explicit comparisons that potential students, funding organisations and other stakeholders constantly carry out. Technical universities with very limited scientific research activities and, consequently, lower assessments of scientific performance may be considered "second rate" by prospective students and funding organisations. This can make it difficult to attract good students and widen the sources of research funding; the latter is an area where vicious circles can easily emerge: lack of reputation makes it more difficult to access international sources of research funding and, without these resources it is more difficult to improve the university's research performance and, hence, its reputation. Reputation, or better the lack of it, was a problem that several of our interviewees from the FUAS universities mentioned when referring to the possibilities and strategies to widen the geographical scope of FUAS RDI activities. A glass ceiling can therefore be placed over the aspirations to growth and improvement of FUAS universities, unless the perceived level of FUAS is improved beyond the provision of services to local and regional stakeholders.

2. A self- directed RDI function

The second alternative that is open to FUAS and its universities is to pursue RDI activities with goals that are explicitly distinct from those related to teaching. Although RDI projects can continue to contribute to teaching, this contribution is not understood as their main or sole function and can be indirect. The RDI function seeks its own goals and, in this sense, is self-directed. The RDI function can seek to develop university capabilities by improving the knowledge base and technical capacity, by generating further resources, and also by improving teaching capacities and possibilities. The latter can take place through two mechanisms:

(1) By ensuring that the academic staff is up-to-date with the latest developments in their fields and maintains a hands-on knowledge of the shifting requirements and needs of research stakeholders. This up-to-date knowledge can then be transferred to students.

(2) By supporting the development of research students working at graduate level. The FUAS universities have a wide range of Master's courses where students with knowledge of specific research contexts and techniques develop this knowledge further. These students may contribute to fairly difficult research assignments. There are, for instance, examples in current FUAS universities of researchers and experts who have played an active role in research contracts and used their work towards their Master's dissertations. Most universities also have doctoral programmes and their students are optimally placed to benefit from and contribute to external research assignments. Doctoral research students typically contribute highly qualified expertise to research projects and can also use the income derived from this work to help them through their studies. Doctoral students are a key aspect of the research strategies of most universities; the lack of a doctoral programme at FUAS universities is an issue to which we will return later in this report.

It should be noted that, although RDI activities in this mode do contribute directly to teaching, they do so in a manner different from the subordinate way in which such contribution occurs today at FUAS universities. In this alternative model, the contribution is either indirect through increasing the capacity of the academic staff, or it may serve a small proportion of the student body who conduct their studies around research activities.

This approach addresses the shortcoming identified in the teaching-led strategy we have defined above, but requires from the FUAS universities a targeted plan to address those characteristics that emerge as weaknesses in this context. In the course of our assessment we have identified several traits requiring attention.

1. Need to differentiate across diverse tasks incorporated in the RDI concept. FUAS strategies and documents refer to an RDI function. Yet, as these same documents acknowledge, the standard definitions make it clear that "Research", "Development" and "Innovation" are distinct activities. Importantly, as R&D implies the generation of new knowledge, products and services, "Innovation" is a much vaguer concept referring to activities to bring new products and services to the markets, and otherwise apply them to the achievement of social and economic objectives. FUAS universities, for instance, invest considerable effort in developing entrepreneurial skills and practices among their students, and to turn such capacities into new businesses. These activities may be considered "innovative" in several respects but do not necessarily rely, and in the case of UAS seldom do, on the outcomes of R&D activities. For instance, the capabilities necessary to develop an R&D capacity sufficient to engage with established European partners in R&D collaborations are very different from those required to train and encourage cohorts of undergraduate students to behave entrepreneurially in their local and regional context. Importantly, the researchers we interviewed in our review were very clear about these differences, and saw "innovation" as a completely different category from R&D. Yet, both in FUAS

rhetoric and in its organisational procedures, these capabilities are currently treated as if they were a single and coherent body. Instead, they need to be set apart, both in documents and internal studies, and in the establishment of organisational structures to support the research function.

2. The generation of a "critical mass" of qualified FUAS researchers able to engage in R&D projects funded from traditional and highly competitive sources, both national and international. We found during our interviews that some researchers involved in advanced research projects found their groups at the FUAS universities to be very small, or even felt isolated from their teaching-oriented colleagues. The need to achieve "critical mass" was a recurrent topic in our conversations. Although the term is vague, and its meaning will vary across disciplines and research fields, the problem that interviewees were reflecting upon is that there were not enough experienced researchers in their field of activities to respond flexibly and efficiently to research opportunities emerging at national and, particularly, international levels. There was also little scope for the exchange of experiences and knowledge that researchers found could help them in their professional development. In some cases, FUAS had allowed academics from different constituent universities to become aware of each other and to explore potential collaborations; it seems clear to us that, to strengthen the research capabilities of FUAS universities, more work is needed in this direction.

3. An issue that was not mentioned explicitly during our interviews but which we believe is important to point out is that of the availability of highly trained graduate researchers. In most universities, these roles are played by researchers during their doctoral work. Doctoral programmes are widely understood to be a crucial element in the development of a research function in universities. Not only is this statement applicable to "traditional" and "research" universities, but also to Higher Education Institutes focusing on the teaching of skilled professionals. Polytechnics and professional schools across Europe and North America are allowed to develop doctoral programmes and they do it. These are never large programmes, nor do they constitute a core element of the HEIS' activities, but are part of an R&D function that, within the applied HEI, covers the type of roles that we presented at the start of this section. We noted that some of the younger and more committed researchers we interviewed aimed to continue developing an academic research career; although their contribution to existing projects was very important, we consider that they would not be able to stay at a FUAS university if they wanted to achieve their goals. If the university authorities consider it desirable that the Universities of Applied Sciences develop a research function able to engage with international partners and generate high-quality R&D, then it is necessary for these centres to be able to grant doctoral degrees and set up doctoral programmes. This will not be a central task in these universities portfolio, neither will it engage large number of staff and students, but it should provide a base to strengthen the link between staff and student

researchers, allow them to develop a higher-quality research function, and provide an avenue for further development within FUAS for students interested in continuing with a research career.

4. The three FUAS universities remain separate contractual units. This is a problem for FUAS objectives to develop a coordinated research strategy and, when feasible, respond as a unit to calls for tender and research opportunities. This situation will pose a special difficulty if several FUAS universities want to cooperate in European Commission H2020 research projects: every institute would need to be presented as a separate partner, but there are implicit constraints on the number of partners from the same country in a proposal. Similar problems may occur with other funders and programmes; a diversity of small projects partners does not help the chances of selection for a proposal and, in these situations, FUAS partners may face incentives to go their own way instead of collaborating.

5. FUAS universities do not have by themselves a reputation in the field of research that could help them in proposals and bids. Being relatively small, teaching-oriented universities with very limited international research experience, they can be seen as too "light-weight" to compete in international research programmes. Some of our interviewees considered reputational issues as a potential barrier to their attempts to expand research activities, and thought that a FUAS joint activity, and common "brand" could help achieve the necessary recognition to help in the process of research expansion.

Despite these limitations and challenges, FUAS can offer capabilities that are in short supply in the research landscape, and particularly when it comes to academic research organisations. FUAS universities organise their work around applied areas, and structure their research projects around specific practical problems. To do so, they naturally organise themselves into interdisciplinary teams. We noted that interdisciplinary collaboration was second nature to FUAS researchers and they took it as the natural state of affairs. The choice for a limited number of focus areas that are well grounded in the different participating UASs, and seem to connect to relevant issues in the regions, is in our view also a wise choice in relation to the development of a research function: to become strong in a few well-chosen niches works better than a smorgasbord of disciplines, it is, however, important to develop specific research agendas in close connection with regional priorities. We learned that the regions are enhancing their collaboration in developing such priorities, so there is a growing momentum to step up this collaboration. Success in this respect will also increase the chances for European funding in H2020, where strong regional connections between research, industry and public organisations are gaining emphasis. It is necessary, however, to reconsider the choices made in the focus areas in connection with the Grand Societal Challenges of the EU, that is, if one wants to strengthen the connection between the region and the European environment.

FUAS researchers are also accustomed to working in teams bringing together experts from different fields and initiatives, and are able to organise this collaboration with ease. We consider this to be a considerable strength. Problem orientation is increasingly dominating many research programmes, and funding organisations are often calling for interdisciplinary approaches to which traditional research universities, organised along disciplinary lines, can find it difficult to adapt. The ability to assemble teams with different disciplinary backgrounds and skills and to be able to work seamlessly together represents an advantage for the FUAS universities seeking to develop their research function.

Implications for FUAS

The role that FUAS, as a federation of universities, can play in the development of a research function will depend on the development strategy adopted. We will discuss in turn the activities that FUAS could undertake under a teaching-led model and a self-directed R&D function.

A teaching-led model of research under FUAS

The teaching-led model is based on strengthening current practices. The integration of research and teaching activities is well-developed at all FUAS universities. The Federation may increase opportunities for FUAS students to benefit from the research activities of other FUAS partners, and provide central services to support the integration of research and teaching. Both can be more relevant when addressing the needs of Master's students. The volume of students here tends to be smaller and the research assignments more substantial. It is also here where the need for more specialised research training is likely to appear and where there can be instances of research students feeling isolated within a specific, self-contained small group oriented to address a single research assignment.

To share good practices, not only among lecturers but also across students, and provide a set of central services that can help in student development, FUAS could reconsider the Graduate school model. The school would focus much more on the specific research needs of all FUAS Master's students developing for instance joint courses and activities in research methods. Typically, specific research assignments would be organised at university level but the school could also offer a "clearing centre" through which lecturers with projects at FUAS universities who would like to offer opportunities to students from other FUAS partners could channel and organise these offers. The school would need to develop the protocols necessary for the recognition of research credits across FUAS universities and the economic arrangements that may be necessary to underpin the agreements. Finally, the school could also seek RDI projects that could be relevant for courses at more than one FUAS university and thus develop joint FUAS research collaborations.

A research institute to move towards self-directed RDI

The development of a self-directed RDI function at FUAS universities is much more challenging as it requires the generation of new capabilities within what is emerging as a new organisational model. The objective here is to use the new organisational tools that a federation of universities can offer to address the problems identified above. The responses that the universities will design to face these challenges can benefit from, or require, a central FUAS organisation driving such responses. We suggest that a FUAS Research Institute could play this role.

The organisation should focus on developing, supporting and, when suitable, managing RDI activities if they involve the generation of new knowledge or of products and services new to the market. Activities related to the support and encouragement of entrepreneurship and the development of purely advisory tasks should not be included within the remit of the Institute.

A Research Institute could help provide the critical mass of research, management capabilities and "brand image" necessary to support the FUAS RDI function. In addition to the tasks listed in the previous section for a graduate school, the Institute would provide a physical point of encounter for all FUAS staff and graduate students involved in RDI activities. Institute staff would play, among other things, a development role, seeking funding opportunities and communicating them to relevant FUAS staff and students. The Institute would also organise seminars and other events oriented to develop the research capacity of Institute members. These events should cover scientific sessions (for instance seminars and conferences) as well as information and training meetings on research development and management issues (from European Commission funding opportunities to preparing and budgeting proposals). The Institute would provide a physical meeting point for FUAS academics with research interests and work towards countering the feeling of isolation that we encountered among some researchers. Ideally, this meeting point should also be open to potential partners from industry and the public sector, in order to discuss collaborative research and innovation projects. If FUAS aims at becoming a regional stronghold that is also visible at the national and even international level, developing a powerful RDI-triangle in close connection with strong partners is of essential importance.

Finally, the Institute should strive to take over tasks that are now not possible in the FUAS structure. First, FUAS should work towards being allowed to train doctoral students. A University cannot develop a sustainable, high-quality R&D function without the contribution of doctoral students. If FUAS was allowed to carry out a doctoral programme this should be centrally organised through the Research Institute. The Institute could provide the physical "home" for the students but, more importantly, would organise the research training activities and teaching programmes of the doctoral programme (the type of activities that traditional universities are increasingly channelling through their "doctoral schools"). As the number of doctoral students is bound to be low, the Institute would provide a common home and avoid the risk of isolation.

Also, in an optimal situation, the Institute should be able to enter contracts and have its own legal personality. This would allow the FUAS Universities to be consistently presented, in areas like European projects, as a single entity and to enter contracts and projects as a single partner. Expertise on contractual matters and project management could also be shared in this way across the three universities.

Chapter Six

DEVELOPMENT OF FUAS RDI IN 2014

FUAS Research Review results were discussed in a FUAS RD&I steering group meeting on August 26th, 2013, and they have been taken into consideration in defining the focus points and development actions of RDI activities in 2014. On a broader platform, FUAS Research Review results have been discussed in the "Voice of FUAS" seminar for FUAS member universities' staff on September 10th, 2013 in Laurea Leppävaara.

In addition, FUAS member universities have discussed FUAS Research Review results in their internal meetings.

2014 RDI focus points and development actions

Defining the focus points of RDI activities in 2014 is based on FUAS Research Review results, the goals of the project "Development of FUAS operations structure – RDI activities" that was funded by the Ministry of Education and Culture, and, thirdly, on the FUAS Strategy Implementation Programme of 2013.

The FUAS RD&I steering group has outlined the 2014 FUAS RDI activities development actions as follows: 1) initiating new international RDI projects and increasing the total of external tendered RDI funding and 2) strengthening the role of FUAS as an RDI regional development operator.

The following actions have been outlined as development actions:

1. Initiating new international RDI projects and increasing the total of external tendered RDI funding
    - giving RDI focus area groups the task of planning and preparing for a minimum of four (4) new projects of which at least one is international
    - improving the possibilities of preparing international RDI projects by increasing the resources of RDI project preparation
    - mapping out international co-operation partners in each focus area, and their needs in expanding their international RDI network
    - making visits to selected RDI partners/inviting selected RDI partners to visit FUAS and agreeing on future actions to further strengthen RDI co-operation
2. Strengthening the role of FUAS as an RDI regional development operator
    - Defining a joint view on FUAS RDI activities towards 2020 with regional development operators, companies, student councils and alumni
    - Strengthening regional partnerships in each focus area and establishing new RDI partnerships with companies

The RDI activities' development goals and development actions for 2014 and their implementation responsibilities, timetables and procedures for the assessment of their effectiveness are described in detail in appendix 6.

FUAS Research Review has also served as a basis for the preparation of the Ministry of Education and Culture's "Funding directed at universities of applied sciences for improving the possibilities for teaching, research and development", which is a FUAS member universities' jointly produced project application for FUAS universities of applied sciences regarding the development of the focus areas of RDI activities (FUAS RDI) from the point of view of working life.

References

AARREVAARA, T., DOBSON, I.R. & ELANDER, C. (2009). *Brave New world: Higher Education Reform in Finland, Higher Education Management and policy*, Vol. 21/2. http://www.universityworldnews.com/filemgmt_data/files/Brave_New_World_Dobson_%26_Elander.pdf

ACADEMY OF FINLAND. (2009). *The State and Quality of Scientific Research in Finland 2009.* Publications of the Adacemy of Finland 10/2009. http://www.aka.fi/Tiedostot/Tiedostot/Julkaisut/SIGHT_2009_English_eBook.pdf

DUTCH ADVISORY COUNSIL FOR SCIENCE POLICY. (2012). *Vasthoudend innoveren. Een onderzoek naar het Duitse Wetenschapslandschap en R&D beleid*, (Tenacious Innovation. A Study into the German science landscape and R&D policy) Den Haag 2012

EUROPEAN COMMISSION. (2010). *EUROPE 2020. A strategy for smart, sustainable and inclusive growth.* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF

EUROPEAN COMMISSION. (2011). *Cohesion policy and regional research and innovation potential. An analysis of the effects of Structural Funds support for Research, Technological Development and Innovation, 2000 – 2010.* Prepared by Lorena Rivera León, Michal Miedzinski and Alasdair Reid of Technopolis Group. http://ec.europa.eu/invest-in-research/pdf/download_en/rkf5th_brochure.pdf

EUROPEAN COMMISSION. (2013). *Research and Innovation. Horizon 2020. Questions and Answers.* http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=-faq&sub=results&printfaqs=all

EUROPEAN UNION. (2011). *Cohesion Policy 2014-2020. Investment in growth and jobs.* http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2014/proposals/regulation2014_leaflet.pdf

FINNISH HIGHER EDUCATION EVALUATION COUNCIL. (2012). *Audit manual for the quality systems of higher education institutions 2011–2017.* Tampere 2012. http://www.finheec.fi/files/1780/KKA_1512.pdf

FUAS – FEDERATION OF UNIVERSITIES OF APPLIED SCIENCES. (2012). *Collaborate for Success -Yhteistyöllä kilpailukykyä -FUAS-liittoumastrategia 2011 – 2015.* Lahti University of Applied Sciences. Series C 94. Lahti 2012. http://www.fuas.fi/fuas/Materiaalipankki/fuas_strategia_2011_2015.pdf

HALONEN, T. (2013). *Challenging and changing environment.* Presentation by Tomi Halonen, Concellor of Education, Department for Higher Education and Science Strategy and Steering Group, Ministry of Education and Culture. 16.5.2013.

HIRVIKOSKI, T. (2013). *The Knowledge Triangle: Promoting Innovation and Multidimensional Learning in a University of Applied Sciences.* In Lappalainen, P. & Markkula, M. (Eds): The Knowledge Triangle - Re-Inventing the Future. European Society for Engineering Education, Aalto University, Universidad Politecnica de Valencia, Culminatum Innovation Ltd, European Union.

MAASSEN P. KALLIOINEN O. KERÄNEN P. PENTTINEN M. SPAAPEN J, WIEDENHOFER R. KAJASTE M. MATTILA J. (2012). *From the bottom up -Evaluation of RDI activities of Finnish Universities of Applied Sciences.* Finnish Higher Education Evaluation Council 7:2012. Tampere 2012. http://www.kka.fi/files/1482/KKA_0712.pdf

THE MEASUREMENT OF SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES -FRASCATI MANUAL 2002 - *Proposed Standard Practice for Surveys on Research and Experimental Development.* Organisation for Economic Co-operation and Development (OECD). 2002. http://www.oecd-ilibrary.org/science-and-technology/frascati-manual-2002_9789264199040-en

MINISTRY OF EDUCATION. (2009). *Strategy for Internationalisation of Higer Education Institutions in Finland 2009-2015.* Finland, 2009:23. http://www.minedu.fi/export/sites/default/OPM/Julkaisut/2009/liitteet/opm23.pdf?lang=fi

MINISTRY OF EDUCATION AND CULTURE. (2012). *Education and Research 2011–2016 -A development plan.* Ministry of Education and Culture, Finland 2012:3. Department for Education and Science Policy http://www.minedu.fi/export/sites/default/OPM/Julkaisut/2012/liitteet/okm03.pdf?lang=fi

MINISTRY OF EDUCATION & THE MINISTRY OF EMPLOYMENT AND THE ECONOMY. (2009). *Evaluation of the Finnish National Innovation System* – Full Report. http://www.tem.fi/files/24929/InnoEvalFi_FULL_Report_28_Oct_2009.pdf

OECD. (2005). *Innovation Policy and Performance: A Cross Country Comparison.* http://s3.amazonaws.com/zanran_storage/www.eib.org/ContentPages/31067713.pdf

OUGHTON, C., LANDABAS, M. & MORGAN, K. (2002). The Regional Innovapp. tion Paradox: Innovation Policy and Industrial Polic. Journal of Technology Transfer, No. 27, 97–110.

PIRINEN, R. (2012). *Collaborative Regional Development and Research in Higher Education: In the Perspective of Quality in a University of Applied Sciences.* Creative Education, 2012. Vol.3, pp. 1150-1157 Published Online October 2012 in SciRes (http://www.SciRP.org/journal/ce DOI:10.4236/ce.2012.326171

PRATT J. ROTH G. AUVINEN P. (2012). *Collaborating to achieve a strategic vision -An evaluation of curriculum development in FUAS institutions.* Lahti University of Applied Sciences. Series C 118. Lahti. http://www.fuas.fi/fuas/Raportit/Documents/fuas_julkaisu_curriculum_review_2012.pdf

RAIJ, K. & NIINISTÖ-SIVURANTA, S. (EDS.) (2011). *Learning by Developing LbD Guide.* Laurea Publications, Vantaa. http://www.laurea.fi/fi/tutkimus_ja_kehitys/julkaisut/Erilliset_julkaisut/Documents/LbD_Guide_04102011_ENG_lowres.pdf Acquired 01.01.2013.

RESEARCH AND INNOVATION COUNCIL OF FINLAND. (2010). *Research and Innovation Policy Guidelines for 2011 – 2015.* http://www.tem.fi/files/30413/Research_and_Innovation_Policy_Guidelines_for_2011_2015.pdf

CBS STATLINE. 2012. *Statistics Netherlands.* http://statline.cbs.nl/statweb/?LA=en

VALTIOVARAINMINISTERIÖ. 2012. *Eurooppa 2020 -strategia.* Suomen kansallinen ohjelma, kevät 2012. 16a/2012. http://ec.europa.eu/europe2020/pdf/nd/nrp2012_finland_fi.pdf

VÄÄNÄNEN, I. (ED.) (2012). *Research, Development and Innovation Activities at Lahti University of Applied Sciences.* A publication of Lahti University of Applied Sciences, series C Articles, reports and other current publications, part 103. http://www.lamk.fi/palvelut/tutkimuspalvelut/julkaisutoiminta/a-tutkimuksia/Documents/lamk-julkaisu-asarja-2012-Research,%20Development%20and%20Innovation%20Activities.pdf

VÄÄNÄNEN, I. & LAITINEN-VÄÄNÄNEN, S. (2011). *Notes on the Developing R&D Integrated Learning in Regional Knowledge Production.* Journal of Finnish Universities of Applied Sciences, 2011, No. 1. http://www.uasjournal.fi/index.php/uasj/article/view/1291/1203

Appendix 1.
Facts and figures of HAMK

HAMK University of Applied Sciences

Vision for 2015

HAMK is a valued international higher education institution, and is its region's leading promoter of innovation and entrepreneurship. HAMK also raises the local population's competence level and acts as a flexible partner for and renewer of the labour market. HAMK has wide networks, and irrespective of time and place, quickly responds to the integration and development of education, the employment sector and R&D.

Strategic choices

COMPETENCE DEVELOPMENT	DEVELOPMENT OF OPERATIONS
• Core competences lie in teacher training, bioeconomy, technology and wellbeing, and in related business know-how. • Specific areas of development include links with the labour market, quality, internationalisation, adult education and Master's degrees.	• Combining work and study. • Increasing joint implementations of adult and youth education. • Degree tailoring and education on demand. • Reforming educational models. • Promoting professional paths and professional orientation.
PROFILING	**REGIONAL COOPERATION**
• Ensuring staff have the necessary competence. • Adhering to own guiding principles. • Profiling degree programme contents in relation to other universities of applied sciences. • Developing operations that set HAMK apart from others.	• Improving anticipatory actions. • Helsinki-Hämeenlinna-Tampere axis as the core of the operating region. • Partnerships mainly directed towards the Helsinki Metropolitan Area. • Tightening contractual cooperation with other higher education institutions.

Areas of specialization

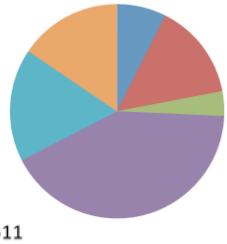
Culture; natural resources and the environment; natural sciences; social sciences, business and administration; social services, health and sport; technology, communication and transport; and professional teacher education.

Values

JOINT SUCCESS • We succeed together with our students and partners, thanks to trust, openness and good networks.	**BOLD RENEWAL** • We have the ability and will to identify opportunities in the future, and the skill to make swift, courageous decisions, always controlling the level of risk in proportion to benefits and resources.
COLLABORATIVE DEVELOPMENT • Everyone participates in target-oriented, innovative development together with students, the labour market and other stakeholders.	**HUMAN GROWTH** • Mutual respect, tolerance, consideration and appreciation of competence are important principles in all of our operations in all of our operations.

Students HAMK University of Applied Sciences

Number of Degree Students, 6918



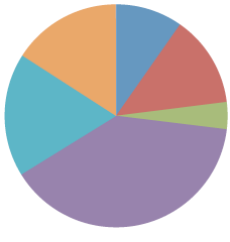
- Culture, 511
- Social Sciences, Business and Administration, 1002
- Natural Sciences, 256
- Technology, Communication and Transport, 2871
- Natural Resources and the Environment, 1171
- Social Services, Health and Sports, 1066
- Tourism, Catering and Domestic Services, 1

Number of Graduates, 1071

- Culture, 75
- Social Sciences, Business and Administration, 169
- Natural Sciences, 27
- Technology, Communication and Transport, 414
- Natural Resources and the Environment, 178
- Social Services, Health and Sports, 207
- Tourism, Catering and Domestic Services, 1

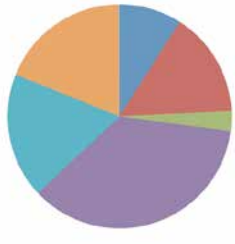
Bachelor's Degree Programmes (full-time studies)

Number of Students, 4789



- Culture, 466
- Social Sciences, Business and Administration, 636
- Natural Sciences, 188
- Technology, Communication and Transport, 1880
- Natural Resources and the Environment, 858
- Social Services, Health and Sports, 760
- Tourism, Catering and Domestic Services, 1

Number of Bachelor's Degrees, 730

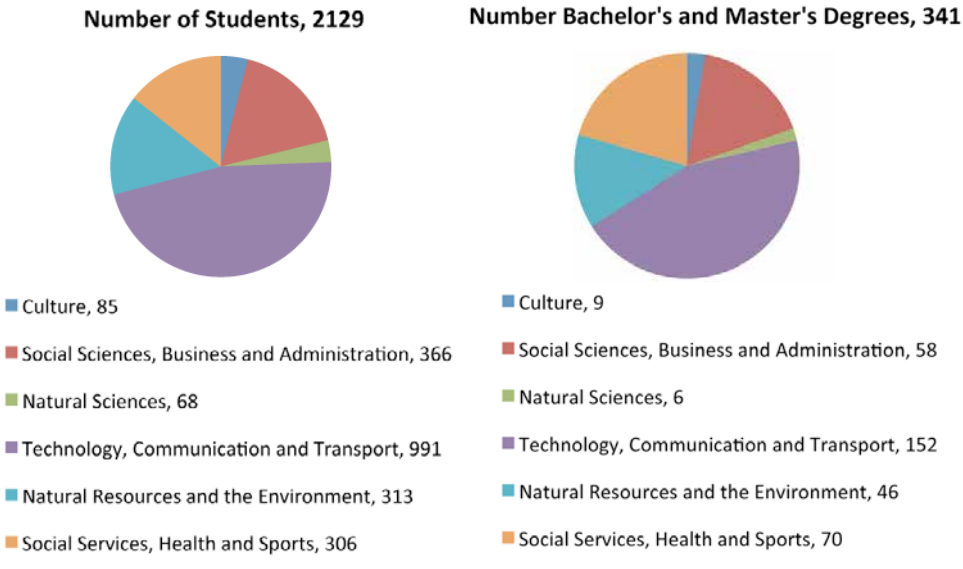


- Culture, 66
- Social Sciences, Business and Administration, 111
- Natural Sciences, 21
- Technology, Communication and Transport, 262
- Natural Resources and the Environment, 132
- Social Services, Health and Sports, 137
- Tourism, Catering and Domestic Services, 1

	STUDENT INTAKE	1ST PLACE APPLICANTS	APPLICATION RATE *
Culture	90	282	3.31
Social Sciences, Business and Administration	130	485	3.73
Natural Sciences	40	66	1.65
Technology, Communication and Transport	420	1162	2.77
Natural Resources and the Environment	170	394	2.32
Social Services, Health and Sports	170	543	3.19

* (1st place applicants / student intake)

Degree Programmes; Part-time Bachelor's Degree Programmes and Master's Degree Programmes



	STUDENT INTAKE	1ST PLACE APPLICANTS	APPLICATION RATE *
Culture	20	172	8.60
Social Sciences, Business and Administration	115	627	5.45
Technology, Communication and Transport			
Natural Resources and the Environment	215	712	3.31
Social Services, Health and Sports	20	40	2.00

* (1st place applicants / student intake)

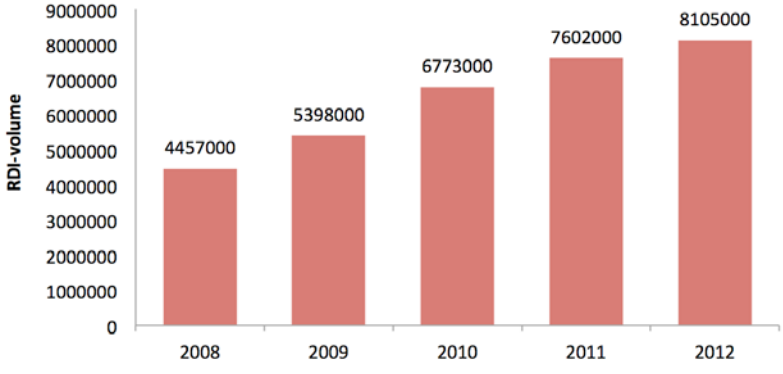
PROFESSIONAL TEACHER EDUCATION	STUDENTS
Humanities and Education	885

OPEN STUDIES COMPLETED AT HAMK	STUDENTS
Number of Students	166
Number of Credits Completed	579

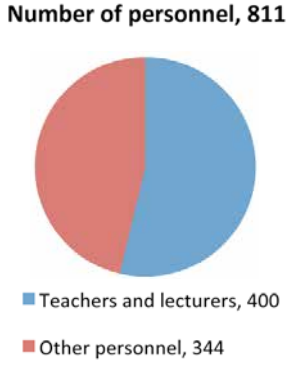
SPECIALISATION STUDIES	STUDENTS
Natural sciences	59
Technology, Communication and Transport e	59
Natural Resources and the Environment	40
Social Services, Health and Sports	13

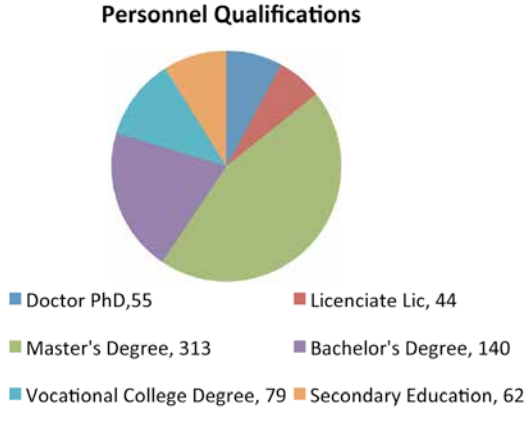
Research, Development and Innovation activities

Personnel man-years	120
RDI volume, M €	8.1
Number of publications	164



Personnel and Revenues

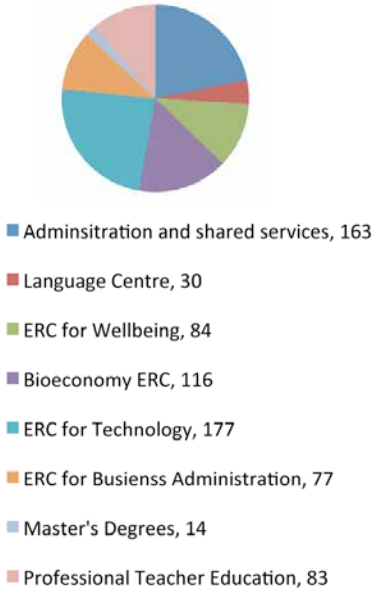




Number of personnel by Units/ Education and Research Centers (ERC)

Personnel costs, M€	36.4
Average Age of Personnel	47
Revenues, M€	58.6

Number of personnel by Units/Eduation and Research Centers (ERC)



Appendix 2.
Facts and figures of LUAS

LAHTI University of Applied Sciences

Vision

We are an international centre of expertise
in learning and sustainable renewal.

Areas of Focus

- Design
- Environment
- Welfare service development

Values

- Trust
- Openness
- Customer orientation
- Respect for others
- Renewal

Mission

We educate competent professionals
and promote the competitiveness of the region.

Profiles

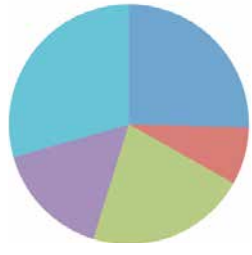
- Integrative pedagogy
- Practice-based innovation
- Student entrepreneurship

Students at Lahti University of Applied Sciences

Number of Degree Students, 5293

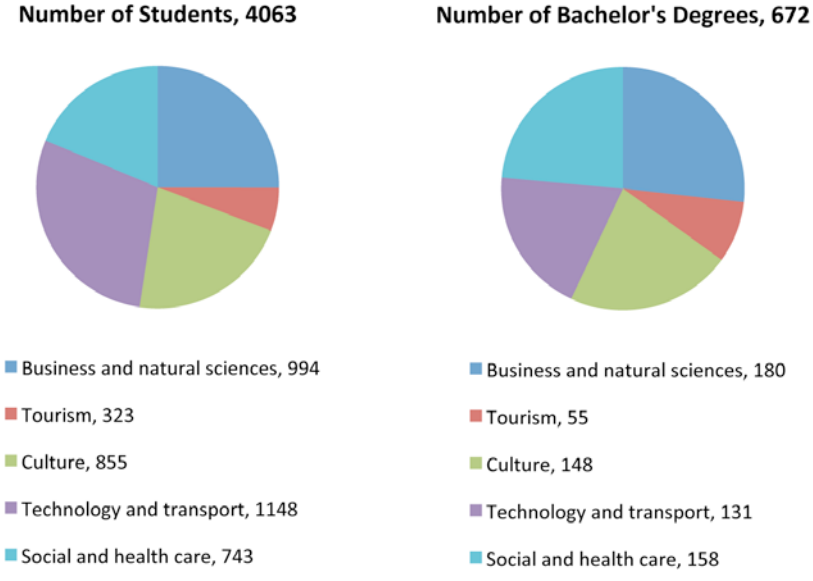
- Business and natural sciences, 1265
- Tourism, 484
- Culture, 1064
- Technology and transport, 1310
- Social and health care, 1170

Number of Graduates, 901



- Business and natural sciences, 229
- Tourism, 70
- Culture, 195
- Technology and transport, 142
- Social and health care, 265

Bachelor's Degree Programmes



	STUDENT INTAKE	1ST PLACE APPLICANTS	APPLICATION RATE *
Business and natural sciences	108	397	3.67
Tourism	80	297	3.71
Culture	180	1 130	6.28
Technology and transport	213	402	1.89
Social and health care	209	1 475	7.15
Total	790	3 721	4.71

* (1st place applicants / student intake)

Degree Programmes (Adult Education, Bachelor's Degree Programmes and Master's Degree Programmes)

Number of Students, 1180

- Business and natural sciences, 271
- Tourism, 161
- Culture, 188
- Technology and transport, 157
- Social and health care, 403

Number Bachelor's and Master's Degrees, 229

- Business and natural sciences, 49
- Tourism, 15
- Culture, 47
- Technology and transport, 11
- Social and health care, 107

NUMBER OF BACHELOR'S AND MASTER'S DEGREES	TOTAL	BACHELOR'S	MASTER'S
Business and natural sciences	49	34	15
Tourism	15	6	9
Culture	47	32	15
Technology and transport	11	11	-
Social and health care	107	67	40

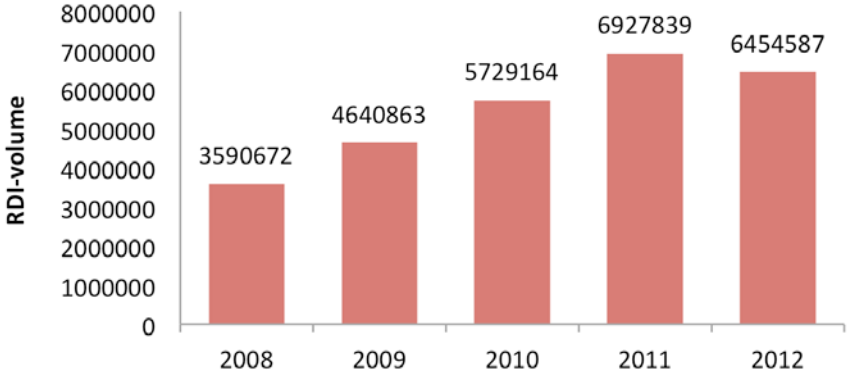
	STUDENT INTAKE	1ST PLACE APPLICANTS	APPLICATION RATE*
Business and natural sciences	50	217	4.34
Tourism	40	100	2.50
Culture	52	205	3.94
Technology and transport	22	53	2.41
Social and health care	82	469	5.72
Total	246	1 044	4.24

* (1st place applicants / student intake)

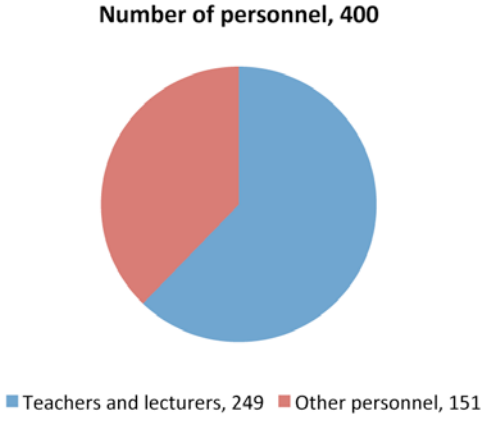
OPEN UNIVERSITY OF APPLIED SCIENCES	STUDENTS
Number of Students	997
Number of Credits Completed	3 723

Research, Development and Innovation activities

RESEARCH AND DEVELOPMENT	
Personnel man-years	73.9
RDI volume, M€	6.4
Number of publications	234
of which artistic works	82



Personnel and revenues



Personnel costs	23.3 M€
Average age of personnel	47.5 years

Personnel Qualifications

Doctor PhD, 32
Licenciate Lic, 14
Master's Degree, 199
Bachelor's Degree, 90
Vocational College Degree, 39
Other, 26

Number of Personnel

Innovation Centre (RDI), 36
Faculty of Business Studies, 57
Faculty of Tourism, 19
Institute of Design and Fine Arts, 72
Institute of Music and Drama, 24
Faculty of Social and Health Care, 64
Faculty of Technology, 66
Development Services, 62

Revenues	40.8 M€

Appendix 3.
Facts and figures of Laurea

Laurea's mission within the Finnish higher education system is to be a university of applied sciences specialising in service innovations, operating in ht Greater Helsinki Metropolitan Area and focusing on regional development.

Values

- Sense of community
- Social responsibility
- Creativity

Laurea's strategic intent

In 2015 Laurea will be an internationally acknowledged university of applied sciences specialising in future expertise and regional development in the metropolitan area.

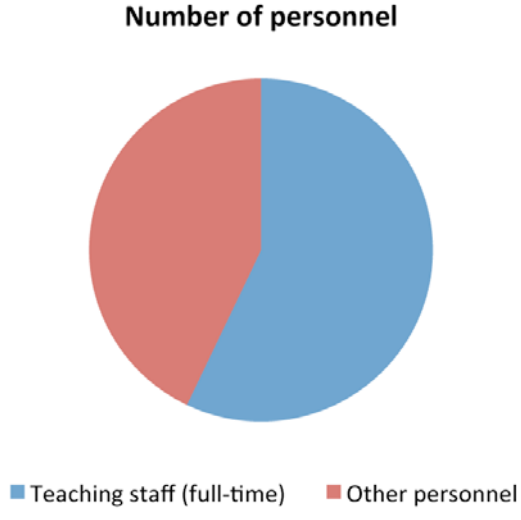
Laurea's profile

- Service innovations and value networks
- Internationally acknowledged and productive research, development and innovation activity
- An operating model Lbd (Learning by Developing) that promotes the development of working life by integrating learning and R&D

Laurea's focus areas

- Service Business
- Expertise in nursing and coping at home, in the form of general nursing education
- Security and Social responsibility
- Student entrepreneurship

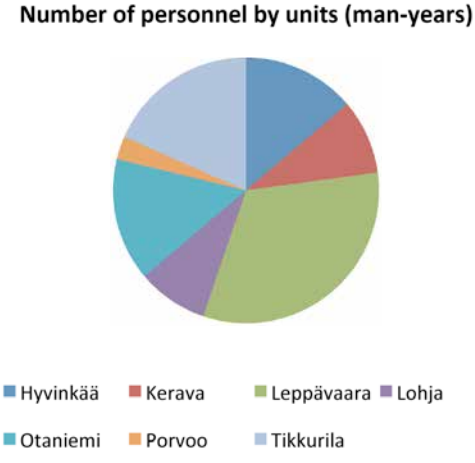
Personnoel and Revenues



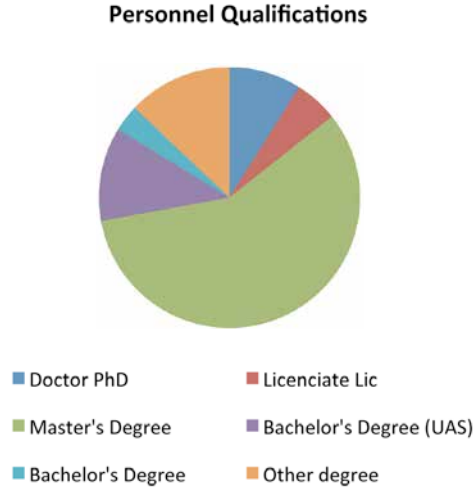
Number of personnel (man years)	501.2
Teaching staff (full-time)	286.2
Other personnoel	215.0

Personnel costs	32.8 M€
Average age of personnel	46.2 years

NUMBER OF PERSONNEL BY UNITS (MAN-YEARS)	
Hyvinkää	55.3
Kerava	36.4
Leppävaara	129.9
Lohja	34.5
Otaniemi	60
Porvoo	11.3
Tikkurila	73.8



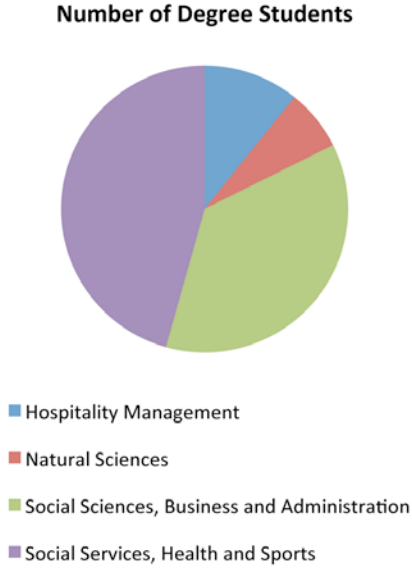
PERSONNEL QUALIFICATIONS (MAN-YEARS)	
Doctor PhD	44.9
Licenciate Lic	27.0
Master's Degree	289.6
Bachelor's Degree (UAS)	58.3
Bachelor's Degree	16.6
Other degree	64.8



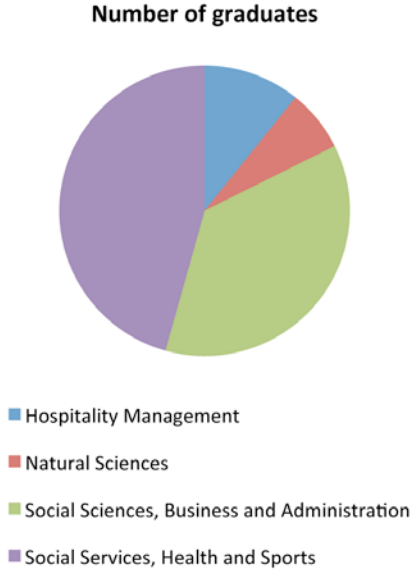
Revenues	58.3 M€

Students at Laurea Univeristy of Applied Sciences

NUMBER OF DEGREE STUDENTS	7673
Hospitality Management	837
Natural Sciences	716
Social Sciences, Business and Administration	2799
Social Services, Health and Sports	3321



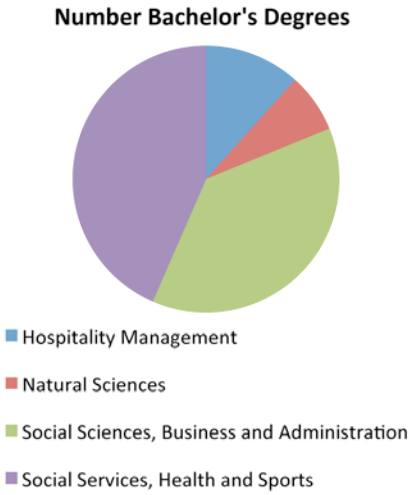
NUMBER OF GRADUATES	1597
Hospitality Management	172
Natural Sciences	110
Social Sciences, Business and Administration	586
Social Services, Health and Sports	729



Bachelor's Degree programmes

NUMBER OF STUDENTS	6235
Hospitality Management	750
Natural Sciences	585
Social Sciences, Business and Administration	2227
Social Services, Health and Sports	2673

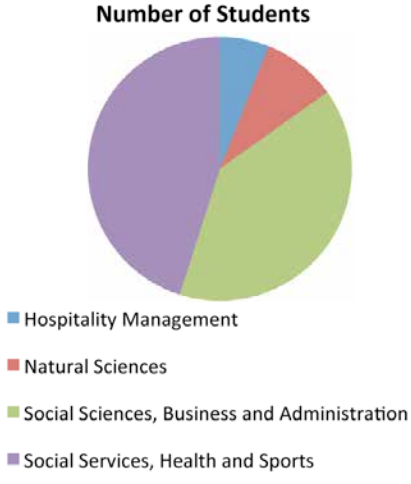
NUMBER OF BACHELOR'S DEGREES	1312
Hospitality Management	153
Natural Sciences	94
Social Sciences, Business and Administration	495
Social Services, Health and Sports	570



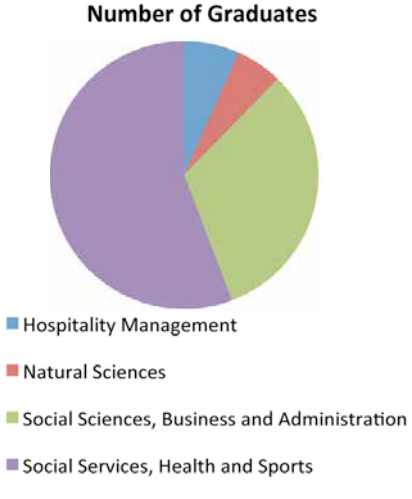
	STUDENT INTAKE	1ST PLACE APPLICANTS	APPLICATION RATE *
Hospitality Management	185	650	3,51
Natural Sciences	120	280	2,33
Social Sciences, Business and administration	515	2035	3,95
Social Services, Health and Sports	630	3265	5,18
Total	1450	6230	4,30

* (1st place applicants / student intake)

Degree Progammes (Adult Education), Bachelor's Degree Programmes and Master's Degree Programmes



NUMBER OF STUDENTS (BACHELOR'S AND MASTER'S DEGREE)	TOTAL	BACHELOR'S	MASTER'S
Hospitality Management	87	43	44
Natural Sciences	131	95	36
Social Sciences, Business and Administration	572	284	288
Social Services, Health and Sports	648	454	194
Total	1,438	876	562



NUMBER OF GRADUATES (BACHELOR'S AND MASTER'S DEGREE)	TOTAL	BACHELOR'S	MASTER'S
Hospitality Management	19	10	9
Natural Sciences	16	5	11
Social Sciences, Business and Administration	91	53	38
Social Services, Health and Sports	159	107	52
Total	258	175	110

STARTING PLACES, 1ST PLACE APPLICANTS AND APPLICATION RATE (BACHELOR'S DEGREE)	STUDENT INTAKE	1ST PLACE APPLICANTS	APPLICATION RATE *
Hospitality Management	-	-	-
Natural Sciences	45	69	1.53
Social Sciences, Business and administration	70	759	11.71
Social Services, Health and Sports	155	1,182	7.63
Total	207	2,010	7.44

* (1st place applicants / student intake)

STARTING PLACES, 1ST PLACE APPLICANTS AND APPLICATION RATE (MASTER'S DEGREE)	STUDENT INTAKE	1ST PLACE APPLICANTS	APPLICATION RATE *
Hospitality Management	-	-	-
Natural Sciences	-	-	-
Social Sciences, Business and administration	145	325	1.41
Social Services, Health and Sports	75	166	2.21
Total	220	491	2.23

* (1st place applicants / student intake)

OPEN UNIVERSITY OF APPLIED SCIENCES	STUDENTS
Number of Students	115
Number of Credits Completed	1,242

RESEARCH AND DEVELOPMENT (RDI)	
Personnel man-years	111.4
Extended operations, M€	11.7
Number of publications	164

Appendix 4.
Onsite visit evaluation programme

FUAS Research Review onsite visit progamme is organised at Laurea, Tikkurila.

Audit Board's internal meetings are organised at room A121 and interviews at room A122 (1st floor).

Monday, June 17

9:30	Meeting at the lobby of Sokos Hotel Vantaa
10:00 – 12:00	Meeting and orientation of the Audit Board
12:00 – 13:00	Audit board lunch
13:00 – 15:00	Meeting and orientation of the Audit Board
15:00 – 16:00	**MEETING 1:** Meeting with FUAS representatives • Leena Treuthardt, Executive Director, FUAS • Antti Kauppi, Senior Advisor, FUAS • Jouni Koski, Chair of FUAS RD&I steering group, Laurea • Jaana Ignatius, Development Manager, Quality, FUAS • Ulla Kotonen, Development Manager, RDI, FUAS
16:00 – 17:00	**MEETING 2:** Meeting with the presidents of Universities of Applied Sciences • Outi Kallioinen, President, LUAS (online) • Maarit Fränti, President, Laurea, • Janne Salminen, Vice President, RDI and System Development, HAMK • Ilkka Väänänen, Director, Research, LUAS • Jouni Koski, Vice President, Education, research and development, Laurea
19:00 –	Dinner with Outi Kallioinen & Jouni Koski

Tuesday, June 18

9:00 – 10:30	**MEETING 3:** Meeting with the chairs of FUAS RDI focus areas • Hanna Maijala, Chair of RDI Focus Group, Ensuring Welfare • Helena Kautola, Chair of RDI Focus Group, Technology and entrepreneurship • Minna Mattila, Chair of RDI Focus Group, Societal Security and Integrity • Silja Kostia, Chair of RDI Focus Group, Environment and Energy Efficiency
10:30 – 12:00	**MEETING 4:** Meeting with the RDI experts • Antti Vettenranta, Director of Business, Student Entrepreneurship, Laurea • Leena Nietosvuori, Coordination of Education, Social and Healthcare, LUAS • Ari Hautaniemi, Project Manager, LUAS • Leena Vainio, Research Director of Education and Research, HAMK • Matti K. Hakala, Senior Advisor for RDI, HAMK • Eija Laitinen, International Assistant, Lecturer, HAMK
12:00 – 13:00	Audit Board lunch meeting
13:00 – 14:30	**MEETING 5:** Meeting with RDI services • Harri Haapaniemi, Laurea • Aki Haimi, Manager of Projects Services, HAMK • Tiina Järvinen, Project Coordinator, LUAS • Petra Vainio, Financial Assistant, LUAS • Aino-Maria Pokela, Development Manager, Communication, FUAS
14:30 – 16:00	**MEETING 6:** Meeting with funding institutions, external stakeholders • Jaana Simola, Development Director, Regional Council of Päijät-Häme • Matti Lipsanen, Development Director, Regional Council of Häme • Arto Ranta-Eskola, Director, Research, Rautaruukki Oyj • Tomi Tura, Director, Lahti Region Development LADEC Ltd
16:00 – 17:30	**MEETING 7:** Meeting with the ALDIGA project (project manager, teachers and students, partners) • Helena Kautola, Member of Project Steering Group, HAMK • Silja Kostia, LUAS • Heli Hiltunen, Student, HAMK • Prof. William (Bill) Anderson (online)
19:00 –	Dinner with Leena Treuthardt & Ulla Kotonen

Wednesday, June 19

9:00 – 10:30	**MEETING 8:** Meeting with the CONNECT project (project manager, teachers and students, partners) • Birgit Aurela, Project Manager, Laurea • Maarit Virtanen, Project Manager, LUAS • Eija Laitinen, International Assistant, Lecturer, HAMK • Charles Agunbiade, Project Researcher Trainee, Student, LUAS
10:30 – 12:00	**MEETING 9:** Meeting with the GUARANTEE project (project manager, teachers and students, partners) • Rob Moonen, Project Manager, Laurea • Heikki Seppälä, Researcher, Laurea • Keith Baker, Philips, Netherlands (online) • Julia Kantorovitch, VTT
12:00 – 13:00	Audit Board lunch meeting
13:00 – 14:30	**MEETING 10:** Meeting with the ENNE project (project manager, teachers and students, partners) • Jari Hautamäki, Project Manager, LUAS • Minna Vesasto, Project Coordinator, LUAS • Jaana Ilomäki, Member of Project Steering Group, Internal Auditor, City of Hyvinkää
14:30 – 15:30	Audit board discussion
15:30 – 16:30	Audit Board's feedback on FUAS RDI activities, management and implementation of strategy • Helena Kautola, ER Centre for Technology Research Director, HAMK • Ulla Kotonen, Development Manager, RDI, FUAS
16:30 – 19:00	Audit board independent working

All meetings consist of 15 min for audit board orientation, 15 min for presentation, 45 min for interviews, 15 min for internal audit board discussions.

Appendix 5.
Examples of FUAS RDI projects

FUAS Research Review Team collected and submitted information of following RDI projects to the Audit Board:

- AIRborne information for Emergency situation Awareness and Monitoring, http://airbeam.eu/
- ALDIGA - Algae from Waste for Combined Biodiesel and Biogas Production, http://www.lamk.fi/aldiga
- BENCH –Beneficial Business Relations between the Central Baltic Region and China, http://projektwebbar.lansstyrelsen.se/benchproject/En/Pages/default.aspx
- CaringTV + Safe Home project, www.laurea.fi/en/caringtv, www.turvallinenkotihanke.fi
- CONNECT - Co-creation of network modes for market entry in developing countries – Finnish renewable energy SME, http://www.laurea.fi/en/connect
- DIALE - Deep learning through dialogue, http://www3.hamk.fi/dialogi/diale/index_eng.html
- Ecomill - Environmental Efficiency, http://www.luas.fi/ecomill
- Entre Akatemia – Support for Entrepreneurship, www.luas.fi/entreakatemia, www.facebook.com/entreakatemia
- Forte- Promoting women's entrepreneurship in social and health care sector, http://projektwebbar.lansstyrelsen.se/forteproject/En/about-forte/Pages/default.aspx
- Guarantee - A Guardian Angel for the Extended Home Environment, http://www.guarantee-itea2.eu/
- IDeALL - Integrating Design for All in Living Labs, http://ami-communities.eu/wiki/IDeALL
- JADE - Joining Approaches for the Integration and Development of transnational knowledge clusters policies related to independent living of Elderly, www.jadeproject.org
- KOULII - Integration of Education and Innovation, http://www.koulii.fi
- ENNE - Proactive Approach to Structural Change, http://www.luas.fi/enne

- Promoting students' health through Second Life
- ServiceD, www.servicedesign.tv
- TeknoBoost, www.hamk.fi/teknoboost
- Velog - Appeal through Logistics for Forssa-region, www.hamk.fi/velog

Below is presented more detailed information of selected FUAS RDI projects in which there have been at least two FUAS institutions as partners.

TABLE 8. Examples of FUAS RDI projects in which there have been at least two FUAS institutions as partners.

NAME OF THE PROJECT	ADMINISTRATOR	FUAS PARTNERS
ALDIGA – Algae from Waste for Combined Biodiesel and Biogas Production	VTT Technical Research Centre of Finland	HAMK, LUAS
CONNECT	HAMK	HAMK, LUAS, Laurea
Entre Akatemia – Support for Entrepreneurship	LUAS	LUAS, Laurea
Promoting students' health through Second Life	HAMK	HAMK, LUAS, Laurea

ALDIGA – Algae from Waste for Combined Biodiesel and Biogas Production

FUAS institution:	HAMK/LUAS
Contact person/ project coordinator:	• Maritta Kymäläinen (HAMK) • Silja Kostia (LUAS)/Mona Arnold (VTT)
Started:	1.3.2010
Ended:	31.12.2012
Financier:	TEKES
Total budget of the entire project, including all partners (in Euros):	ca. 940,000€
The budget of the entire project in your UAS (in Euros):	120,000€
Number of students' RDI-credits:	45
List of the project personnel in your UAS:	• Maritta Kymäläinen (proj.manager) • Laura Kannisto (proj.engineer) • Heli Hiltunen (project and thesis worker) • Tuomo Viitaja (thesis worker) • Miriam Meyer (exchange student from Hamburg University of Applied Sciences)

LIST OF PROJECT PARTNERS	RESE-ARCH INSTITU-TION	EDUCATI-ON INSTI-TUTION	PUBLIC SECTOR	COMPANY	NON-PROFIT ORGANI-SATION	OTHER
1 VTT, Technical Research Centre of Finland (Mona Arnold)	x					
2 UH, University of Helsinki (Martin Romantschuk)		x				
3 SYKE, Finnish Environment Institute (Kristian Spilling)	x					
4 LUAS, Lahti University of Applied Sciences (Silja Kostia)		x				
5 HAMK University of Applied Sciences (Maritta Kymäläinen)		x				
6 University of Waterloo (Bill Andersson)		x				
7 Kemira Oyj				x		
8 Envor Biotech Oy				x		
9 Ekokem Oy				x		
10 LHJ Group Oy				x		
11 Gasum Oy				x		
12 Kujalan Komposti Oy				x		
13 PHJ, Päijät-Hämeen Jätehuolto Oy				x		
14 Clewer Oy				x		
15 Neste Oil Oyj				x		
16 Wärtsilä Finland Oy				x		
17 Sybimar Oy				x		
18 Bioste Oy				x		

Purpose

The main goal was to design and validate a new integrated concept of bio-waste-to-energy utilisation based on algae, biodiesel and biogas production. The aim was to develop a process requiring minimal external energy involving efficient utilisation of all side streams generated in addition to the main fuel streams, i.e. biodiesel and methane.

First, the aim was to identify the most potential waste streams for algae cultivation, and, also, to evaluate their role in anaerobic digestion (i.e. biogas production) as co-substrate with algal reject. After identification the growth of the selected algae species had to be determined in the waste streams in order to confirm the suitability of the waste streams for algae cultivation. The focus was on the detailed productivity analysis including quantitative production rates (biomass and lipid/triacylglycerol), yields, carbon and oxygen balances in specific conditions, to provide algae production data e.g. for the modelling of new integrated concepts. Besides the data from algae cultivation, the biomethane production potential of the algae and its rejects had to be determined. The data was used for the material and energy balances established for the selected process concepts as input-output models. Furthermore, techno-economic performance and greenhouse gas emissions of several different integrated algae to biofuel process concepts were evaluated.

Project design, methodology and approach

The project was executed at five different research institutes and universities. The algae cultivation was studied experimentally at laboratory and pilot scale at VTT, UH and SYKE. HAMK was responsible for the biogas production studies (on laboratory scale) and LUAS for the selection of waste streams based on their composition (analytical and theoretical work). Based on the data obtained in the experimental studies, modelling and techno-economic evaluation of different process concepts were performed at VTT.

Findings

The results suggest that continuous, nitrogen limited, mixotrophic algal cultivation could be a promising strategy to produce lipid for biofuel feedstock. Although caution is needed in extrapolating lab scale results to large scale, these experiments were essential for scaling up, process techno-economic modelling and life cycle analysis.

It was seen that in general industrial waste waters require pre-treatment before using them for algae cultivation. Also, composting waste water needs to be diluted because of too high concentrations of main nutrients.

Light intensity studies proved that in Southern Finland there is sufficient amount of light for algae growth from February to October. For winter time, dark fermentation can be implemented using waste carbohydrates as the carbon source for the algae.

Residual algal biomass after lipid extraction act as a good biogas feed, whereas – due to a strong and sturdy cell wall structure – pre-treatment can be recommended to increase the biodegradability and methane production rate when digesting native algal biomass. Addition of Kemira's BDP-chemical stabilized the AD process which was beneficial at high organic loadings. Algal biomass is a suitable co-substrate in AD plants but requires careful control of the ammonia concentration.

Under the used process and economic assumptions, the considered cases are unprofitable, mainly due to high electricity consumption by cultivation and harvesting, and capital investment costs. The GHG emission estimates of all considered concepts also clearly exceed the target values set in Biofuel target 2018 – EU directive.

Research limitations/implications

Algae are very diverse biomass and prospected to play an important role in tomorrow's bioeconomy. The multifaceted project showed its potential for integration with waste and waste water management. However it also confirmed that for the realization of profitable not subsidised production systems, the costs of cultivation must be reduced. Technology development is still needed in this sector. In addition, besides oil for biofuel, other useful substances such as proteins must also be extracted from the algae and these fractions need to be commercialized.

Originality/value

The research on algae cultivation for biofuel production based on waste streams is a novel approach for waste utilization and nutrient recycling. As the results showed, the overall concepts cannot yet be seen as profitable but the situation may change drastically already in the near future, as technology is developed and the value of the products will increase. For the companies involved, the results obtained give the first indication which is the most critical points of these concepts in Finnish conditions.

Presentations at Scientific Conferences and Publications, by 1.4.2013

Tikka, M., Kymäläinen, M., Hytönen, E., Arnold, M. ja Kostia, S., Levät jalostavat jätevirroista energiaa, Kemia-Kemi 6/2012, p. 28-29.

Kymäläinen, M., Advanced biogas production from various sources. Abstract and oral presentation for International Workshop on Biofuel, 5th November 2012, Manav Rachna International University (MRIU), Faridabad, India.

Silja Kostia, Marika Tikka, Kalle Valkonen, Antti Kautto, Pekka Järvelin and Martin Romantschuk, Testing waste streams for algae cultivation. Abstract and oral presentation for International Workshop on Biofuel, 5th November 2012, Manav Rachna International University (MRIU), Faridabad, India.

Abstract submitted for NORDIWA 2013 – 13th Nordic Wastewater Conference: Mona Arnold, Kristian Spilling, Maritta Kymäläinen, Yanming Wang, Anne Ojala and Marika Tikka, Algae for Wastewater.

Students' theses (available at www. theseus.fi)

Hiltunen Heli, 2011. Biogasification Potential of Some Algae Species. Bachelor Thesis. HAMK University of Applied Sciences. http://urn.fi/URN:NBN:fi:amk-2011120917801

Järvelin Pekka, 2011. Microalgae – Energy Production and Wastewater Purification: Three Scenarios for Microalgae Cultivation in the Kujala Waste Management Center. Bachelor Thesis. LUAS. http://urn.fi/URN:NBN:fi:amk-2011120817701

Viitaja Tuomo, 2012. Mikrolevien metaanituoton tehostaminen (in Finnish). Bachelor Thesis. HAMK University of Applied Sciences. http://urn.fi/URN:NBN:fi:amk-2012122020237

CONNECT Co-creation of network modes for market entry in developing countries – Finnish renewable energy SME

FUAS institution:	HAMK/LUAS/Laurea
Contact person/ project coordinator:	• Birgit Aurela • Ritva Jäättelä (Laurea UAS)
Started:	2011
Ended:	on going
Financier:	
Total budget of the entire project, including all partners (in Euros):	783,210€
The budget of the entire project in your UAS (in Euros):	192,066€
Number of students' RDI credits:	In HAMK 156 ECTS credits by April 2013 (more to come; at least 50 more students participating already).

LIST OF PROJECT PARTNERS	RESEARCH INSTITUTION	EDUCATION INSTITUTION	PUBLIC SECTOR	COMPANY	NON-PROFIT ORGANISATION	OTHER
1 Laurea UAS		x				
2 HAMK UAS		x				
3 LUAS UAS		x				

Purpose

Purpose of the project is to support growth and speed up internationalization of Finnish SMEs to developing countries.

Project design, methodology and approach

To achieve the purpose, we are aiming to create, develop and pilot test network creation modes for more effective market entry in developing countries.

Working objectives

- to develop internationalization skills of SMEs;
- to improve the ability of SMEs to participate in value networks;
- to increase the understanding and utilization of value potential of international students/expats for SMEs;
- to open possibilities for new recruitments in renewable energy companies and also business opportunities for new intermediating companies in this sector;
- to co-create effective modes for network creation;

Findings

The benefit for partner companies, which are chosen for piloting, is more or less a company specific mode for the creation of a network enabling market entry or presence. Benefits for other SMEs and for international students/expats are summarized below:

Objective - Outcomes/Benefits → Possible indicator(s)

- Develop internationalization skills of SMEs
  Improved customer and market understanding of SMEs
- Knowledge transfer and competence development
  - Evaluated by the participating companies after final seminar (interview/questionnaire)

Improve the ability of SMEs to participate in value networks

- Increase positive attitude and competencies to value network and collaborative development
- Evaluated by the participating companies after final seminar (interview/questionnaire)

Increase the understanding and utilization of value potential of international students/expats for SMEs

- Facilitated collaboration between SMEs and students/expats from potential target countries
    - Number of companies and students/expats participating in workshops

Open possibilities for new recruitments in renewable energy companies and also business opportunities for new intermediating companies in this sector

- Increased employment opportunities for students from developing countries in SMEs helping companies' market entry in their home countries
    - number of contacts agreed between students and SMEs
    - number of part-time / full-time jobs agreed
    - number of companies started
    - co-creation of effective modes for network creation

Tested and refined mode for network creation

- Engagement of stakeholders during the pilot phase

Research limitations/implications

New culture and working in different countries.

Social implications (if applicable)

The project will teach to work in a multidisciplinary and multi-cultural environment and in new surroundings.

Entre Akatemia – Support for Entrepreneurship

FUAS institution:	LUAS
Contact person/ project coordinator:	Ari Hautaniemi
Started:	1.5.2011
Ended:	31.12.2013
Financier:	European Social Fund
Total budget of the entire project, including all partners:	457,716€
The budget of the entire project in your UAS:	305,449€
Number of students' RDI-credits:	(1.5.2011 – 31.3.2013) 131 credits
List of the project personnel in your UAS:	• project manager Ari Hautaniemi • project coordinator Riitta Välttilä • project secretary Kirsi Kuuneva • several teachers from different fields (business and management, social & health care, tourism, technology).

LIST OF PROJECT PARTNERS	RESEARCH INSTITUTION	EDUCATION INSTITUTION	PUBLIC SECTOR	COMPANY	NON-PROFIT ORGANISATION	OTHER
Laurea University of Applied Sciences		x				

Purpose

The purpose of the project is to promote an operating method for the entrepreneurship of young people, an attitude favourable to entrepreneurship, and a realistic image of entrepreneurship. The special project target group is young women, because in Finland there are fewer female entrepreneurs than male ones. The project will, however, also promote the joint entrepreneurship of men and women by at the same time promoting the creation of a more equal working community.

Project design, methodology and approach

There are three key operating methods in the project based on experience and on an increase in social capital: a) Small group methodologies, in which entrepreneurs interested in student mentoring, and teachers and students from different subjects meet to discuss openly certain themes concerning entrepreneurship, b) key development tasks for students, teachers and entrepreneurs carried out in mentor companies, in which entrepreneurial activity is studied and the life of entrepreneurs and their work are looked at through solutions to problems that genuinely arise from the needs of an entrepreneur, and c) broader societal workshops dealing with business life, municipal organisations or other organisations, in which academics grasp some regionally significant challenge and come up with solutions for it. The purpose of the workshops is to offer participants experiences of societally significant work.

Findings

Key findings: a) the significance to learning of different learning environments (differing from classrooms and traditional learning facilities) and premises, b) direct interaction between students and entrepreneurs and exchange of information based on a realistic (not overly positive) image of entrepreneurship, and c) a multidisciplinary approach for team members in the set challenges and in the make-up of the teams supports the creation of a positive learning process and key experience history with respect to entrepreneurship.

Research limitations/implications

The model should also be duplicated and tested elsewhere in different contexts. In the assessment of the final impact, it is worth paying attention to the development and actualisation of the participating students' intentions and potential in entrepreneurship, after they have graduated.

Social implications (if applicable)

In the project, it has been possible to create an unprecedented network based on collaboration and co-operation between entrepreneurs, students and teachers, which in practice is an excellent indication of how a UAS can best understand and support existing business activity and integrate teaching into a regional development perspective.

Originality/value

The operating methods of the project are not in themselves new; experience-based dialogue (e.g. the peripatetic school) has already been in use for thousands of years, but the successful construction of the whole around entrepreneurship is unprecedented.

Presentations at Scientific Conferences and Publications, by 1.4.2013

Hautaniemi, Ari & Välttilä, Riitta (2013) Kolme pientä elefanttia – sosiaalinen pääoma ja aktiivinen yhteisöllisyys yrittäjyyskasvatuksessa. Teoksessa Väänänen, I., Harmaakorpi, V. & Raappana, A. (toim.) Teorioita ja käytäntöjä korkeakoulujen aluekehitystoiminnasta. Lahden ammattikorkeakoulun julkaisu, sarja c, osa 127. Hansaprint, Vantaa.

Entre Akatemia. Supporting Entrepreneurship by Building Social Capital. Posteriesitys Lahden tiedepäivässä, 2012

Entre Akatemia. Supporting Entrepreneurship by Building Social Capital. Posteriesitys FINPIN 2012 Conference on Entrepreneurial Universities, Münster, Saksa, 2012

Gender-based segregation, labour market flexibility and innovation. What do we know, what do we need to do. European Employment Forum, Bryssel, Belgia, 2011.

Promoting students' health through Second Life

FUAS institution:	HAMK
Contact person/ project coordinator:	Tiina Mäenpää
Started:	1.1.2010
Ended:	28.2.2013
Financier:	
Total budget of the entire project, including all partners (in Euros):	120.000€/per year
The budget of the entire project in your UAS (in Euros):	
Number of students' RDI-credits:	223 ECTS
List of the project personnel in your UAS:	• Tiina Mäenpää • Irma Sinkko, • Timo Niemelä • Merja Salminen

LIST OF PROJECT PARTNERS	RESEARCH INSTITUTION	EDUCATION INSTITUTION	PUBLIC SECTOR	COMPANY	NON-PROFIT ORGANISATION	OTHER
FUAS (HAMK, LUAS, Laurea)		x				
Helsinki Metropolia UAS		x				

Purpose

The aim of the project was to promote the student's (HAMK, LUAS, Laurea, Metropolia) health and wellbeing. The project was funded by the Ministry of Social affairs and health. Overall aims were: improving the accessibility, preventive welfare services, increasing community with the means of UAS, student welfare and the Lutheran church, and to increase the students' wellbeing.

The last year of the project concentrated on improving the accessibility, the preventive welfare services and strengthening and increasing the wellbeing services offered in virtual environments according to the feedback received. In addition, the aim was to strengthen the connections between virtual and real-life wellbeing services and creating an operations model that would support student's wellbeing. In the third year the aim was to find out the suitability of virtual wellbeing services and Second Life - virtual world and spreading the information concerning its usability in UAS sector.

Project design, methodology and approach

4GoodLife wellbeing environment was created in Second Life in order to promote students health and wellbeing. The aim of 4GoodLife was to strengthen the preventive welfare services for students and it included information e.g. on physical training, healthy diets, relaxation and drug abuse. It was possible to contact on-duty healthcare personnel (nurses, psychologist, curator and pastor) via avatars. In addition different kind of support groups and events were organised.

4GoodLife Facebook group was created to support the virtual wellbeing environment and links concerning improving wellbeing, upcoming events and information supporting wellbeing were promoted on the wall of the group. The group members had a change to ask questions and during the project, real-life places for connecting one another were developed, which have been promoted in both online environments. In addition, feedback has been collected on both sites.

Findings

A virtual wellbeing environment in Second Life was developed to promote students' wellbeing but it was soon discontinued as it was not functional in for the task, according to the feedback from the students and personnel.

In addition, a Facebook group was developed to promote information on wellbeing and different health promoting events. The experiences were described in e-publication (https://publications.theseus.fi/handle /10024/54886) which gathers information on the project from different points of views and user experiences. The publication describes for example the group sessions, on-duty activities and development of real-life environments. Through the experiences and good practises of the project, an operational model supporting the student's wellbeing has been developed to be utilised at the UASs.

Research limitations/implications

The project boosted the discussions on promoting students' health and wellbeing in the UASs. In addition the personnel's awareness of the possibilities of social media has increased. The project has increased the courage to utilise social media and brought widen the perspective of the personnel. The cooperation between the partner UASs and their personnel has strengthened and increased and the sharing of best practises has begun.

The project offered opportunity to try preventive welfare in virtual world Second Life. It was noticed that Second Life does not function well in this sort of usage, yet students regard positively on utilising virtual possibilities and social media in promoting student's wellbeing. Increasing the community of UASs has been developed through further developing the real-life meeting places and their connections to virtual environments.

The project gave valuable experiences of Second Life and Facebook as environments for preventive welfare. In addition, experiences on producing healthcare services in social media were received. The experiences have been presented in local and international conferences. In addition they have been described in the e-publication. The information received can be utilised in similar projects and when planning the development of the healthcare services of the UASs.

Social implications (if applicable)

The project boosted the discussions on promoting students' health and wellbeing in the UASs. In addition the personnel's' awareness of the possibilities of social media has increased. The project has increased the courage to utilise social media and brought widen the perspective of the personnel. The cooperation between the partner UASs and their personnel has strengthen and increased and the sharing of best practises has begun.

The project gave valuable experiences of Second Life and Facebook as environments for preventive welfare. In addition, experiences on producing healthcare services in social media were received. The experiences have been presented in local and international conferences. In addition they have been described in the e-publication. The information received can be utilised in similar projects and when planning the development of the healthcare services of the UASs.

Originality/value

The project gave valuable experiences of Second Life and Facebook as environments for preventive welfare. In addition, experiences on producing healthcare services in social media were received. The experiences have been presented in local and international conferences. In addition they have been described in the e-publication. The information received can be utilised in similar projects and when planning the development of the healthcare services of the UASs.

Presentations at Scientific Conferences and Publications, by 1.4.2013

No scientific publications or conference presentations were published, but articles on professional magazines and presentations on in-service trainings and conferences were made. The e-publification was published on 28.2.2013.

Students' theses (available at www. theseus.fi)

Second Lifevirtuaalimaailma ammatillisen argumentoinnin harjoitteluympäristönä : Second Lifessä toimivan harjoitteluympäristön suunnittelussa huomioitavia asioita. Raija Välimäki. 2011. -Suitability of Second Life as an environment of practicing argumentation in nursing education. https://publications.theseus.fi/handle/10024/38662

4 Goodlife – Ammattikorkeakouluopiskelijoiden näkemyksiä terveyden edistämisestä internetissä.

Pauliina Onkalo. 2012. – Evaluation of the suitability the of usage of 4Goodlife and suggestions on developing the 4Goodlife in the Second Life.

http://publications.theseus.fi/bitstream/handle/10024/52603/Ammatti.pdf?sequence=1

Second Lifen mahdollisuudet opiskelun alkuvaiheen tukemisessa. Outi Hakala ja Mirkka Wihinen. 2011. -The possibilities of Second Life in supporting the beginning of studies in UAS.

Second Life-kurssien osallistujien ja kouluttajien kokemuksia toiminnasta ja opiskelustavirtuaalimaailmassa : johtopäätöksiä oppimisympäristön suunnitteluun. Päivi Svärd. 2012. - User experiences of Seconf Life cources and suggestuions for development. https://publications.theseus.fi/handle/10024/41043

Sosiaalinen media terveydenhoitajan työvälineenä terveydenedistämistyössä. Riikka Pelkonen. 2012. - Examining the experiences of public health nurses in using social media as a health promotion tool. https://publications.theseus.fi/handle/10024/43110

Terveyden edistäminen multimedia käsikirjoittamisen keinoin. Leena Koskimäki. 2013. – Promoting health through the means of multimedia writing.

Ehkäisevä päihdetyö Second Life –virtuaalimaailmassa. Alina Vartiainen ja Lucia Guerrero Egea. 2011. https://publications.theseus.fi/bitstream/handle/10024/31961/Ehkaiseva_paihdetyo_second_life_virtuaalimaailmassa.pdf?sequence=1

Integrating RDI into Learning

Appendix 6.
2014 RDI focus points and development actions

STRATEGIC OUTLINE	DEVELOPMENT GOAL	DEVELOPMENT ACTION	IMPLEMENTATION RESPONSIBILITY, TIMETABLE	ASSESSMENT OF EFFECTIVENESS: PRACTICES, TIMETABLE	OBJECTIVES
Strengthening of international practice-based RDI activities	Initiating new international RDI projects and increasing the total of external tendered RDI funding.	Giving RDI focus area groups the task of planning and preparing for a minimum of four (4) new projects of which at least one is international (per emphasis area)	Responsibility: RDI focus area chairpersons (Helena Kautola, Minna Mattila, Hanna Maijala, Silja Kostia). Timetable: 1 – 12/2014	New RDI funding applications and funded RDI projects in 2014.	A minimum of four (4) new RDI projects of which at least one is international (per focus area)
		Improving the possibilities of preparing international RDI projects by increasing the resources of RDI project preparation. Allocating funding to be used for supporting the preparation of FUAS RDI projects.	Responsibility: RDI Head of Development & RD&I steering group Timetable: 1 – 12 / 2014	RDI project applications completed with RDI project preparation funding and funded RDI projects in 2014.	4 funded project preparations per focus area
		Mapping out international co-operation partners and needs in expanding international RDI network in each focus area.	Responsibility: RDI focus area chairmen. Timetable: 1 – 5 / 2014	Used in future project preparations.	A report on the international RDI partners of focus areas.
		Making visits to selected RDI partners / inviting selected RDI partners to visit FUAS. Agreeing on future actions to further strengthen RDI co-operation.	Responsibility: RDI focus area chairmen & RDI Head of Development Timetable: 9 – 12 / 2014	Used in future project preparations.	1 visit per focus area
Acting as an engine renewing the fundamentals of innovation system	Strengthening the role of FUAS as a regional RDI development operator.	Defining a joint view on FUAS RDI activities towards 2020 with regional development operators, companies, student councils and alumni.	Responsibility: Project researcher and RD&I steering group Timetable: 1 – 12 / 2014	Used in directing the focal points of RDI activities and defining the FUAS Strategy Implementation Programme.	A report on directing the focal points of FUAS RDI activities in the future.
		Strengthening regional partnerships in each focus area and establishing new RDI partnerships with companies.	Responsibility: RDI emphasis area chairpersons & RDI Head of Development Timetable: 1 – 12 /2014	Creating new company co-operation projects and partnerships.	1 to 3 new RDI partnerships per focus area

139

FUAS
FEDERATION
OF UNIVERSITIES
OF APPLIED SCIENCES

The FUAS federation – Federation of Universities of Applied Sciences – is a strategic alliance established by Häme, Lahti and Laurea Universitites of Applied Sciences

HAMK
HÄMEEN AMMATTIKORKEAKOULU
UNIVERSITY OF APPLIED SCIENCES

LAHDEN AMMATTIKORKEAKOULU
Lahti University of Applied Sciences

LAUREA
AMMATTIKORKEAKOULU
UNIVERSITY OF APPLIED SCIENCES

The FUAS Research Review is one step towards the strategic intent of FUAS for 2020. The purpose of the Research Review was to give a clear and realistic picture of the research, development and innovation activities of FUAS through assessing the RDI activities of each member institute and to produce strategic evaluation data that will develop the FUAS RDI activities. The Research Review produced and assessed information about the role of the RDI activities at FUAS, the current state of the RDI activities at the four focus areas of FUAS, the integration of the RDI activities and education, the international aspects of the RDI activities, and the profitability, quality and influence of the RDI activities. The report combines both self-evaluation and external evaluation as well as options for the development of RDI at FUAS.

The publication series of Lahti University of Applied Sciences
A Research reports
B Study material
C Articles, reports and other current publications

ISSN 1457-8328
ISBN 978-951-827-197-3