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Student entrepreneurship at research-intensive universities:

from a peripheral activity towards a new mainstream

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About LERU

LERU was formed in 2002 as an association of research-intensive universities sharing the values of high-quality teaching in an environment of internationally competitive research. The League is committed to: education through awareness of the frontiers of human understanding; the creation of new knowledge through basic research, which is the ultimate source of innovation in society; the promotion of research across a broad front, which creates a unique capacity to reconfigure activities in response to new opportunities and problems. The purpose of the League is to advocate these values, to influence policy in Europe and to develop best practice through mutual exchange of experience.

Executive summary

We live, more than ever before, in a knowledge-based economy, an economy where routine activities are increasingly automated or outsourced, and where creative tasks and innovation have become more prominent. We also live in a society facing global challenges for which appropriate solutions have to be found. In this context, attitudes, skills and behaviours are needed that stimulate the pursuit of creative tasks and the addressing of complex problems in innovative ways. These attitudes, skills and behaviours can be called entrepreneurial, because they provide individuals with the willingness and ability to recognise and pursue opportunities for new value creation and problem solving in any organisational setting. Entrepreneurship must therefore be understood as a multifaceted concept that includes the attitudes and skills to create new value in society, not (just) being a business owner or founder of a start-up.

The economic changes and societal challenges not only influence the skills and attitudes needed, but have also shed new light on the role of research-intensive universities in today's economy and society. This role, as educators of tomorrow's employees, policy makers, leaders and citizens needs to be rethought. In depth, disciplinary, scientific expertise remains the cornerstone of a university education, but enriching it with attitudes and skills that aim at creating new societal value and shaping tomorrow's society has become of the utmost importance. One of way of forging such skills and attitudes is through interdisciplinary teamwork.

For many of today's global societal challenges, research will be a crucial part of the solution. However, it is often not straightforward how this newly generated knowledge must be translated into addressing these societal challenges, and how new solutions should be deployed to generate the necessary impact. This requires students and researchers that are equipped with appropriate entrepreneurial skills and attitudes. To do this, universities need to stimulate bottom-up initiatives, combined with a university-wide vision. This might require a change of the organisation of the university and its staff.

Universities do not need to become "entrepreneurial" themselves, but they should be aware of their role in entrepreneurial ecosystems, namely to educate students that can create value in the organisations, economy and society they will join after graduation and that are able to tackle (societal) problems in an innovative way. In order to keep track of this and to learn how to do this effectively, universities should take the lead in developing and using tools for assessment. These tools should diagnose what the university's position is on entrepreneurship, how it can improve, and whether or not it achieves the aspired changes and ultimately creates a better society. Last, but not least, universities should increasingly become the driving force in forming entrepreneurial ecosystems in which students are no longer a human resource that is being deployed, but an entrepreneurial driving force that creates new value in society.

This paper sets out LERU's vision on the role that universities, and higher education institutions in general, need to play when it comes to stimulating and supporting student entrepreneurship. It is intended for all stakeholders who play a role in shaping the higher education system, from universities, to profit and non-profit organisations, and from individuals involved in coaching and/or teaching to policy makers and governments. It is enriched with good practice examples of student entrepreneurship at LERU universities.

Resulting from this vision, LERU makes the following recommendations:

1. *Research-intensive universities need to proactively develop the entrepreneurial skills and attitudes of their students and staff.*
2. *Interdisciplinary student work and project-based learning are essential components of successful entrepreneurship education.*
3. *For entrepreneurship to thrive at universities and to make it accessible and relevant to all students, its meaning needs to be reframed.*
4. *Research-intensive universities need to embrace bottom-up initiatives that help to foster an entrepreneurial culture.*
5. *Universities need to be open and take the lead with regard to entrepreneurship education in their entrepreneurial ecosystem.*

1. Introduction – The changing role of research-intensive universities

Research-intensive universities operate in a unique context, which stems from their three-fold mission of education, research and service to society, and more specifically from the synergy that arises from the interplay between these activities (Wissema 2009). The research activities undertaken at universities make them one of the core sources of new knowledge and cutting-edge technology. At the same time, university students are exposed to research-driven excellence and evidence-based education conducted by university faculty. Curiosity and intrinsic motivation, the capacity to identify opportunities along with a high tolerance for constructive failure, being used to deal with uncertainty, managing projects and funding sources and being part of collaborative work environments are individual qualities university faculty is often endowed with. These qualities are also relevant in the context of starting new ventures. (EC 2012, Berbegal-Mirabent 2018, Etzkowitz 2001, Etzkowitz 2017, Clarysse 2011, Jain 2009). A research-intensive university is therefore an ideal environment for fostering entrepreneurial skills and attitudes.

The university context is an important determinant for starting a new venture by students (Astebro 2012). Empirical evidence shows the positive impact of a university culture on students' entrepreneurial attitude. For example, the analysis of Bergmann et al. (2016) reveals the relevance of positive peer effects resulting from fellow students' attendance of entrepreneurship courses and social interactions with their peers, e.g. by sharing information on motivation, learning and course experiences. This results in other students considering such courses for themselves. This seems to be true especially for the very early phase, where it is all about stimulating a student entrepreneurial attitude, by creating an environment that supports student entrepreneurship (Jansen et al. 2015).

1.1. Research-intensive universities as drivers of entrepreneurial ecosystems

The role of today's universities has changed due to the new requirements of an increasingly knowledge-based economy and society (Etzkowitz 2000 and 2017). Over the past 35 years, the commercialisation of academic research has become a considerable part of universities' activity, mainly through patenting and licensing of research results. Over time, universities have become important contributors to the innovation system where they act as knowledge creating and disseminating institutions transferring their knowledge and cutting-edge technologies into society (Etzkowitz 2000 and 2001). As an illustration, a recent study finds that the impact LERU members have on the European economy amounts to some €100 billion gross value added in 2016 alone (Biggar Economics 2017).

Next to the changing role of universities in the regional innovation system, there is also an increasing focus on

Trinity College Dublin - LaunchBox

Trinity is committed to providing a transformative learning environment, fostering innovation and entrepreneurship at all levels across the university. Identifying these opportunities requires us to provide new tools and methodologies to our students. Tangent is a new unit in Trinity offering students, staff, and the wider entrepreneurial ecosystem programmes in innovation, creative thinking, and entrepreneurship.
LaunchBox is Tangent's Student Accelerator and is open to teams of Trinity students with an early-stage business idea. As part of the summer accelerator programme, LaunchBox provides mentorship, funding, access to alumni and investors, and the ideal collaborative environment to launch new start-up ventures. 2018 is the sixth year of LaunchBox. LaunchBox is one of a number of pathways that Trinity provides for students on their entrepreneurship journey including EIT-funded programmes for Health and Climate focussed startups where the graduates of the LaunchBox programme can continue to progress their business ideas to the next stage.

www.tcd.ie/tangent/accelerators/launchbox/

University of Copenhagen - UCPH Innovation & Entrepreneurship project

The project consisted of three work packages

1. Developing UCPH teachers' innovation and entrepreneurship skills for teaching
    - Practice-based learning cooperation between lecturers and innovation consultants
    - Developing and successfully running innovation and entrepreneurship summer schools
    - Review of how existing methods of evaluation can be used to assess and evaluate student innovation & entrepreneurship competences
    - The development of a two-day course on innovation & entrepreneurship in teaching
    - Development of teaching materials based on the practice-based collaboration mentioned above – most of the material is now accessible in the digital Toolbox for Innovation & Entrepreneurship in Education
2. Establishing an Innovation & Entrepreneurship network for teachers
3. Student entrepreneurship: Developing and implementing a concept for a student entrepreneurship environment at the university. The university has now opened three UCPH Innovation Hubs, where students can get free advice and office space while establishing a start-up or working on problem-oriented student projects.

https://innovationenglish.sites.ku.dk/
https://ie.ku.dk/english/

entrepreneurship-related activities, since entrepreneurship is seen as an important driver of economic growth and job creation (EC 2013). Aside from spill-overs of scientific knowledge and technology transfer from the university to the market, universities' strongest contribution to innovation is the creation of human capital by stimulating young people through teaching and learning (Jansen et al. 2015, Jonkers et al. 2018). The role of universities is now considerably broader and more fundamental than in the 20th century, as it is also about "providing thinking, leadership and activity to enhance entrepreneurship capital" as Audretsch (2014, p 320) points out.

As a result, the proactive development of an entrepreneurial ecosystem has become an explicit, strategic goal of many universities and of governments' higher education policies (Bergmann et al. 2016). Universities are typically key players in such ecosystems as they are both knowledge creators, as well as talent creators — two of the most important elements of entrepreneurial ecosystems (Stam 2015). More indirectly they can also be important network creators, and leaders in their region, further enhancing the entrepreneurial economy. In this way, universities can put their research and education missions into perspective and connect it more explicitly to value creation processes in the economy and to tackling societal challenges. As a consequence of the more strategic approach towards entrepreneurial ecosystems, universities are increasingly setting up infrastructure that supports an entrepreneurial environment and climate and that helps students in starting innovative ventures.[1]

An in-depth analysis of six leading university-enabled entrepreneurial ecosystems in North America (Babson College, University of Southern California, University of Texas-Austin), Latin America (Tecnologico de Monterrey), Europe (EM Lyon) and Asia (National University of Singapore) has shown that seven factors are key for a thriving university-enabled entrepreneurial ecosystem: (1) senior leadership vision, engagement and sponsorship; (2) strong programmatic and faculty leadership; (3) sustained commitment over a long period of time; (4) commitment of substantial financial resources; (5) commitment to continuing innovation in curriculum and programmes; (6) an appropriate organisational infrastructure; and (7) commitment to building the extended enterprise and achieving critical mass (Fetters et al. 2010). Several best practices can also be found among LERU members, such as the entrepreneurial ecosystems around the University of Cambridge (Kirk and Cotton 2012)

1 Whether or not students choose a career as an independent entrepreneur or entrepreneurial employee, they benefit from entrepreneurial learning, because they develop business knowledge and essential skills along with entrepreneurial attitudes, comprising creativity, initiative, persistence, team-work and a sense of risk awarenes as well as responsibility (EC 2013; EC 2012).

and the University of Oxford[2], the bio-tech alliance between Leuven, Heidelberg, Maastricht and Copenhagen[3], and Imperial College London's new White City Campus[4].

1.2. The rise of entrepreneurship research

Although the meaning of "entrepreneurship" is as old as the existence of exchange and trade between individuals (Landström 2010, Landes et al. 2010), the study of entrepreneurship has remained marginal for a very long time. This can be partly explained by the initial limited interest in society: since the industrial revolution, economic development was mainly associated with mass production, whereby large-scale systems and big corporations were seen as superior in terms of efficiency, the so-called managerial economy (Audretsch and Thurik 2001).

With the emergence of more entrepreneurially-driven economies in the 1970s and 1980s (Thurik et al. 2013), scholars from different fields started to conduct studies related to entrepreneurship and small business. Many pioneering studies on entrepreneurship from this period focussed on the discovery of this "new" phenomenon: on the disproportionate role of young and small firms in job creation (Birch 1979) and in innovation (Ács 1990), the re-emergence of self-employment (Blau 1987, Steinmetz 1989), and the role of small firms in the rejuvenation of regional economies (Brusco 1982, Piore 1984). These studies provided an intellectual foundation for the incorporation of entrepreneurship and small business into different research projects, and many scholars entered this promising field of research. Moreover, several initiatives were also taken to stimulate communication between scholars in the – then still very fragmented – research community. Good examples are, for instance, the initiation of academic organisations, as well as the launch of academic conferences and scientific journals (Landström 2018).

The building of a strong infrastructure within the field continued in the 1990s when it became a "melting pot" for scholars from various research fields, leading to the introduction of new research questions, different methodological approaches and different concepts and theories (Landström 2018). At the same time, the collaboration between researchers increased through professional organisations and conferences, through enhanced publication opportunities that resulted from the introduction of a large number of new scientific journals, and through a growing number of education programmes (Aldrich 2012). In addition, new funding sources for entrepreneurship studies became available. The research within the field showed a strong empirical focus with scholars trying to understand the phenomenon from many different angles.

The significant increase in the academic legitimacy of the field of entrepreneurship research was partly triggered by the rise of business schools around the world. This rise also included the growth of academic research on business and economics, and a stronger focus on accreditations and rankings based on top journal publications. This vastly increased both the quantity and quality of entrepreneurship research. As a result, entrepreneurship as a scholarly field has become more and more established and institutionalised.

University of Cambridge - Owlstone

In 2004, University of Cambridge PhD students Andrew Koehl, Billy Boyle and David Ruiz Alonso put their idea through the Cambridge University Enterprise, a student-run business creation competition. Although they did not win the competition that year, a runner-up prize of £5,000 allowed them to catalyse and secure a $2 million investment six weeks after the competition to spin out Owlstone from the University of Cambridge Engineering Department. Initially developed for military and industrial applications, Owlstone's microchip chemical sensor technology Field Asymmetric Ion Mobility Spectrometry (FAIMS) has now attracted over $100 million in funding, and spun out Owlstone Medical in 2016, which is developing breath tests for the early detection of lung and colorectal cancer. Recently, Owlstone Medical raised $15 million in March 2018, and won Royal Academy of Engineering's 2018 MacRobert Award in July 2018.

https://www.owlstonemedical.com/about/

2 https://www.eship.ox.ac.uk/

3 https://www.health-axis.eu/

4 https://www.imperial.ac.uk/white-city-campus/

2. Changing conditions for graduates' careers

With close to 5 million EU citizens obtaining a higher education degree every year[5], the tertiary education system has a significant impact on how tomorrow's citizens and workforce are being educated. The specific research culture and their impact on innovation activities give research-intensive universities, such as the LERU member universities, a special position in the tertiary education system.

Historically, the academic degrees obtained at these (and other less research-driven) universities have led to fairly predictable careers and quite stable employment terms. However, in the current labour market this setting is no longer the dominant one. The fast adoption of new technologies, spurred by a rapid digitalisation of society, has had a profound impact on the types of jobs available to graduates and on their likely future career patterns (Brynjolfsson and McAfee 2014, Levy 2004, Economist 2014). As a consequence, societies that embrace the current innovation paradigm are seeing the emergence of network-based, open innovation systems, where disciplinary knowledge needs to be complemented with a broader set of experiences and transferable skills (Brocke 2016, Bowerman 2017).

Moreover, humankind is facing some of the biggest societal and environmental challenges in history, from disease prevention, national security, job creation, food production, quality of life and the natural environment and sustainable development, to climate change, large scale conflicts and inequality (Bush 1945, Brundtland 1987, WEF 2018). Universities play a key role in addressing these societal challenges through research, often supported by governmental funding instruments such as the EU Framework Programme for Research and Innovation. The results from that research can be transferred into society via new or improved products, services, policies, patents, spin-outs, start-ups, with informal interactions between researchers and industry or other non-academic organisations or via consulting (Fini et al. 2018). Much of the transfer of these research results is driven by entrepreneurial researchers. But the biggest impact of research that takes place at universities is through the teaching of students (Bay Area CEI 2017).

When it comes to teaching entrepreneurship to students, one must realise that entrepreneurship is a way of thinking , whereby opportunities are emphasised over barriers and threats (Krueger 2000). This opportunity identification process is an intentional process, and therefore, entrepreneurial intentions merit our attention. The intention to act entrepreneurially is driven by entrepreneurial attitude and skills. In that respect, entrepreneurial attitude is defined as the predisposition to respond in a generally favourable way to entrepreneurial

Universitat de Barcelona - International Summer School on Creativity management in an innovation society

The University of Barcelona, in a joint effort with HEC Montreal, organises this Summer School since 2009 (9 editions by now). This is a two-week activity intensively focused on creativity and innovation with a strong interdisciplinary approach where we combine academic sessions, presentations of experiences, visits to companies and co-creation workshops. There is an average of 60 students attending the School in each edition and the programme is taught one week in Montreal and the second week in Barcelona. Participants have the privilege to be in contact with organisations, thinkers, innovators and creators of many disciplines: design, architecture, gastronomy, software, circus, new technologies, etc. They also have the opportunity to work and learn new techniques and management tools to promote creativity and innovation in different organisations. The summer school is mainly about leaving the comfort zones and finding alternatives and radical solutions that are different from the standards.
The participants come from very different backgrounds and professions: master's students, professionals, public managers, academics and consultants. This combination of different disciplines, work experiences and ages of the participants has a high added value.

http://www.ub.edu/catempren/

5 http://ec.europa.eu/eurostat/statistics-explained/index.php/Tertiary_education_statistics.

Université de Genève - University of Geneva(UNIGE)– Best Idea Contest

Since 2011, UNIGE organises once a year in November the "BestIdea Contest". Students are invited to pitch a start-up project and a jury made up of professionals gives them a highly valuable feedback. About 30 projects are presented each year and participants come from all Faculties of UNIGE. The 10 best projects receive an award which is delivered by partners from the entrepreneurial field. Useful prizes are offered, such as coaching sessions, mentoring or co-working places, to help the award-winning student-entrepreneurs move forward with their start-up project. The contest targets very early stage projects and the winners often successfully participate in other Swiss start-up competitions.
Since 2011, more than 200 student projects from all Faculties of UNIGE have been presented at the "BestIdea Contest" and several ideas have led to the creation of a start-up or an association. To encourage student-entrepreneurs after the contest, Meet-up Sessions are organised from December to April. Each session welcomes a speaker from a specific field and targets one topic (BusinessModel, Customer segmentation, Sales strategy etc.). To enhance networking occasions, a "PowerLunch" is also organised once a year, bringing together policy-makers and student-entrepreneurs.

https://www.letemps.ch/economie/graines-startupers-passent-premier-oral-geneve

opportunities, whereas entrepreneurial skills (abilities, talents) refer to the ability to perform entrepreneurial tasks including opportunity recognition, viability screening, and creative problem-solving skills. Entrepreneurial skills and attitude[6] can be trained and thereby augmented.

2.1. Required skills for the future

In 2006, the European Parliament and the Council adopted a Recommendation on Key Competences for Lifelong Learning (EPC 2006). In its annex, the European Reference Framework of Key Competences for Lifelong Learning defined the competences each European citizen needs for personal fulfilment and development, employment, social inclusion and active citizenship. One of the key competences in this list is "sense of initiative and entrepreneurship". Since then, the understanding of entrepreneurship competences has evolved (EPC 2018) and has even resulted in the development of a fully recognised academic research domain (Meyer et al. 2014).

Recently, the Joint Research Centre of the European Commission, based on an extensive consultation, developed the Entrepreneurship Competence Framework (Bacigalupo et al. 2016), a tool to improve the entrepreneurial capacity of European citizens and organisations. This EntreComp Framework defines 15 competences for entrepreneurs, grouped in 3 areas: "Ideas and Opportunities", "Resources" and "Into Action". It defines entrepreneurship as "*…when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural, or social.*" (Bacigalupo et al. 2016, p 10) In this sense, entrepreneurship is a competence which is applicable across all spheres of life and does not necessarily need to be used for starting a company. This competence has the potential to become one of the important meta competences which – according to the Oxford Reference[7] – includes learning, adapting, anticipating, and creating change of the future.

To be successful in the future, meta competences – the ability to acquire new skills – will become increasingly important (Cheetham 2005). Studies indicate that globally about 60% of occupations have at least 30% of their activities that are automatable (McKinsey 2017). As some old skills become quickly obsolete, new ones are needed. The constant need to acquire new skills is becoming an economic imperative, stressing the importance of life-long learning (Wilks 2018). While the skills that are easiest to teach are also easiest to digitise, non-routine analytic and non-routine interpersonal skills cannot easily be digitised (EC 2017). A literature survey to compile the most important skillset of future

6 The concept of "entrepreneurial mindset" is also worth mentioning. Although it is emergent and requires further study and validation, it is now present both in theory development and practice. It attempts to enrich or extend the well-established concepts of entrepreneurial attitude and entrepreneurial skills. Future research and practice will refine and validate the various entrepreneurship constructs.

7 http://www.oxfordreference.com/view/10.1093/oi/authority.20110803100152792

employees results in the following list: complex problem solving, critical thinking, creativity, people management, coordinating with others, emotional intelligence, judgment and decision making, service orientation, negotiating and cognitive flexibility (Wilks and Sousa 2018). Such a skillset provides the human intelligence to best deal *with*, and use artificial intelligence: to race with machines, instead of *against* them (Brynjolfsson and McAfee 2014).

2.2. Required attitudes for the future

In the assessment of the employability of university graduates one should not forget the fact that a graduate's work attributes are more than her "propensity […] to obtain a job" (Harvey 2001, p 97). Important attributes are also "*those which pertain to an individual's capacity for citizenship, including involvement in democratic processes, social cohesion, equity and human rights and ecological sustainability and thus ability to contribute towards a well-functioning society*" (Bowden et al. 2000, p 32). In their societal role of preparing young talents as a trained, agile and flexible workforce, research universities therefore contribute to the development of society at large (LERU 2018). From the perspective of the labour market, it is important to note that attitude scores the highest in terms of relevance for employers (CPI/Pearson 2017). This in turn raises important questions about the nature and function that universities should play in preparing their students for citizenship (Arthur 2005).

Indeed, university graduates should not only possess the knowledge, skills and values to enable them to cope with dynamic employment opportunities. Through their disciplinary formation university graduates also need to have a good perspective on who they are and how they might contribute positively to the heterogeneity they will encounter in local, regional and global communities (Hill 2016, p 155). To identify possibilities, to act and to create benefits for different stakeholders involves entrepreneurial attitude and skills. In this sense, entrepreneurship also empowers graduates to have self-directed career management.

University of Amsterdam - **International Master's Programme Entrepreneurship**

The UvA and the VU offer a unique Master's programme in Entrepreneurship. Both universities are important players in the entrepreneurial ecosystem in Amsterdam. The Master Entrepreneurship aims to provide students with cutting-edge knowledge on entrepreneurship, relevant skills, and an entrepreneurial attitude. Accordingly, the student is equipped to assess and successfully develop new business ideas in uncertain environments with limited resources but with decent foundations, in the context of both new ventures as well as established companies. In addition, the student is able to bridge theory and practice by applying and creating relevant academic knowledge on entrepreneurship in real life settings to solve challenging problems. The programme attracts on average 85 students, both Dutch as well as international students (on average 30%), with various study backgrounds.

http://abs.uva.nl/content/masters/entrepreneurship/entrepreneurship.html

University of Edinburgh - **Launch.ed 3DS programme**

3 Day Start-up is a 72-hour learning-by-doing event that teaches entrepreneurial skills to university students in an extreme hands-on environment. This extra-curricular event is aimed at students from across the university who are curious about entrepreneurship and want an opportunity to test their ideas and develop their skills. Part of its strength is that it brings a broad range of disciplines and levels together to work in teams. Local community engagement results from involvement in customer discovery and in mentoring and judging. Since running the first pilot in 2013 the Launch.ed team have run 6 further 3DS events involving over 400 students. Students like experiential learning. Getting out of the building and speaking to real customers highlighted as main take away by students along with increased understanding and confidence in pitching a concept or idea and taking it forward.

http://launch.ed.ac.uk/threedaystartup/

3. Student entrepreneurship education at research-intensive universities

In order to assess the current situation and trends regarding the importance of student entrepreneurship, especially at research-intensive universities, a survey was held among the LERU members. The survey not only looked at the processes for supporting entrepreneurship education, but also at the people driving these processes. The survey questions are listed in the appendix of this paper. The feedback gathered revealed that the word "entrepreneurship" is often associated with (predominantly) economic aspects of new venture creation. The view of the LERU universities, however, is that "student entrepreneurship education" is about much more than teaching the necessary skills needed for developing new ventures and self-employment. Student entrepreneurship also includes the stimulation and development of the entrepreneurial attitudes and skills of students. As set out above, these entrepreneurial attitudes and skills are increasingly requested by employers that want to be competitive and relevant. They include the ability to work in a team, to be creative and resourceful, to be innovative, to develop products or services that do not yet exist, to imagine one's future outside the traditional jobs, to be more risk-tolerant, and to learn how to deal with failure and competition. The importance that universities adhere to this topic is not only illustrated by the variety of good practices from the LERU universities summarised in this paper, but also from the vast body of knowledge that has been generated over the last decades, making entrepreneurship research a fully established scientific field (Meyer et al. 2014).

3.1. Goals of entrepreneurship education and training

In 2012, a landmark paper was developed by the UK Quality Assurance Agency for Higher Education highlighting the importance of entrepreneurship teaching in higher education. This work has been instrumental in developing new educational initiatives worldwide and received a recent update looking at the impact it has made over the last 5 years (QAA 2018). Based on this, the main goal of student entrepreneurship related activities at universities can be summarised as follows[8]:

1. Stimulating an **entrepreneurial attitude and skills**. This involves the development of enquiring and future-orientated thinking, as well a positive predisposition towards acting entrepreneurially. It increases the students' intention to act entrepreneurially by taking

KU Leuven - Leuven Community for Innovation driven Entrepreneurship.

KU Leuven has launched a university-wide initiative, the "Leuven Community for Innovation driven Entrepreneurship" (Lcie). Its goal is to foster entrepreneurship throughout the entire university, acting as a change agent by embedding entrepreneurship in the curriculum where deemed useful. The driving force behind the initiative is the technology transfer office (KU Leuven Research & Development) that works very closely with all individuals that want to participate, being it professors, staff, researchers, students or alumni.
Lcie is the one stop shop for students, researchers, professors and alumni of the KU Leuven who have questions related to entrepreneurial skills and entrepreneurship. It includes a set of courses delivered through the Lcie Academy, the use of office, lab and incubator space with coaching. It also includes several bottom-up initiatives launched by the community. Examples of such initiatives are IusStart and Techstart, being legal and technology advise delivered by students under the supervision of PhD students and/or experts from the network. Another one is the Product innovation Project, a course that is student-driven and based on design thinking in which student teams tackle societal and corporate challenges. Last but not least, funding is also made available for entrepreneurial teams via an Lcie innovation fund.

www.lcie.be/en

8 The summary is based on discussions with the LERU policy workgroups but is largely based on the constructs as outlined in the QAA 2018 paper.

Imperial College London - Imperial Enterprise Lab

The Imperial Enterprise Lab is a new entrepreneurship centre that supports students to develop and test new ideas. Centrally located, and with a university-wide remit, the Lab's mission is to inspire, educate and nurture the next generation of student innovators and entrepreneurs at Imperial College London. The Lab does this through 3 inter-related activities. Firstly, by running extra-curricular events and programmes to encourage the development of students' entrepreneurial mindset and skills – this includes monthly events such as Pitch-n-Mix sessions, where students are encouraged to share ideas and form interdisciplinary teams through to "How To" seminars where students can learn specific entrepreneurial skills. It also includes student start-up competitions such as WE Innovate, our flagship programme for female-led start-ups and Venture Catalyst Challenge (VCC) where student teams can enter ideas into multiple tracks and win funding. Second, the Lab provides a physical facility and venue space where students can hangout, collaborate, and host events. And third, the Lab provides access to expert business coaches, mentors and specialist advisors – most notably via the new Imperial Venturing Mentoring Service (IVMS) which has recruited 40+ experienced mentors from across Imperial's alumni network and the London entrepreneurship ecosystem.

Augmenting the work of the Lab, its sister organisation the Imperial College Advanced Hackspace provides access to a dedicated maker and prototyping space that's open to all staff and students. The guiding ethos of the Hackspace is to encourage entrepreneurial students to *learn by making* which it does this by providing training and access to small project booster grants.

https://www.imperialenterpriselab.com
https://www.imperial.ac.uk/advanced-hackspace/

ownership of their professional career (including lifelong learning), pursuing opportunities for new value creation, and tackling societal problems in an innovative way.

2. Providing **entrepreneurship education** that focuses on competences in the context of new venture creation, developing entrepreneurial graduates who are able to undertake autonomous learning and self-evaluation in more risky settings, including legal, financial, social and ethical considerations.
3. Providing a **supportive** on-campus **environment** that allows student initiatives to become successful start-up ventures. This may be the access to existing knowledge and experience inside a university but also to the external networks that the university community has to offer.

All these activities can be referred to as Entrepreneurship Education and Training (EET (Martin 2013)). It should be stressed that in this terminology the concept of social entrepreneurship is inherently included. The same goes for other types of entrepreneurship labels that are now becoming increasingly adopted such as green entrepreneurship, digital entrepreneurship and intrapreneurship.

The outcome of EET can be an increase in start-ups but equally so, improved competences and attitudes for (corporate) employment. The latter is often referred to as intrapreneurship education, as it focuses on competences in the context of existing businesses and industry sectors. It aims at developing entrepreneurial graduates who are able to understand the complex nature of, and interconnections within, existing businesses and value chains and apply this knowledge to create cultural, social or economic value. This distinction is relevant because research shows that entrepreneurial education and training has not per se a proven positive effect on the intention of the participants to become an entrepreneur (Oosterbeek et al. 2010).

Research confirms that EET not only leads to an improved skillset that is relevant for entrepreneurship, but also to increased entrepreneurship outcomes. EET programmes can have a positive impact on the interest and attitudes towards entrepreneurship among students who attend such courses, but are also likely to make them better entrepreneurs later (Martin et al. 2013). Moreover, EET helps to position an entrepreneurial trajectory as an equally viable career path as compared to the more traditional career paths typically pursued by students. This means that a university can provide a suitable learning environment both for students who want to start their own venture as well as for students that want to experience the benefits of being entrepreneurially engaged

University College London - Stasher: safely store your luggage while you sightsee

UCL alumni Matt Majewski (MSc Business Analytics & Computer Science 2016) and Jacob Wedderburn-Day (MSc Economics 2016), together with co-founder Anthony Collias, created Stasher: a service that provides anyone on the move a safe spot to store (and insure) their bags. Pitching to UCL Innovation & Enterprise, they won a slot at The Hatchery, UCL's incubator for start-ups. Whilst there, they got advice from our business advisors, connected with our networks, and solved challenges with other like-minded entrepreneurs.
Since moving on from being a "Hatchling", they have secured roughly £1.5m in funding; quadrupled in size; grown their presence beyond Europe to Asia, the USA and Australia; won Expedia's Hotel Jumpstart competition and a place on Plug & Play's travel accelerator; and stored their 100,000th bag in July 2018. They have now set their sights on developing an app, and expanding into new territories. *"Without UCL Innovation and Enterprise, we might still be a small business - run from a kitchen table in our spare time. Now we're about to expand our list of global destinations and develop new services." Jacob Wedderburn-Day, Co-founder Stasher*

https://stasher.com

via one or more of the various possible projects, courses or experiences.

3.2. Discipline-related entrepreneurship aspects

Education has been the core expertise and prerequisite of individual disciplines. This disciplinary education tends to be organised in faculties which were often created decades ago. As a result, the corresponding education-related processes have been well optimised, but have also resulted in specific (sub)cultures that may significantly vary between disciplines (see e.g. Becher 1994). Furthermore, the pathways to translate research into economic or societal value differ significantly between disciplines. Hence the entrepreneurial behaviour, understanding and engagement between disciplines also varies considerably (Philpott 2011). This is especially clear from the difference between technology-related and non-technology related disciplines (Fini et al. 2010). Hence the way student entrepreneurship needs to be framed is discipline-specific.

The survey held among LERU members indicates that often the notion of "entrepreneurship" is associated with students from engineering and business faculties, while the broader approach that LERU universities (as well as EU policy makers) stand for encompasses all faculties and disciplines (see Morris et al. 2014). Disciplinary adaption and proper framing of the university vision regarding entrepreneurship is crucial to be able to reach students and staff from all disciplines. LERU universities suggest to use other words in combination with "entrepreneurship" such as: "attitude", "initiative", "impact", "creativity", "taking action", "unleashing ideas", "curiosity", "team work", and "academics into action" among many others. However, it is equally important that efforts are made to ensure that also "entrepreneurship" is seen as accessible and relevant to all.

3.3. The opportunity of interdisciplinary entrepreneurial teams

The importance of interdisciplinarity from the perspective of research has been highlighted by LERU in a position paper "I*nterdisciplinary and the 21st century research-intensive university*" (2016, p 7):

> "*The expertise of academic institutions is needed to develop interdisciplinary approaches that the dominant strain disciplinary science has been ill-equipped to provide. It is equally important for academic institutions to train students, the vast majority of whom will leave academia upon graduating, in these integrative approaches to enhance the capacities of governments, the private sector, media, NGOs, civil society, and others to use and implement them at all levels of society.*"

The same conclusion can be drawn when it comes to entrepreneurship education. Too often, the myth prevails of the lone entrepreneur that has succeeded in his or her endeavour, while the contribution of the team is not always recognised or highlighted. For example, Harper (2008, p 614) defines the entrepreneurial team as: "*a group of entrepreneurs with a common goal that can only be achieved by appropriate combinations of individual*

entrepreneurial actions". Studies on collaborative teams show that teamwork is important for leveraging creativity, expertise and diversity of the teams' combined knowledge. Moreover, the more complex, ambitious and innovative the teams' endeavours are, the more crucial it is that the teammembers have a broad and diverse background, such as diversity of disciplines (Dahlin 2005).

Research-intensive universities are, by their very nature, ideally suited to provide "out of the box" solutions to complex societal problems and challenges. The combination of disciplines allows them to take up a key role in knowledge-based economic and societal development, while exposing their students to the context of interdisciplinary teamwork. This is in essence a perfect mimicking of how society operates and therefore optimally prepares their students for a future career with the appropriate attitude and skillset. Comprehensive, research-intensive universities are an ideal environment for stimulating and diffusing an entrepreneurial culture.

Although this statement may seem easy to make, practitioners from the LERU members indicate the complexity that arises e.g. from efforts aimed at structurally embedding interdisciplinary concepts within a system that since long time has been structured around disciplines (LERU 2016). A fully supported interdisciplinary cooperation requires curricular reformations in combination with the establishment of accompanying organisational structures. Changing the complex university structures in the context of a rapidly changing society is an important challenge for university policy making and leadership. Fortunately, there is ample evidence from the LERU community that this approach is the right way to go, and several good practices in this paper illustrate this with concrete steps that have already been taken.

Lund University - Student Entrepreneurship at Lund University

LU Innovation is the Innovation branch within Lund University, offering professional support, valorisation, business development and financing to all 50.000 students and 5.000 researchers at the university. With regards to Student Innovation, Lund University organises the practical support for Student Innovation & Entrepreneurship under the brand VentureLAB which offers the three I's - Inspiration, Information and Incubation.
A specific tool that was developed, targeted at undergraduate Students, is the financial tool "Leapfrog" where students are offered a 3 month grant to focus exclusively on developing their idea – thereby accelerating their progress, either towards success or towards realising that it will not succeed – i.e. 'fail fast'. This programme is running for 5+ years and has already supported more than 150 students. It has proven a very cost-effective way to advance student-based innovation projects.

https://www.venturelab.lu.se/
https://www.leapfrogs.lu.se/en/

Universiteit Leiden - Innovation, Co-Creation and Global Impact

This is a minor aimed at Bachelor students, using entrepreneurial concepts and skills to solve issues. It originated in a department working on innovation in education and looking to drive change within its faculty. The course successfully engages non-science students and students not traditionally interested in entrepreneurship or who experience barriers to engagement. The course demonstrates that using entrepreneurial tools, people can make a change in their own environment in a sustainable manner to solve challenges faced by their local community. Addressing these led to strengthening the bond between the university and the city and its inhabitants.
The programme demonstrates that a proper framing is essential to engage students who are normally not interested in entrepreneurship. The course avoids emphasising entrepreneurship per se, instead it emphasises the inspiration and benefits it offers to help achieve a goal the student has set for herself or himself.

https://studiegids.leidenuniv.nl/studies/show/5785/entrepreneurship-for-society

Ludwig-Maximilians-Universität München - **Strengthening Tomorrow's Innovators - The add-on Study Programme Technology Management at the Centre for Digital Technology and Management (CDTM)**

The Centre for Digital Technology and Management (CDTM) is a joint institution of the two universities in Munich, the Ludwig-Maximilians-Universität München (LMU) and the Technische Universität München (TUM).

CDTM offers the interdisciplinary add-on study programme "Technology Management", which is part of the Elite Network of Bavaria. Each semester, approximately 25 students from different backgrounds are admitted to the programme. In a variety of courses, they gain theoretical and methodological knowledge, soft skills, as well as experience in trend research, product development and entrepreneurship. Studies abroad at renowned partner universities in Asia, Europe and North America are an integral part of the curriculum, emphasising the high degree of internationality of the programme. In addition to academic opportunities, students gain access to an active network of alumni, academics and professionals and become part of a lifelong community of highly motivated and talented peers. CDTM alumni and students have founded 160 start-ups.

Weblink: https://www.cdtm.de/study/

University of Freiburg - **"Praxismodul Entrepreneurship"("Practicing Entrepreneurship")**

The workshop "Praxismodul Entrepreneurship" (Practicing Entrepreneurship) gives students the opportunity to develop an entrepreneurial understanding and modular design for founding an enterprise while studying. Autonomous action and self-directed learning are the main focus areas of this course. To achieve this, students compose their own curriculum within four pre-designed building blocks. As a certificate of performance students create a portfolio across all modules. The course has to be completed within a year and is supervised by members of the university´s start-up academy. Thus the "Praxismodul Entrepreneurship" is flexible in terms of starting-time as well as in content.

Students develop their individual profile of entrepreneurial competences in a targeted and precise way based on four individually configurable components: 1) Personal competences; 2) Practical Competences; 3) Professional know-how; 4) Feedback. The latter entails that students can assess the strengths and weaknesses of their entrepreneurial work, and the economic viability of it, via individual counselling.

https://www.zfs.uni-freiburg.de/de/praxis-und-praktikumsmodule/praxismodule

3.4. Benefits for existing curricula

The benefit of achieving new understandings, interpretations and insights is central to most models of learning (Daft 1984). In the economy, sources of competitive advantage are thought to potentially evolve around knowledge-creation and decision-making capabilities (Barney 1991). In the particular context of entrepreneurship education, decision making processes take place in an environment characterised by high ambiguity and uncertainty. Research indicates that under such conditions, the use of heuristics in decision-making is predominantly more present in entrepreneurs as compared to managers in larger organisations. Heuristics here refer to simplifying strategies that individuals (entrepreneurs in this case) use to make strategic decisions, especially in complex situations where less complete or uncertain information is available and, as such, this can add to the competences of individuals exposed to entrepreneurship (Alvarez 2001). Furthermore, academic graduates often tend to not fully recognise the value of their knowledge (which comprises information, technology, know-how and skills) or how to turn that knowledge into something applicable. Therefore, they need what is referred to as "entrepreneurial alertness" (Kirzner 1980) to become better aware of the value of their knowledge to society.

By providing entrepreneurship education and training, universities train their students in the ability to find conceptual, abstract information of where and how to obtain knowledge, and how to recombine this, to tackle organisational and societal problems. Transferred to the labour market, such entrepreneurial knowledge allows individuals to identify their own career resources and to learn how to deploy and utilise them (EC 2012).

3.5. Credits or not?

Although many good practices in entrepreneurial education are provided in the context of courses providing ECTS credits to students, there is also a good reason to offer entrepreneurial support in formats without credits. Students are more likely to participate in courses with ECTS credits for instrumental value: it needs to be completed in order to get a diploma (i.e. driven by the students' extrinsic motivation). On the other hand, students with an intrinsic motivation to study entrepreneurship are motivated by entrepreneurship as a potential personal career objective. Research indicates that with intrinsically motivated students the perceived learning outcomes and satisfaction is in some cases even be lower than with extrinsically motivated students. This can be partly explained by the fact that students with high levels of motivation to study entrepreneurship, have different expectations of such courses. They typically want to learn to become an entrepreneur in the traditional sense and hence need different levels of coaching and/or content in the entrepreneurial offerings. For example, "*individuals may already have some business idea in mind that they wish to test and develop further, but perhaps the course assignment does not provide the expected hands-on knowledge, as it is intended to improve the students' skills at generating new businesses*" (Hytti 2010, p 598). A mixed approach with more flexible programmes (including elective courses) is therefore a better choice. This is also confirmed by the survey indicating that the majority of LERU members strive for a mix of intra- and extra-curricular offerings on EET, with some of them aiming for a university-wide approach[9].

Université Paris-Sud - "From a single education programme to a multi-support education and training system"

Several years ago, a specific degree was created pursuing two different goals: allowing students to understand how a company works, and giving them some basics in entrepreneurship. This programme proved very useful and contributed to awareness and entrepreneurship training of tens of Université Paris-Sud students, but was restructured to address some of its flaws:

- The "basics in discovering how a company works" part has been separated, and a range of educational materials (videos, tests,…) have been created so that it can easily be included in their principal curricula.
- The original degree has been replaced by a set of four specialised degrees ("entrepreneurship"; "creation and development of innovative start-ups"; "intrapreneurship"; "entrepreneurship, law and digital") corresponding to different combinations of 4 modules out of 8. 4 of these modules are also proposed in a full online access.
- In parallel, a programme of webinars on the main issues of entrepreneurship has been launched, with the purpose of reaching a wider range of students.
- A specific training/mentoring programme called "Maturaction" will be tested in 2018. It aims at creating interdisciplinary entrepreneurial teams of students that work on potential innovations stemming from the university's research laboratories, getting these closer to the market.

http://www.u-psud.fr/fr/formations/entrepreneuriat-etudiant/tous-les-du-entreprendre-a-paris-sud/du-creation-et-developpement-de-startups-innovantes.html

9 On the survey – see Appendix, question 3 – nearly 70% of the respondents selected 2 or 3 as the degree of intra/extra-curricular offering of EET.

4. The development of an entrepreneurial culture

Research-intensive universities take on a special role in society which is a result of their threefold mission of education, research and service to the community. This threefold mission provides an excellent starting point for nourishing an entrepreneurial culture: research stimulating experimentation, education as developing human talent, and the application of this to tackle business and societal challenges. Given the proper support from policy makers, both at governmental level as well as university level, such an entrepreneurial culture provides a fertile ground to support bottom-up initiatives within the entrepreneurial ecosystem.

4.1. Bottom-up initiatives

The introduction of an entrepreneurial culture is not something that can be designed top-down. It emerges in a bottom-up way, and is likely to be hard, but not impossible to change. Formal rules and regulations, and governance structures may enable or constrain entrepreneurial behaviour at the individual level and an entrepreneurial culture at the organisational level. The survey confirms that in all LERU universities, a limited number of staff members play a key role in driving the entrepreneurial process, thereby fostering an entrepreneurial culture throughout the university (Ribeiro et al. 2018). When academics clearly showcase their positive attitudes towards entrepreneurial behaviour, students are more likely to engage in entrepreneurial activities. In this process, these academics may even be looked upon as role models for their students.

Furthermore, the survey also indicates that a large number of initiatives are organised outside the curriculum, by and with a variety of stakeholders, including local governments, local businesses or business angels' networks, student organisations etc. One of the key challenges in this context is for universities to be able to embrace these various bottom-up initiatives (Fyen 2016).

4.2. University leadership and policy

To maximise positive spill-over effects of the various bottom-up initiatives across the institution, a university-wide adopted

University of Zurich

The UZH Entrepreneur-Fellowships are the latest funding instrument of the University of Zurich, recently launched for biotech/medtech fields: Over a period of 18 months, PhD candidates and postdocs receive 150,000 CHF in order to pursue their business concepts based on cutting-edge research and technology developed at the UZH and found a spin-off company. The goal is to foster young talents for an entrepreneurial career by providing not only funding but also equipment and lab space at the UZH Incubator Lab, business trainings offered by the BioEntrepreneurship & Innovation Programme, mentoring by Entrepreneurs-in-Residence, coaching by the Therapy Development Accelerator as well as advice on commercialisation issues by the Technology Transfer Office. An expert committee from academia and industry selects outstanding candidates that have innovative ideas beneficial for society. The UZH Entrepreneur-Fellowships are coordinated by the Department Research, Innovation and Academic Career Development at the Vice President's Office for Research, and will be expanded thematically to other areas. Other programmes addressing both students and young researchers have been recently introduced, such as the UZH Innovators Camp in 2018, and the Digital Entrepreneurship Programme in 2019.

https://www.researchers.uzh.ch/en/funding/postdoc/bioentrepreneur-fellowships.html
https://www.innovation.uzh.ch/de/entrepreneur-guide/kompetenz-wissen/innovators-camp.html
https://www.innovation.uzh.ch/de/entrepreneur-guide/kompetenz-wissen/digitalentrepreneurship.html

Sorbonne University - Student-entrepreneur diploma

Since September 2004, the student entrepreneur status has allowed students who are developing a project to benefit from favourable conditions for entrepreneurial commitment such as healthcare, funding, co-working as well as a diploma as student-entrepreneur. The maturity of entrepreneurial projects is diverse and covers all the steps from the maturation of the idea to the registration of a fully completed organisation. Students may dedicate only part of their time to their project or be available full-time (post-graduation or substitution period for the internship). Each cohort is multidisciplinary.
Students benefit from personal support: group workshops, training sessions, individual meetings with experts or press relations for instance. The programme is based on experimentation and pragmatism. Each start-up is accompanied both by a professional tutor and an academic one, issued from the students' initial training programme.
At the end of the training, 80% of the students have created their start-up. These initiatives are connected with the University's social and economic surroundings and benefit from the support of public and private partners.

http://www.sorbonne-universites.fr/actions/vie-de-campus/insertion-professionnelle-entrepreneuriat/entrepreneuriat-etudiant-le-pole-pepite-paris-centre.html

vision is an important determining factor. Such a vision can accelerate a cultural change with students and staff when it amplifies the importance of entrepreneurial behaviour and activities within the university's educational policy. A decisive factor for success is the ability to strike the right balance between top-down support and support for bottom-up activities that can contribute to realising the vision (Van Aken and Weggeman 2000). Research suggests that removing existing barriers to entrepreneurial activity within university systems is likely to be more effective than establishing policies and assessment processes to leverage entrepreneurial activity from its academics (Philpott 2011). This means, in particular, that a strong top-down approach to stimulate entrepreneurship activities is likely to be less efficient compared to an approach using mechanisms to increase the intrinsic motivation of university faculty.

Given the diversity of activities that contribute to an entrepreneurial culture in (and around) the university, it is important that these activities have a certain level of coordination and coherence. In fully developed and mature entrepreneurial ecosystems, this coordination and coherence is typically structurally embedded in the system. For less mature ecosystems, one or more entities in (or linked to) the university can play an important role to reach such a level of embedded coordination. According to the survey, appropriate entities can be business schools, career services, technology transfer offices, or centralised university support departments. The practices of the LERU universities reveal that there is no "one-size-fits-all" approach: some institutions have assigned the responsibility for student entrepreneurship to someone within the university management, such as a vice-rector, while others indicate that those responsible are, for instance, the director of a "venture" lab or the person responsible for university incubation facilities.

Finally, clear and transparent rules and codes of conduct need to be adopted for those engaging in entrepreneurial activities (Axler 2018). In their implementation an appropriate compromise must be struck between academic freedom on one hand (a key value of universities) and the clear delineation of appropriate boundaries that create the necessary degree of fairness, transparency and consistency for those people engaging in entrepreneurial behaviour and activities.

4.3. Support systems

The university itself is a crucial partner in the development of an entrepreneurial culture because it can provide a variety of support systems. At the infrastructure level, the university can offer facilities such as labs, offices and maker spaces, on its premises or close to them. But, equally important is the access to suitable financing where the university can play a role by either providing financial support for entrepreneurial initiatives (such as the "sandbox" approach launched by the Massachusetts Institute of Technology[10]) or by establishing relevant networks with financial players that are made

10 http://sandbox.mit.edu/.

easily accessible to students. The same holds for access to practical experiences where the university (alumni) network can provide a wealth of social capital in the form of mentoring, access to professional networks, coaching or expert advice for students working on specific projects or ideas. A variety of approaches is given in the many examples cited in this paper. Although the level of support towards student entrepreneurship varies significantly among the LERU members most LERU universities indicate that they dedicate somewhere between four and six full-time equivalents of support staff (not including academics' time). There are also outliers on the higher side, often in the framework of a larger grant or government sponsored project, but these are limited in time and not in the form of a structural support scheme.

The nature of the business models of many of the student-driven ventures makes them more unpredictable and riskier than traditional intellectual property-led spin-out ventures. This often means that students need to change course multiple times before finding traction into the market. For that reason, several universities have indicated that they also support entrepreneurship activities of recent alumni, up to a few years after graduation. The level of support, and the associated revenue model (if any) linked to this support, differs from university to university. While some provide most of the facilities free of charge to their students, others are experimenting with pay-per-use models.

In general, the visible support of a university for all types of ventures (being it intellectual-property driven spin-outs from PhD students and researchers or the student-led ventures that have less of an intellectual property component) is crucial to sustain an entrepreneurial culture within its community.

4.4. Alumni as connectors between the university and the entrepreneurial ecosystem

Inherent in the field of entrepreneurship is the spirit of "paying forward" which allows universities to tap into the huge reservoir of social and human capital formed by their broad (and often global) network of alumni, who are typically very open to supporting students. The involvement of alumni as role models, in mentoring and even in teaching, does not only provide a large source of added value to the students' ideas and projects but is also inherent to the establishment of a culture of constructive failure that spills over into entrepreneurship education.

This complex web of connections also generates a variety of opportunities (such as real-world challenges, projects with industry and practical experiential learning opportunities) which motivated students can benefit from. The survey responses from all LERU members acknowledge this and indicate that entrepreneurship is being supported by a variety of players, including local businesses, governments and student organisations.

Last but not least, the intricate networks that are formed when universities actively engage in EET, have a long-lasting impact on their educational processes, as they become enriched with practitioners' views and inputs and provide concrete real-life contexts for students to work in (Burns 2017).

University of Strasbourg - **Génération Startup**

Génération Startup is an event organised by the University of Strasbourg and dedicated to the promotion of entrepreneurship. The first edition took place on June 7th, 2018. More than 400 participants attended the event, which brought together students, professors, entrepreneurs and professionals. The day was marked with round tables, workshops, speed-coaching, pitch battles, testimonials by entrepreneurs and the final of a start-up competition (the "chercheurs entrepreneurs challenges"). Local actors in the area of entrepreneurship joined the event in order to coach the participants and share their experiences: from growth hacking to fundraising, deep tech, lean start-up etc., they gave participants the keys to make their projects a reality.
Given the success of this first edition, *Génération Startup #2* is in the making and will take place on June 4th, 2019.

http://www.unistra.fr/index.php?id=generationstartup

Utrecht University - Young Innovators

Young Innovators is an honours course for Master's students at Utrecht University. The Young Innovators programme embodies a community of learning, where the focus is on creating positive impact through social innovation and personal leadership. As such, the programme focuses on learning to research, design and deliver innovative and sustainable solutions to real-life societal challenges. Supported by leading researchers the programme allows student teams to immerse themselves in both theory and practice of innovation across corporate, public and community sectors. Each team seeks out a societal challenge and develop a solution for it Parallel, they follow workshops on innovation processes (e.g. SCRUM, Design Thinking, LEAN), teamwork, group dynamics and (innovative)leadership. They are also invited to masterclasses by speakers from societal, public, academic, political and business perspectives. Co-creation and communities of learning are leading principles in the programme. Every year, between 70-90 students participate in the Young Innovators programme.

https://www.uu.nl/masters/en/general-information/international-students/about-utrecht-university/young-innovators/about-young

4.5. Policy measures: From quantity to quality

An analysis of support measures and policies shows a shift from policy directly stimulating (the quantity of) entrepreneurship, towards policy improving the quality of entrepreneurship and especially the entrepreneurial ecosystem (Thurik et al. 2013). This is an important finding as the full effects of support measures and policies are likely to be realised over a longer time scale. Consequently, systematic longitudinal tracking of student start-up formation, survival rates and success, as well as career destinations and progression is crucial, but is not in itself sufficient as a complete measure for success. Much of the entrepreneurial human capital will prove its value not per se in the number of new ventures that were started, but in the overall lowering of (perceived) barriers in taking new initiatives, e.g. when those students move to key decision roles in organisations, for-profit and non-profit, later in life. This is well illustrated by a recent framework that was established by the Irish Universities Association (IUA 2018) laying out a set of indicators both at quantitative level as well as qualitative level. These indicators provide a good starting point for policy makers to measure higher education civic and community engagement. A similar approach has been taken by the EU Joint Research Centre in the development of its "Regional Innovation Impact Assessment Framework for universities" that includes a combination of quantitative indicators complemented by qualitative narratives to illustrate the impact of universities on their ecosystem (Jonkers et al 2018).

5. Recommendations

Based on the context and vision out in this paper, LERU makes the following to all stakeholders who play a role in shaping the higher education system, that is, universities, profit and non-profit organisations, individuals involved in coaching and/or teaching, policy makers and governments.

5.1. Research-intensive universities need to proactively develop the entrepreneurial skills and attitudes of their students and staff.

Universities are the training ground "par excellence" of tomorrow's leaders, business owners, citizens. To optimally prepare them for their future role, universities must proactively equip their students with an entrepreneurial attitude and skillset that prepares them for a global society characterised by complexity, variability, and uncertainty. In this process, academic staff plays a crucial role. In order for universities to be successful in this endeavour, ongoing commitment to invest in, and support, student entrepreneurship education activities is required – both in terms of senior leadership support as well as direct funding and access to institutional fundraising capabilities. This also means universities need to pay attention in setting up proper assessment processes for monitoring progress of these activities.

5.2. Interdisciplinary student work and project-based learning are essential components of successful entrepreneurship education.

The societal and economic challenges that students will need to tackle in their career paths are likely to be increasingly complex and varied. In many cases it requires a multidisciplinary team to tackle these challenges from diverse perspectives. Universities need to foster the advantages they have as places of diversity and interdisciplinarity. When developing student entrepreneurship education programmes and activities, they must proactively develop new structures and create appropriate settings such as project-based learning environments, in which young people can collaborate and solve problems with peers from different backgrounds. These programmes and activities need to be designed in such a way that they benefit all interested students, regardless of their background and discipline.

University of Helsinki - Helsinki Think Company

Helsinki Think Company is the entrepreneurship society of the University of Helsinki, with the mission of bringing academics to action. It was first established by the University of Helsinki and city of Helsinki in 2013 with the aim of finding new ways to generate academic entrepreneurship. Helsinki Think Company supports students and researchers by providing three (soon four) free and open co-working spaces and event venues, as well as project courses, accelerator programmes and ideation challenges, often organised together with partnering organisations. The active community is run by employees, most of whom are students. A large pool of volunteers from students to top-level experts also participate in the community e.g. as event workers, workshop leaders and mentors.
The flagship programme is 4UNI, an annual solution competition for all students in Finland. During the intensive 2-month programme, multidisciplinary teams develop business concepts to tackle society's vicious problems. In 2017 Think company's co-working space had 24571 visitors and hosted 722 events.

www.thinkcompany.fi

5.3. For entrepreneurship to thrive at universities and to make it accessible and relevant to all students, its meaning needs to be reframed.

The word "entrepreneurship" nowadays is too often seen as an exclusive term – something that is only relevant to certain types of students or faculty. It is therefore crucial that a common and coherent culture and understanding is developed with respect to the meaning of entrepreneurship. Entrepreneurship should be reframed in a way that is discipline specific, making it relevant to all students, and by clearly illustrating the societal benefits of entrepreneurial behaviour. This framing must also draw a distinction between developing an entrepreneurial attitude more broadly – something that is relevant to all students – and the cultivation of specific entrepreneurship skills for those students interested in new venture creation. In this regard, it means developing a broader lexicon of words around "entrepreneurship" such as: "attitude", "initiative", "impact", "creativity", "taking action", "unleashing ideas", "curiosity", "team work", and "academics into action" among many others.

5.4. Research-intensive universities need to embrace bottom-up initiatives that help to foster an entrepreneurial culture

Research-intensive universities take on a special role in society due to their threefold mission of research, education and service to society. The interplay between these generates a culture that is a fertile ground for the emergence of various bottom-up entrepreneurship initiatives – independently driven by students and staff. LERU universities should take the lead and create permissive institutional environments where bottom-up activities are actively encouraged and supported whilst simultaneously providing a communication infrastructure to ensure these initiatives are easy to find and to access.

5.5. Universities need to be open and take the lead with regard to entrepreneurship education in their entrepreneurial ecosystem

Many studies have demonstrated the important economic contribution of universities to their region and society at large. In order to truly create a knowledge economy, universities must become key players in shaping the economic landscape. They can do so by forging strong partnerships with local, regional, national and international players in what will become high quality entrepreneurial ecosystems. This includes e.g. leveraging their – typically very international – network of alumni. It also means being open to, and leveraging the entrepreneurial communities and ecosystems that already exist around universities and adopting an inclusive approach to entrepreneurship education to prevent the formation of closed "university islands".

University of Oxford - The Oxford Foundry

The Oxford Foundry is a new entrepreneurship centre dedicated to supporting all students at Oxford in becoming more entrepreneurial by upskilling students in developing an entrepreneurial mindset; empowering students to learn the practical application of emerging and current technology; and developing the students' ability to ideate and innovate through idea competitions and an accelerator (L.E.V8) and pre-accelerator (L.E.V8 Woman) programme.
The Foundry hosts workshops, events, competitions and intensive programmes, making entrepreneurship relevant to the whole student body They are co-creating a programme through a developing Student Advisory Board that enables collaboration between the arts, sciences and more, working with 26+ student society presidents and 2,200+ student members from across the whole University. The Foundry is as much about enhancing employability as it is about supporting the starting and scaling of ventures that will go on to deliver real social and economic impact.

https://www.oxfordfoundry.ox.ac.uk/

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Appendix

The survey questions

1) Please provide an overview of university activities on student entrepreneurship

2) Please provide an inspiring name to discuss about entrepreneurship

3) Can you indicate where the focus of the university lies on the place of entrepreneurship in the curriculum?
   a. 1/5: the students acquire (and are expected to acquire) their entrepreneurial skills and attitude mostly from extra-curricular activities.
   b. 2/5: the university has some courses focusing on entrepreneurial skills and attitude, but the majority of students' entrepreneurial skills are obtained outside the curriculum.
   c. 3/5: the university strives towards a balance of intra- and extracurricular offerings on entrepreneurial skills and attitude.
   d. 4/5: the university considers entrepreneurship and entrepreneurial skills important and is organizing a significant amount of activities in the curriculum to stimulate this.
   e. 5/5: the university considers this a key mission and is taking action (or is planning) to embed student entrepreneurship in (nearly) all faculties.

4) Please indicate the key actors that are driving student entrepreneurship in the university's ecosystem
   a. Extra-curricular actors (e.g. student societies, local government, …)
   b. University actors (e.g. individual professors, Vice-Rector, …)

5) Please indicate the key actors responsible for student entrepreneurship policy making, if present.

6) Please indicate the resources allocated by the university to support student entrepreneurship (e.g. estimate of annual budget, number of fulltime equivalents, use of infrastructure, …)

7) Please provide a few (1-3) best practices that you would like to share on the topic of student entrepreneurship.

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