



Supporting the Entrepreneurial Potential of Higher Education

Final Report

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Executive summary

Key findings in a nutshell

European universities perform a wealth of approaches to entrepreneurship education (EE). However, impediments to develop EE further remain. The study found six principal challenges and possible solutions:

Challenge 1: **Overcoming reservations** against EE on the part of university managers, educators and students. One solution may be to see EE not only as teaching to start a new business but also, more broadly, creatively making an idea happen.

Challenge 2: **Assuring sustainable finance** for EE as a relatively young and personnel-intensive discipline. One solution may be to offer EE also as paid education to professionals.

Challenge 3: **Assuring curricular EE quality** when experience is small, new methods arise, and when leading educators leave. Local offers for “educating the educators” as well as national and international EE educator networks may help. If legal framework conditions for EE are

unfavourable, e.g. related to involving practitioners in teaching and to allowing students to engage in commercial activities, universities may lobby for their modification.

Challenge 4: **Assuring quality of extra-curricular EE** activities involves maintaining their flexibility while improving their institutionalisation. Certification bodies for their evaluation and legitimisation could be further developed.

Challenge 5: Universities’ networks with external stakeholders often lack scope and strength. Universities should **strengthen networks** e.g. with alumni who can be easily accessible and trustful guest speakers, mentors and funders.

Challenge 6: **Measuring outcomes and impact** of EE in the light of high expectations towards EE. Such measures should be long-term, not only focused on start-ups, and assess students’ entrepreneurial mindsets, skills and behaviour before and after courses.

Study background and objectives

This document is the final report of the study “supporting the entrepreneurial potential of higher education” (sepHE, <http://www.sepHE.eu>). The report presents the study’s approach and findings and it points out challenges, possible solutions and policy implications for further action. The overall objective of the study is gaining insights about the factors that may further enable the entrepreneurial potential in higher education in Europe. Towards this end, the study collected and analysed 20 case studies about innovative entrepreneurship education (EE) practices at European universities. The background of the study is the European Commission’s strong belief that higher education in general and entrepreneurship education in particular play a crucial role in creating jobs, economic growth and wealth in Europe.

Methods applied in this study

Analytical framework

The study focuses on three principal issues of entrepreneurship education: curricular offers, extra-curricular activities, and institutional aspects. Hence, the study’s analytical framework focuses on EE design, the way it is delivered by educators to target groups, EE setting and management as well as organisational set-up and change, legal frameworks, and mindsets. The framework also addresses the influence of the socio-cultural, economic and political context and the impact of EE on the society and economy.

Case studies

The study team and the European Commission, supported by a peer group, selected 20 universities for case studies which constitute the key part of the study. The cases were selected according to six criteria: The cases represent (1) new models in entrepreneurship education while having sufficient experience with them, (2) different aspects of entrepreneurship education in curricular offers, extra-curricular activities, institutional aspects and outreach to external stakeholders, (3) different types of universities, and (4) many different European countries. Furthermore, (5) most of them are not yet widely known, and (6) offer examples that may relatively easily be transferred to other universities. The selected cases stem from 19 different EU Member States.

Drivers and impediments of entrepreneurship education

Establishing EE does not go without saying – there are impediments to be overcome on the part of a university's management, staff and students. There may be reservations against entrepreneurship as being profit-oriented and biased, thus conflicting with the neutrality and independence of science. Different cultures in academic disciplines prevail – the values, habits, and beliefs of representatives from economics and business studies tend to be different from other disciplines. This may cause reservations against entrepreneurship among all groups involved: university managers, educators and students as well as external stakeholders. Moreover, students may not be interested in entrepreneurship because they prefer becoming employees, not self-employed, after graduation.

Findings about curricular entrepreneurship education offers

The majority of the sepHE case studies focus on curricular offers. In the cases explored, there is a plurality of curricular EE offers, comprising programmes, courses, modules, lectures, tutorials, and also internships. Investigated aspects encompass target groups, design, setting and management of EE.

In terms of target groups, a focus is set in most case studies on offers targeted at university students as opposed to offers for non-student target groups, such as staff members, alumni, researchers and start-ups.

When looking at the design, objectives of entrepreneurship education are usually a combination of the development of theoretical knowledge and practical skills for entrepreneurial thinking and acting. The format and content can be distinguished accordingly based on theoretical entrepreneurship knowledge and its practical application through business plans or business model canvases. Employed teaching methods include traditional or guest lectures, case studies, simulations, mentoring, business cooperation and placements as well as flipped-classroom concepts and team teaching. The majority of the examined cases at present focus on traditional media as opposed to online media. Evaluation methods range from formal methods, such as exams, presentations, participation grades, written business plans or self-reflective journals, to informal evaluation through feedback by internal and external instructors or peers.

Regarding the instructors, a large extent of all EE activities is taught by internal university staff, such as professors, teaching fellows or assistants, PhD students and administrative staff. Next to university-related instructors, external instructors from academia or practice are involved in EE. One particular group of importance are entrepreneurs who engage in EE activities as real entrepreneurs and/or entrepreneurs in residence. Finally, mentors are regularly employed in the context of curricular EE primarily to provide support and advice to student start-up projects.

Concerning the setting, most curricular EE activities take place on campus and the timing varies from short-term, one-time offers to regular, long-term offers.

The findings on the management of curricular EE reveal different approaches to staff development, such as internal and external training, coaching and consulting services or workshops next to mentoring, peer-evaluation and team teaching approaches. Student support is mostly provided by external stakeholders in cooperation with university staff. Internal and external entrepreneurship networks can be managed by distinct formal and informal approaches. Similarly, curricular education can be formally integrated or courses can be executed autonomously with little integration and a limited focus on continued education. Lastly, course evaluation can be conducted through standardized evaluation tools, evaluation committees, pilot programmes, focus groups and feedback meetings.

Findings about extra-curricular EE activities

Corresponding with the open, non-regulated nature of extra-curricular education at HEIs, the university cases feature a **wide range of activities for different target groups** outside the curriculum. This flexibility is used by education institutions just establishing EE to jump start, showcase, and build entrepreneurship in particular through extra-curricular offers.

The case universities often **leverage their own EE through activities conceptualised by third parties** (e.g. Junior Achievement, Start-up Weekend, or others). This enables using

teaching resources effectively by employing established formats and concentrating on student coaching in these activities.

Typical **impediments** of non-institutionalised extra-curricular EE in the cases are a dependence on individual teaching staff to set up and run activities, a lack of evaluation and quality support as regards the educational design of activities and the (external) instructors involved in them, and insufficient incentives for both students (who do not gain credits in extra-curricular EE) and teaching staff (facing opportunity costs of teaching and a low academic acceptance of extra-curricular formats). Some universities therefore consider curricular re-integration.

Findings about institutional aspects of entrepreneurship education

The study dealt with three institutional aspects of EE: organisational set-up and change (section 3.4.1), regulations (section 3.4.2), and mindsets (section 3.4.3). As regards **organisational set-up**, EE was found to be centralised in the majority of cases. Related entities may be entrepreneurship centres (inside or outside faculties), research institutes or professorial chairs. However, only a few case universities have top management positions directly related to entrepreneurship.

The case studies revealed insights about **regulations**, i.e. laws and statutes related to EE. At some universities, specific legal provisions were found to inhibit EE. For example, laws may inhibit the involvement of entrepreneurs in teaching or students' engagement in commercial activities. As regards statutes, in most cases EE plays an important or at least some role in the university's strategy. Furthermore, educators' incentives to become involved in EE are normally immaterial, not material. Materially, EE offers are mostly within the curricular duties of the respective educators. Immaterial incentives may include participation in special training and international networking with other EE educators.

Many case universities seek changing **mindsets** at the university towards becoming more entrepreneurial – among students as well as deans and high-level managers.

Outreach to external stakeholders in entrepreneurship education

Involving external stakeholders into EE was found to be important for bringing in practical experience, which is in turn important for enhancing students' entrepreneurial thinking and behaviour. The case universities were found to co-operate with a **broad range of external stakeholders** from local, national and international level in their EE activities. These stakeholders include, above all, enterprises, finance providers, support services as well as incubators, accelerators, and technology parks. Further stakeholders include other universities, student organisations and alumni.

The **type of involvement** varies. It ranges from lecturing and mentoring as well as funding, investment and sponsoring, to the provision and organisation of events, competitions, training sessions or workshops. **International relationships** play an important role in several case studies, in particular with regard to international university partnerships, for instance through the joint organisation of EE events, training or conferences.

Measuring the impacts of entrepreneurship education

Many case universities were found to not pay particularly strong attention to measuring the impact of entrepreneurship education. Some do not measure the impacts at all. Most widespread was keeping track of start-ups by students and graduates, which is however difficult to achieve comprehensively. Another fairly widespread method is evaluating the impact of entrepreneurship courses by measuring students' entrepreneurial awareness, skills and behaviour at the beginning and at the end of the course. Some universities conduct surveys of their students and alumni including entrepreneurship issues. Only a few universities were found to participate in international surveys related to entrepreneurship education.

Conclusions: challenges, possible solutions, and policy implications

The findings lead to six principal conclusions for further developing entrepreneurship education in Europe. They deal with challenges, solutions and policy implications, derived from the 20 case studies and validated with independent experts. The conclusions may help European universities

to establish or improve EE, they may give stakeholders ideas how to support EE, and they may show policy makers how to promote EE.

Challenge 1: Overcoming reservations against entrepreneurship education

In order to overcome prevailing reservations about EE on the part of university managers, educators and students, universities may sophisticate their EE design and management, also through learning from other universities. They may institutionalise EE through including it in the university's strategy and in EE-related units and management positions. They may establish EE ambassadors in the university's faculties and promote entrepreneurship showcases. In order to reach all students, they could teach not only "entrepreneurship" as starting a new business, but also "enterprising", i.e. having an idea and making it happen. Entrepreneurship (or "enterprising") could also be taught by educators whose primary expertise is not entrepreneurship. Policy makers on all geographical levels can help spread knowledge about EE approaches and design through conferences, workshops and publications.

Challenge 2: Assuring sustainable finance for entrepreneurship education

EE is relatively personnel-intensive, a relatively young discipline, and it may be based on funding from fixed-term public programmes. These are specific challenges for sustaining finance for EE offers. Possible solutions include that EE becomes part of the university's general efforts to sustain public funding – baseline and project funding – through competent governance. More specifically, universities can seek funding for EE through paid education for SME CEOs and large business managers. Education policy makers could develop support programmes for EE and provide special funds to universities which show clear and strong efforts to develop EE, e.g. for establishing entrepreneurship centres.

Challenge 3: Assuring quality of entrepreneurship teaching

Universities may face challenges of developing EE teaching when EE has been introduced recently. They may also seek to improve EE teaching in the light of new insights about how EE could and should be designed or when facing changing demand from student; and they may need to sustain high quality of EE teaching when EE educators leave the university. Possible solutions are related to teaching EE educators: Universities can offer on-site instructions for individuals or groups of educators, and they can connect with national as well as international networks of EE educators and their training offers. National policy makers can support the establishment or development of national EE networks through encouragement, bringing relevant actors together or initial funding. They can also establish national or international accreditation schemes for EE.

In some countries and universities, students may not be allowed to engage in commercial activities, and regulations may impede involvement of entrepreneurs into teaching. National or regional education policy makers may revisit and possibly revise existing regulations that impede EE in an unjustified manner.

Challenge 4: Assuring quality of extra-curricular entrepreneurship education

Extra-curricular EE allows universities to offer a great variety of entrepreneurship activities and create new ones without going through curricular accreditation. However, this lack of organisational anchoring also brings about impediments such as insufficient incentives for student participation and staff commitment, dependence on individual teaching staff (and their networks to external instructors and sponsors), as well as quality risks due to a lack of evaluation procedures. Solutions may include bundling extra-curricular activities and integrating selected extra-curricular activities into curricula. Education policy makers may support European platforms and the further development of certification bodies to improve the quality, evaluation, and visibility of extra-curricular entrepreneurship activities.

Challenge 5: Assuring strong networks with external stakeholders

While involving external stakeholders was found to be important for making EE practice-oriented, the case studies found that networks with external stakeholders often lack scope and strength. Universities may need to strengthen such networks and establish related databases and management structures. This applies in particular to alumni who may be relatively easily accessible and trustful guest speakers, mentors, and funders. It may also apply to start-up services, technology parks, enterprises, and other universities. Policy makers could promote

databases for connecting with enterprises such as the European Enterprise Network and initiatives like the University-Business Forum and HEInnovate which facilitate collaboration.

Challenge 6: Measuring outcomes and impact of entrepreneurship education

There are often high expectations about positive impacts of EE on students' skills, behaviour, and on the regional economy. However, it is difficult to measure such impact. At the case universities, EE-specific evaluation instruments are only very rarely institutionalised and truly employed on a long-term basis. A typical problem may be the perception of university actors that continuous measurement and analysis of EE impacts is resource-consuming. A possible route for improvement is the establishment of joint samples and an EU-level set of evaluation tools to foster cross-university and EU-wide co-operation to make impact measurement easier and more valuable for individual universities and their entrepreneurship instructors and researchers.

1 Background and objectives of this report

Higher education and its links with innovation play a crucial role in individual and societal advancement. It provides the high skills that Europe needs to create jobs, economic growth and wealth. In recent years, entrepreneurship education (EE) has gained increasing attention from policy makers. The expectation is that educating students to think and behave entrepreneurially is particularly important for reaching the desired impacts on the economy and society. The European Commission's Entrepreneurship 2020 Action plan recognises the need for enhanced entrepreneurial education at universities. However, there is also a need to gain a better understanding about existing EE approaches, in particular innovative approaches.

Against this background, the European Commission, Directorate-General Education and Culture, launched the study "supporting the entrepreneurial potential of higher education" (sepHE, <http://www.sepHE.eu>). This document is the final report of the sepHE study, crafted by empirica GmbH (Bonn, Germany) and the University of Wuppertal (Germany).¹ This report presents the study's findings.

The overall **objective** of the study was to explore a broad range of innovative entrepreneurship education approaches at European higher education institutions. The study examined their drivers and impediments as well as their impacts on students' entrepreneurial mindsets, capabilities, and activities. Hence the study took a broader perspective on the "entrepreneurial potential of higher education", not only examining start-ups by students and graduates.

The sepHE study carried out **case studies** about entrepreneurship education at 20 selected European universities. In accordance with the study's overall objective, the chosen cases show many different approaches and themes of entrepreneurship education. They are not meant to represent "best practices", i.e. being better than others, but rather "insightful practices" which deserve to gain wider attention in Europe. The study examined preconditions for certain approaches to be successful in order to gain insights about what other universities could potentially learn and adopt.

The case studies were collected according to an analytical framework that focused on three issues of entrepreneurship education: **curricular offers, extra-curricular activities, and institutional aspects**. The main institutional aspects considered were organisational set-up, regulations, and mindsets at universities. Furthermore, the study paid particular attention to external stakeholders involved.

The study team carried out an analysis across all case studies in order to identify common challenges for entrepreneurship education, possible solutions for these challenges, and related policy implications. This **cross-case analysis** is the main part of this report (Chapter 3). Chapter 2 explains the methods applied in the sepHE study, and chapter 4 draws conclusions for further developing entrepreneurship education in Europe.

To the extent possible, the study sought alignment with **HEInnovate**², a joint initiative by the European Commission and the OECD. HEInnovate is a self-assessment tool for higher education institutions that aims to proliferate and strengthen entrepreneurship and entrepreneurship education at European universities.

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² See <http://www.heinnovate.eu>.

2 Methodical approach of the sepHE study

2.1 Definitions of important terms

The principal task of the study “supporting the entrepreneurial potential of higher education” was producing 20 case studies about innovative approaches in entrepreneurship education at European universities.³ The main themes of the study were curricular offers, extra-curricular activities, and institutional aspects of entrepreneurship education.

Curricular offers comprise learning offers included in the formal curriculum of the university, as laid down in formally accredited study programmes and other documents. This may above all include lectures, seminars, and tutorials but may also include other forms of teaching and learning. Curricular offers may normally but not necessarily allow gaining credits for courses and academic degrees.

Extra-curricular activities are defined here as projects or initiatives beyond formal education which are connected to the university because they are co-ordinated or accompanied by staff members or students. It is not possible to gain credits for courses and degrees. However, participation in such extra-curricular activities may be valuable training for seminar or thesis papers or examinations. Examples include, but are not limited to, business plan competitions, start-up consulting and mentoring, start-up information days and campaigns, and young entrepreneurs’ clubs.

Institutional aspects: The study distinguishes between three types of institutional aspects: (1) Organisational set-up and change, including issues like university units and systems of units, formal positions, responsibilities, and the development of these items over time. (2) Regulation, i.e. laws, statutes and codes which affect entrepreneurship education at the university, in particular incentives to become involved in EE. (3) Mindsets related to entrepreneurial thinking and behaviour.

Innovative approach: In this study, “innovative” means that a university introduced a certain practice only a few years ago and that the practice is not yet common in entrepreneurship teaching at least on a European level. The practice may in fact be new also on the global level. While one could contest that “a few years old” is not new anymore, from the perspective of case study research there needs to be sufficiently long experience with the method in order to be able to identify and analyse its strengths, weaknesses, and impacts. Moreover, innovation may take place in the form of a completely new approach (“disruptive innovation”) or in incrementally modifying an established method. For example, while case study learning is already well-established in EE, certain modifications of this method may still be considered as new and innovative.

2.2 A framework for the analysis of entrepreneurship education

Conceptual framework

The sepHE study was guided by the idea to synthesise **curricular**, **extracurricular**, and **institutional** aspects of entrepreneurship education that enable the further development of entrepreneurial potential in higher education. For this synthesis, a framework was developed in the course of this study on the basis of selected literature and practice of entrepreneurship education and university entrepreneurship. This framework guided the development of questionnaires for the expert surveys as well as the development of templates for carrying out case study research.

³ In the following, the term “university” also includes universities of applied sciences, technical universities, polytechnics, and business schools which were also included in the case studies for the sepHE study. The case studies do not include vocational training schools, which are also “higher education institutions”.

The suggested broad fundament served as a thinking frame for two tasks of the study: First, for mapping out the details of the analysis framework in the early stage of the project and second, for pre-structuring the issues and dimensions of the case studies conducted, thus informing the preparation of semi-structured guidelines for case interviewing and additional on-site data collection.

Context of entrepreneurship policy reports and EE literature

In the context of entrepreneurship education at HEIs and the EU's *Entrepreneurship 2020 Action plan* (including the action pillar of entrepreneurial education and training to support growth and business creation; EC 2012, 2013), a range of **policy reports and initiatives on entrepreneurship education** have been led by the European Commission (and other institutions) with different emphases, most importantly:

- *Entrepreneurship education: A road to success*: A compilation of evidence on the impact of entrepreneurship education strategies and measures (EC, 2015): a report compiling various influences on the establishment and operation of EE activities including a discussion of the impacts of EE itself
- *Entrepreneurship Education: A road to success: 13 Case studies* prepared for the study 'A Compilation of evidence on the impact of entrepreneurship education strategies and measures' (EC, 2015a): case studies on the above report (EC, 2015)
- *Entrepreneurship education – a guide for educators (EC 2014)*: a guideline with show case examples on training of entrepreneurship educators and their support
- *How to assess and evaluate the influence of entrepreneurship education, ASTEE Assessment Tools and Indicators for Entrepreneurship Education (EC, 2014a)*: tool-box and discussion report on methodical practice and individual-level impact measures of EE
- *Effects and impact of entrepreneurship programmes in higher education (EC, 2012a)*: a report exploring influences of EE interventions at the individual and societal level, in particular effects on the competences, entrepreneurial intent, and employability of individuals as well as broader socio-economic impacts
- *A Guiding Framework for Entrepreneurial Universities (EC/ OECD, 2012)*: a framework document addressing the institutional/ organisational context and constitutive elements of entrepreneurial universities
- *Entrepreneurship Education: Enabling Educators as a Critical Success Factor (EC, 2011)*: report on "train the trainer" concepts for entrepreneurship education of educators in the education system
- *Universities, Innovation and Entrepreneurship: Criteria and Examples of Good Practice (OECD, 2010)*: a report discussing evaluation criteria for the extent and prevalence of innovation and entrepreneurship activities in HEIs
- *Survey of entrepreneurship education in higher education in Europe (NIRAS et al./ EC, 2008)*: a survey of various educational and infrastructural aspects of EE including entrepreneurship teaching/ learning and its resources, institutional support, outreach and external stakeholders, as well as main barriers.
- *Entrepreneurship in higher education, especially within non-business studies (EC, 2008)*: expert group report on teaching entrepreneurship at HEIs in different academic disciplines, including a discussion of entrepreneurship policy measures and impact evaluation.

These reports informed and contributed to the design of the framework and (for the most recent reports) subsequent analysis concerning important elements of (extra-) curricular entrepreneurship education and, in particular, their institutional context and organisational underpinning within HEIs. In addition, for the study further aspects have been taken on board (e.g. the design and content of EE activities, student support in venturing activities, curricular integration etc.; see Exhibit 2-2). This is to get an even broader picture of entrepreneurship education at the European case universities explored in the study (in terms of the characteristics of EE as well as potential drivers and barriers). In particular, the study requested by the European Commission follows the idea that to date many of the individual factors examined in policy reports are relevant to what is driving the features and reach of

entrepreneurship education and only subsequently, its distant outputs (e.g. in terms of students' entrepreneurial intent and behaviour, but also broader entrepreneurial thinking and mind sets). And in the study at hand, these factors and facets are to be explored in broad qualitative cases. Rather than concentrating on individual aspects, a holistic framework has been used in the sepHE study. A holistic framework allows the qualitative exploration of the overall design of entrepreneurship education programmes and activities at the case universities, the interaction of their elements⁴, and the organisational context in which these activities are run.

Such a broad exploratory framework has been used for the sepHE study for the following reasons:

- High degree of focus of existing frameworks: Current EE literature is strongly concentrated on analysing singular aspects of the relationships between the organisational context of HEIs, the operation of EE activities and their characteristics, and possible outcomes and effects of EE interventions – for example effects on students' entrepreneurial intent or the generation of knowledge-based spin-offs.⁵ However, the aim of the sepHE study is to analyse EE and produce case studies in a broader context of curricular offers, extra-curricular activities and institutional aspects, also including the universities' organisational environment. For this, a broader framework beyond singular organisational conditions for and characteristics of entrepreneurship education is required. This also facilitates the exploration of the diversity of EE activities at the twenty case universities.
- Need for a context-related approach: There is a need for considering the context in which entrepreneurship education is set up and operated (e.g. leadership and management of HEIs, organisational infrastructure and culture) in the exploration of EE at the case universities. The organisational context of EE, its operation in HEIs, and its impacts (e.g. on students) are multi-faceted. A pure means-ends focus on EE interventions and their effects on outcome variables such as students' interest in entrepreneurship activities, entrepreneurial intentions, or number of start-ups and spin-offs would not be appropriate for the multiple case study analysis in sepHE.
- Need to put EE design at the centre: The discussion of EE in the literature and in universities showed that EE design is crucial for outcomes of EE. Thus, participants' learning conditions and outcomes within the specific design of EE activities, considering the educators and target groups, need to be at the centre of the required analysis.

The framework that has been employed in the study (see Exhibit 2-1 and 2-2 below and, originally, Halbfas, 2006) provides a didactical perspective on entrepreneurship education. Primarily, this frame puts the emphasis on the design elements of EE activities. However, it also appreciates that the learning outcomes of entrepreneurship education will be brought about in concert by different elements around the teaching and learning situation throughout these activities. The main aspects and elements to be examined in the case studies include:

- EE activities: target groups of EE (students and other target groups, e.g. in continued education), the role of EE educators from university and external instructors, the design of EE activities (entailing their objectives, contents, as well as employed formats and methods), the setting of EE, educational management (in particular the management of external stakeholders and instructors in EE and managing the support of students with entrepreneurial projects)

⁴ For elements or aspects of EE activities explored in the study see Exhibit 2-2 below. Many of these elements likely work in concert within the delivery of EE; for example, personnel resources and incentives for entrepreneurship teaching could affect the extent of course offers and teaching styles, or relations to external stakeholders (e.g. in a university's region) may define the scope for offering problem-oriented, hands-on entrepreneurship courses and activities with teachers from entrepreneurship practice.

⁵ See, for example, Walter and Dohse (2012) and Küttim et al. (2014) with regard to individual impact factors on entrepreneurial intentions and Sternberg (2014) and Rasmussen et al. (2014) discussing the nexus of spin-off generation and university policy support and the role of university departments in building entrepreneurial competencies for successful spin-offs. See Wright (2014) for a general overview of the recent debate around university spin-off creation and other roles of HEIs in education and research.

- Organisational context of EE: university strategy towards EE, organisation-wide co-ordination of entrepreneurship activities, resources for EE, evaluation approaches and regulatory setting for EE.

For using the framework in the exploration of the case studies and their subsequent analysis, in particular two important issues have been considered from the literature: a) the heterogeneity of EE, including activities as well as the staff and external stakeholders involved in them; b) the discussion of impacts of entrepreneurship education and the evaluation approaches taken by the case universities themselves.

(a) For individual education policy measures and activities in entrepreneurship, O'Connor (2013) stresses tailoring specific **designs** of entrepreneurship education programmes for different **target groups** to reach specific (economic) purposes but also other learning outcomes, in particular those going beyond conventional new business creation (e.g. social entrepreneurial projects or sustainable development; Klandt and Volkmann, 2006, Howorth et al., 2012, Lourenco et al., 2013). Similarly, at the stakeholder level the likely diverse expectations towards entrepreneurship education in HEIs (Matlay, 2009) are relevant for the analysis of different actors inside and outside universities who are involved in EE (internal entrepreneurship **educators** and external **stakeholders**; Volkmann et al., 2009). Proximate to a concept of stakeholder inputs to and outputs of EE (Fayolle and Redford, 2014), the sepHE study explores the **management** of different groups of stakeholders and their roles in establishing and teaching EE.

(b) There is an ongoing discussion on the evaluation of entrepreneurship education impacts (e.g. EC 2014 and 2015; Duval-Couetil, 2013; Rideout and Gray, 2013; Volery et al, 2013; OECD, 2010). Likely there will be numerous factors within entrepreneurship education interventions that constitute overall outcome effects in terms of entrepreneurial thinking, aspirations, and behaviour in students and other participants in EE (Martin et al., 2013; Bae et al., 2014; Volkmann and Grünhagen, 2014; Støren, 2014). Beyond the issue of improving our understanding of the impacts of EE, it has to be asked what kind of instruments for assessing impacts of entrepreneurship education are accepted by HEIs and are actually used by the case universities themselves (e.g. in terms of attention and resources allocated to assessment initiatives; cf. Duval-Couetil, 2013). The sepHE study concentrates on how the case universities go about assessing the impacts of their EE and what priority entrepreneurship education and its outcomes for students actually has in the university organisations. For this, the study also takes a look at the **organisational set-up and context** of entrepreneurship education proximate to the dimensions recently proposed in Ghina (2014) and Blok et al. (2014).⁶ However, it would have been beyond the scope of the study to look deeper into national framework conditions.⁷

A holistic reference framework for entrepreneurship education

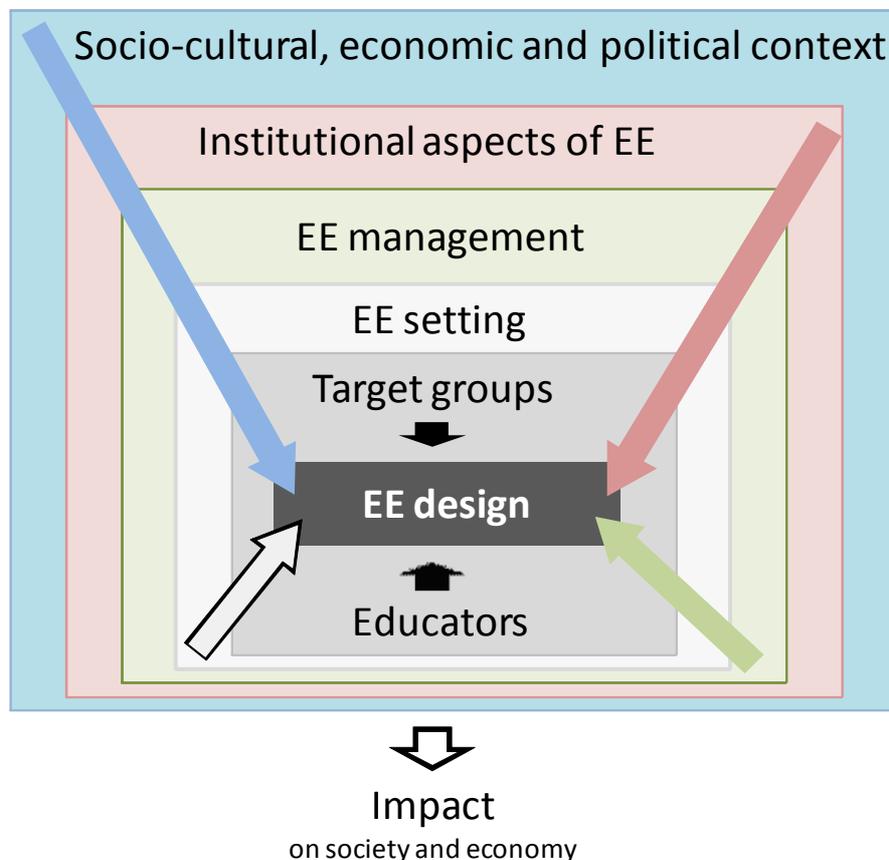
Against this context, the study team developed and used a holistic reference framework depicted in Exhibit 2-1 to manage and navigate the exploration of curricular, extra-curricular, and institutional aspects of entrepreneurship education in this study. In particular, the different layers of the framework and the aspects within them provided the basis for case data collection (see the templates in Annex II).

The framework focuses on the design of entrepreneurship education, the way it is delivered by educators to target groups as well as its setting and management. Beyond mere education, the framework includes institutional aspects, the influence of the socio-cultural, economic and political context. Finally, the framework considers the impact of EE on the society and economy. Annex I provides a more elaborate version of the framework.

⁶ These are strategy, resources, infrastructure, education, outreach, and development.

⁷ In particular, the United Kingdom would deserve more attention in future studies about entrepreneurship education. It would be worthwhile analysing the role and interaction of Enterprise Educators UK (<http://www.enterprise.ac.uk>) and the Quality Assurance Agency for Higher Education (QAA) which issued guidelines for entrepreneurship education in the UK (see QAA (2012) and <http://www.qaa.ac.uk/en/Publications/Documents/enterprise-entrepreneurship-guidance.pdf>).

Exhibit 2-1: Reference framework for EE analysis in the sepHE study



Source: University of Wuppertal / empirica, 2015

Questions to be addressed and empirical design

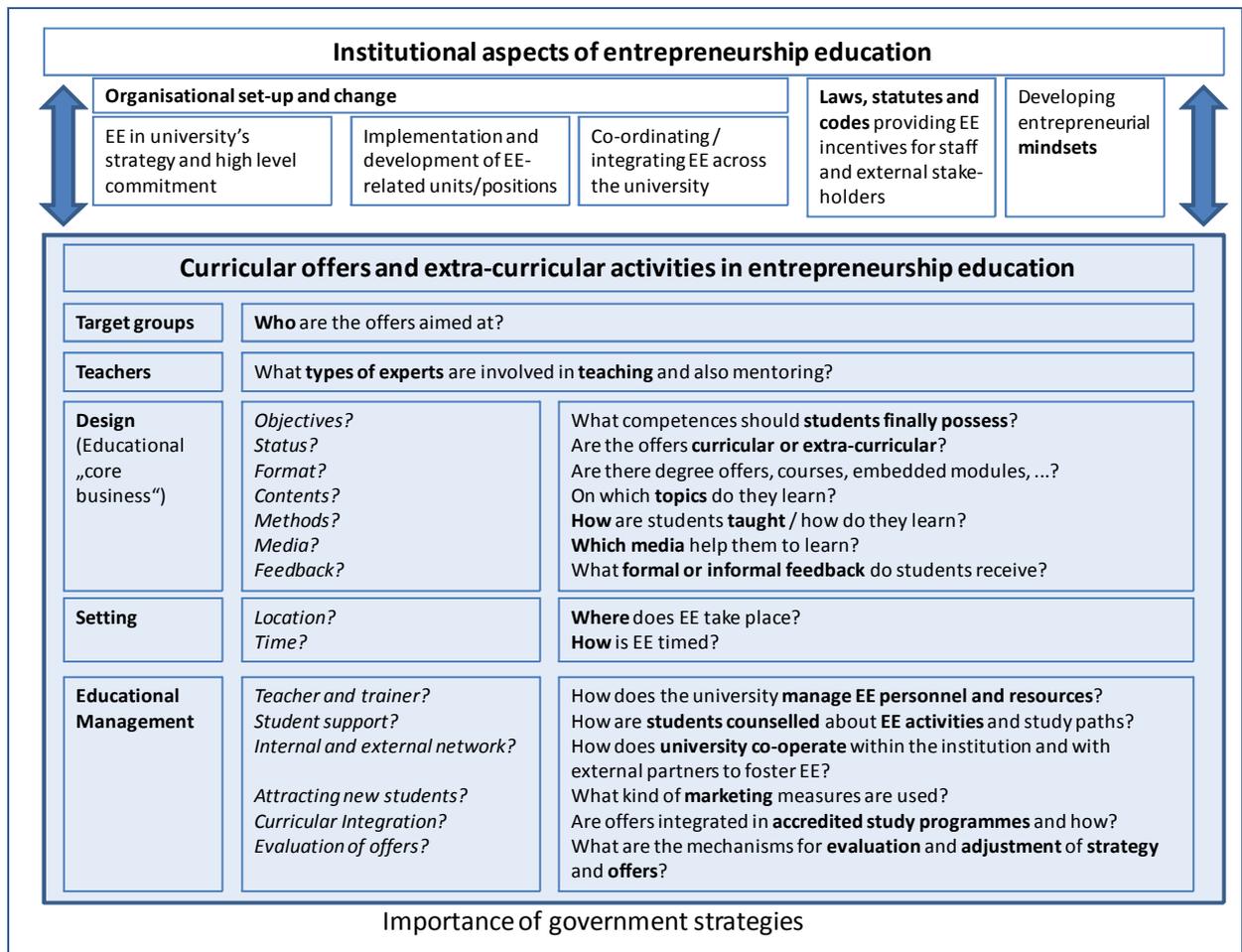
The framework was designed in a way to address the following guiding questions.

- What are the potential drivers and barriers for entrepreneurship in **curricula** within the case universities?
- What context elements define the design of **extra-curricular** entrepreneurship activities and may thus enhance or hamper the extent and quality of extra-curricular EE?
- How is EE embedded in the case universities, and which **institutional** aspects shape the extent and reach of entrepreneurship (in particular across different disciplines and departments in the organisation)?

Based on the framework presented above, the study team developed a case study template that refers in many places to the HEInnovate tool. The template served as a basis for the development of a field manual to facilitate the collection of interview data and archival records for the 20 university cases.

Exhibit 2-2 depicts the main questions guiding case study research, specifying the issues of the analytical framework presented above.

Exhibit 2-2: Overview about questions guiding research in the sepHE study



Source: University of Wuppertal / empirica 2015

2.3 Case studies: selection, data collection and cross-case analysis

Criteria for selecting case studies

In early 2014, the study team and the European Commission developed a shortlist of 40 universities out of which eventually 20 were selected for case study research. The 20 cases were selected considering the six criteria: Innovativeness, broad thematic coverage, broad geographic coverage, lacking publicity, different university types, and transferability.

- (1) **Innovativeness:** The cases were above all selected because they represent new models in entrepreneurship education and at the same time sufficient experience with it so that an analysis is meaningful.
- (2) **Broad thematic coverage:** The cases represent different aspects of entrepreneurship education in curricular offers, extra-curricular activities and institutional aspects as well as outreach to external stakeholders.
- (3) **Broad geographic coverage:** The cases are located in many different European countries.
- (4) **Lacking publicity:** Most of the cases are not yet widely known. They may thus represent new insights and new role models.
- (5) **Different university types** are included as regards age, size, organisation (e.g. technical universities, universities of applied sciences, business schools), and ownership (public, private).

(6) **Transferability:** The cases offer examples that may relatively easily be transferred to other universities, implying that the universities do not have too specific a profile.

The 20 cases were selected deliberately, using a profiling template that was based on the reference framework described above in section 2.2 and which the candidate universities were asked to fill in. The compilation of cases does not claim to represent a “best of” selection. There are other cases that would also meet the criteria set and which the study team recommends to examine in future studies. The appendix document for this report with the 20 full case studies also includes case briefs of further examples.

Case characteristics and themes

Exhibit 2-3 shows the 20 cases that were selected for the case studies, their country of origin, the theme and category focused on, and the innovative approach they take. Against the selection criteria, the cases have the following characteristics:

Geographic coverage: The cases are from 19 different EU Member States. Only the United Kingdom is represented twice (University of Huddersfield, University of Cambridge). This reflects the advancement of UK universities in EE.

Types of universities: Most cases are “normal” public universities with a broad spectrum of academic disciplines. Three cases are technical universities: Kaunas UT, TU Kosice and Polytechnic University of Milan. Two cases are private universities: Kozminski and EM Lyon. One case, Tampere, is a university of applied sciences.

Publicity: In the majority of cases, the insightful EE practice may not yet be well-known across Europe. A few cases may be more widely known, for example the University of Cambridge, EM Lyon and the University of Rotterdam.

Theme examined: The majority of cases focuses on curricular offers, a few linked with extra-curricular offers. Many cases consider institutional aspects of organisational set-up and change or the development of mindsets for entrepreneurial activity.

Guidelines and research templates

Empirica and the University of Wuppertal prepared three detailed templates for carrying out case studies: fieldwork instructions, an annotated template, and a case study template without annotations for authors. The first two templates are included in Annex II of this report.

Fieldwork instructions include overall guidelines (task description and foci), technical instructions (initial confrontation with the case, data collection, analysis, disputation and alignment) as well as interview instructions (checklist for different types of interlocutors, follow-up).

The **annotated template** included guidelines for writing the case study as well as a standard structure for the case texts with detailed explanations. The annotations were meant to cover the whole spectrum of possible items researchers could deal with. However, it was not expected and in fact impossible to deal with all aspects mentioned in depth. Case study researchers were required to stick to the structure provided in order to allow the study team to cross-analyse the 20 case studies efficiently. However, in some cases it was necessary to refine the structure below the first level in order to be able to write a fluent “story”.

The **template for authors** was structured in the same way as the annotated template but did not include the annotations.

The case studies are on average approximately 20 pages long.

Exhibit 2-3: 20 case study universities of the sepHE study and their focus

No.	Case (country)	Theme / category focused	Innovative approach
1	University of Bucharest (Romania)	Developing a strong and distinct position for providing EE / Curricular offers	Master programme for entrepreneurship in energy sector; international team teaching
2	University of Cambridge (United Kingdom)	Persistently innovating EE models / Extra-curricular offers	Extra-curricular activities such as Enterprise Tuesday, Ignite or Enterprisers were first of its kind
3	University of Coimbra (Portugal)	Developing EE in a very traditional university / Curricular offers, mindsets	Building up a regional entrepreneurial ecosystem
4	Dublin City University (Ireland)	DCU Ryan Academy: a public-private partnership in EE / Organisational set-up	Co-operating with a large enterprise for operating an EE academy
5	University of Huddersfield (United Kingdom)	EE across all Schools and how to train the trainers / Curricular offers and their management; organisational set-up	EE as "everybody's responsibility" – teaching "venturing" as well as "realising new ideas"
6	Kaunas University of Technology (Lithuania)	Developing EE with international expert networks / Outreach to external stakeholders	Systematic involvement of experts from abroad for implementing and developing EE
7	Technical University of Kosice (Slovakia)	Extra-curricular EE activities and start-up coaching within the region	Growing entrepreneurship through extra-curricular EE with regional and national partners
8	Kozminski University (Poland)	Developing minds for ambitious entrepreneurship and training educators at other universities / Developing mindsets	Focus on ambitious entrepreneurship
9	University of Liège (Belgium)	ULg VentureLab: establishing an entrepreneurial ecosystem at a university	Building up an entrepreneurial ecosystem at a public university
10	University of Linz (Austria)	Inspiring teaching and a support network for academic entrepreneurs / Curricular offers / outreach to external stakeholders	Patent-based business-planning course combining scientific-technology transfer and curricular EE
11	University of Ljubljana (Slovenia)	Implementing the Design-Thinking approach in EE / Curricular offers	Applying the Design Thinking method to entrepreneurship education
12	University of Lüneburg (Germany)	Developing a comprehensive approach for diverse target groups / Curricular offers, organisational change	Integrative and comprehensive EE approach, targeting all faculties and different student groups
13	University of Lund (Sweden)	Embedding entrepreneurship education in a regional context / Curricular offers, outreach to external stakeholders	Action-reflection approach and intensive interaction with local stakeholders in EE
14	EM Lyon (France)	Educating entrepreneurs as a prime objective of a private business school / Curricular offers	Emphasis on entrepreneurship education in all degree programmes
15	Polytechnic University of Milan (Italy)	Experience-oriented EE / Curricular offers	Implementing an experience-oriented approach to EE
16	University of Osijek (Croatia)	Developing EE from scratch over time / Organisational change, mindsets	Building EE from scratch in an unfavourable post-war and post-socialist environment
17	Erasmus University Rotterdam (Netherlands)	Building the Erasmus Centre for Entrepreneurship and advancing corporate entrepreneurship / Curricular offers, organisational set-up	Sustaining EE through extension towards corporate entrepreneurship and community of entrepreneurs
18	University of Southern Denmark (Denmark)	IDEA centre for promoting EE across the university / Curricular offers, organisational set-up	A central unit outside faculties (IDEA centre) facilitates EE across the whole university
19	Tampere University of Applied Sciences (Finland)	Education in team entrepreneurship / Curricular offers, extra-curricular activities	Education in team entrepreneurship through team learning
20	University of Valencia (Spain)	Developing EE and business culture with regional enterprises / Curricular offers, outreach to external stakeholders	Professors' Summer School in EE as a train-the-trainer approach to spread entrepreneurship to non-business faculties

Pilot research

Following the selection of 20 universities, the study team started carrying out three pilot case studies in spring 2014 in order to verify the appropriateness of the research template. The three pilot cases included the University of Lüneburg, the University of Huddersfield and the University of Southern Denmark.

Field work

Field work for the other 17 case studies began in June 2014 and was in most cases concluded towards the end of 2014. This step included interviews with stakeholders and collecting additional information about the universities from sources such as annual reports, strategy papers, brochures, and statutes. In most case studies, primary information was collected from between five and 15 interviewees. Each university had a gatekeeper who approved that the case is appropriate and the information can be published.

Validity issues

There are certainly issues of validity in terms of not being able to tell the full reality of EE at the case universities. Universities' representatives may want to present their universities and their activities as positive as possible and neglect downsides. This is a serious problem because it may lead to false implications for policy making and mislead adoption, for example seeking to emulate practices which are in fact not as positive as the study team learned about. This problem cannot be completely circumvented, not even when interviewing people from different angles of a university. The researchers encountered instances of information which the universities would rather not want to be published telling their name, which can however be mentioned anonymously. Such instances of what can be called "dark matter" are also included in the following analysis.

2.4 Validation of study results: peer group and expert surveys

Peer group

The study established a peer group, functioning as an advisory board, including four renowned high-level experts in the field of entrepreneurship education. The purpose of this peer group was providing guidance to the study and assessing findings. The peer group members met at three workshops in March and October 2014 as well as March 2015. The peer group also discussed the study's interim and draft final reports. The peer group members represent experts from different countries and different professional backgrounds. They are independent from the project team.

Exhibit 2-4: Peer group members

Peer name	Organisation	Position	Perspective
David B. Audretsch	Indiana University (Bloomington, USA)	Distinguished Professor, Ameritech Chair of Economic Development / Director, Institute for Development Strategies / Director, SPEA Overseas Education Program	Entrepreneurship research
Paul Hannon	Swansea University (Swansea, UK)	Director, LEAD Wales, Institute for Entrepreneurial Leadership, Swansea University	Entrepreneurship education
Paula Kyrö	Aalto University (Helsinki, Finland)	Professor for Entrepreneurship	Entrepreneurship education
Jonathan Potter	OECD (Paris, France)	Senior Economist, Centre for Entrepreneurship, SMEs and Local Development	Public policy analysis and support

Expert surveys

The study carried out two expert surveys for **validating study findings** and enhancing the contractors' knowledge about entrepreneurial activities in higher education in Europe and beyond. The peer group members were included in the sample. Expertise in the field of entrepreneurship education was the essential selection criterion for the panellists. The chosen experts have been identified based on personal networks. They represent different stakeholder groups and vary in terms of their nationality and gender.

The **first round** of the expert survey took place in February and March 2014. It was carried out as an online survey. The purpose of the survey was validating the selection of case study candidates and receiving hints to possible further candidates. By and large the respondents confirmed the pre-selection of 40 cases for a shortlist of case study candidates. Their assessment contributed to selecting the 20 cases for actual research.

The **second round** of the expert survey took place from March to May 2015. Its purpose was validating the study's preliminary findings and suggested policy implications. Interviews were carried out on the phone with a semi-structured questionnaire and open-ended questions. Some experts commented in writing. The questions were structured by the challenges, possible solutions and proposed policy implications as included in Chapter 4 of this report. The expert interviews contributed to a broader and deeper understanding of these. Indirect and also selected direct statements from the interviewees are included in this report. The experts all in all confirmed the conclusions and provided further details to them.

Exhibit 2-5: Experts interviewed for validating study findings in spring 2015

No	Name of Expert	Position and affiliation
1	Teita Bijedic	Researcher, Institut für Mittelstandsforschung Bonn (Germany)
2	Marina Dabic	Professor, Faculty of Economics and Business, University of Zagreb (Croatia)
3	Marc Gruber	Full professor, College of Management of Technology, École Polytechnique Fédérale de Lausanne, Chair of Entrepreneurship and Technology Commercialisation (Switzerland)
4	Frank Janssen	Professor of Entrepreneurship, University of Leuven (Belgium)
5	Liora Katzenstein	Professor, Founder & President of ISEMI (The Institute for the Study of Entrepreneurship & Management of Innovation, Tel Aviv University (Israel)
6	Catherine Léger-Jarniou	Lecturer in Management Sciences, University Paris-Dauphine (France)
7	Karen Maex	Dean, Faculty of Science, University of Amsterdam / Dean, Faculties of Sciences and Earth & Life Sciences, VU University Amsterdam's (Netherlands)
8	Johanna Moisio	Finnish Ministry of Education (Finland)
9	Andy Penaluna	Professor of Creative Entrepreneurship, University of Wales Trinity Saint David (UK)
10	Peter van der Sijde	Associate Professor, Free University of Amsterdam (Netherlands)
11	Erik Stam	Professor, School of Economics, Utrecht University (Netherlands)
12	Silvio Vismara	Associate Professor of Entrepreneurial Finance, University of Bergamo (Italy)
13	David Watkins	Professor of Management Development, Southampton Solent University (UK)

Plus the four peer group members (see Exhibit 2-4).

3 Findings from the sepHE study

3.1 Overarching findings

3.1.1 Development stages and success factors

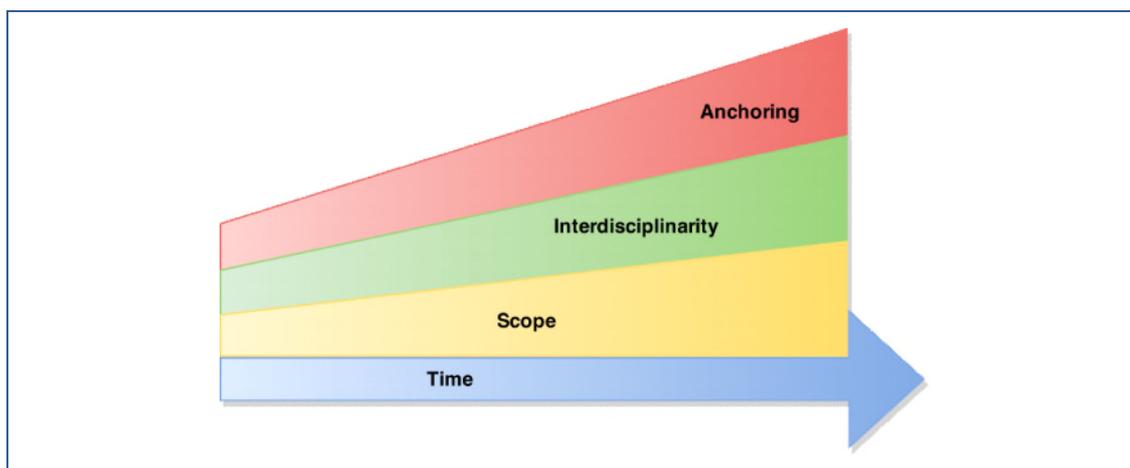
Development stage of the 20 cases universities

The 20 universities examined in this study represent different development stages of entrepreneurship education. There does, however, not necessarily seem to be a kind of “life cycle” for EE approaches, similar for example to the stages of product innovation. While the programmes were born sometime, there is no necessary decline or death. Rather, the case studies show heterogeneity of EE establishment with different manifestations of four characteristics: length, comprehensiveness, interdisciplinarity and anchoring.

- **Length:** This criterion represents the time since introducing EE. In one case (Kaunas), the EE programme is only three years old; in other cases the EE programmes have been running for several decades (e.g. Osijek, Rotterdam).
- **Scope:** There are different levels of breadth of curricular offers and extra-curricular activities. While some universities offer degree programmes in entrepreneurship for Bachelor, Master and PhD level and many courses with specific subjects (e.g. Huddersfield, Lund, Lyon, Osijek, Rotterdam), other universities offer only a small number of courses.
- **Interdisciplinarity:** The levels of EE diffusion into the universities’ various faculties and target groups differ, in particular to non-business disciplines.
- **Anchoring:** EE may be anchored at varying strengths, internally and externally. Internally, there may be more or less support from university management and teachers as well as students demanding EE courses. Externally, there may be more or less strong co-operation with stakeholders such as enterprises, finance suppliers, service providers, and technology parks.

Scope, interdisciplinarity and anchoring may require a certain length of time in order to be distinct and they may – normally but not necessarily – increase with time. Together these three characteristics may determine the impact of EE offers, i.e. the extent to which the entrepreneurial potential of a university is exploited. See Exhibit 3-1.

Exhibit 3-1: Criteria for a typology of development stages in entrepreneurship education



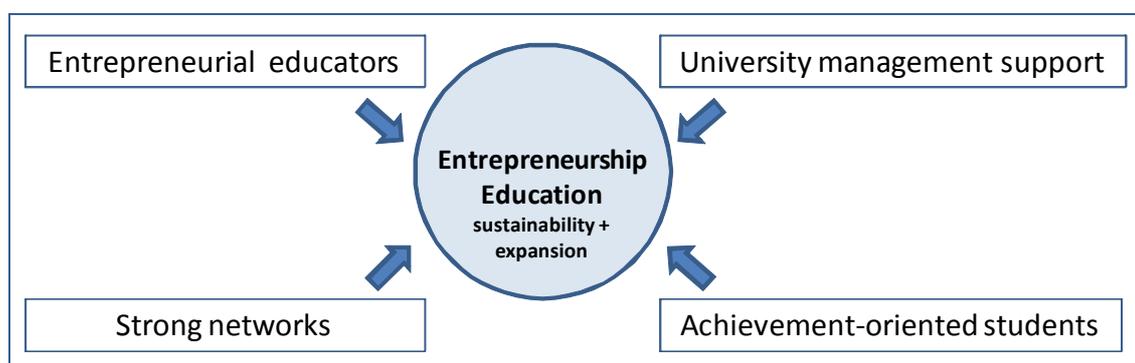
Source: empirica / Bergische Universität Wuppertal 2015

The four criteria may represent a multi-dimensional typology of development stages in entrepreneurship education.⁸

Factors for sustaining and expanding entrepreneurship education

Entrepreneurship education is a young discipline that needs to compete with more established disciplines about resources, i.e. personnel and finance. Furthermore, the principal criterion for selecting case study universities was that they have an innovative approach. This may make entrepreneurship education at some case universities even more prone to be contested. Hence the question arises how the universities manage or are seeking to manage the sustainability and expansion of their EE offers. The cross-case analysis suggests that there may be four principal factors: Entrepreneurial educators, university leadership support, strong networks, and achievement-oriented students.⁹ Exhibit 3-2 illustrates these sustainability factors.

Exhibit 3-2: Overall factors for sustaining and expanding entrepreneurship education



Source: empirica / Bergische Universität Wuppertal 2015

- (1) **“Entrepreneurial” entrepreneurship educators.** All EE programmes were found to be operated by or involve enthusiast individuals. While the educators act entrepreneurially, they do not necessarily need to be current or former entrepreneurs or business managers. However, there may be a need to build up successors early in order to prevent EE programmes from decay if the enthusiast leader leaves the university. Particularly prominent examples of EE educators can for example be found in Cambridge, Liège, and Osijek.
- (2) **Support from university leadership.** Most case universities have strong or at least some support from top management, i.e. chancellors or rectors or their vice representatives. Cases of university managers who promote EE particularly strongly include for example the Bucharest University of Economic Studies, University of Huddersfield, Dublin City University, and Kaunas University of Technology.
- (3) **Strong networks.** Entrepreneurship education is predominantly perceived as requiring practice-oriented approaches. This requires involving business people acting as speakers, mentors, finance providers or door openers. Furthermore, a network of entrepreneurship educators may be helpful to exchange experiences and assure EE quality.
- (4) **Achievement-oriented students.** Last but not least, it does not necessarily go without saying that students are ready to think and behave entrepreneurially, and they may not necessarily be ready to learn with challenging methods. They need to have a certain level of achievement-orientation and creativity.

⁸ While it would be insightful to analyse how the universities reached their current EE status, the case studies were not designed to collect in-depth information about this specific issue.

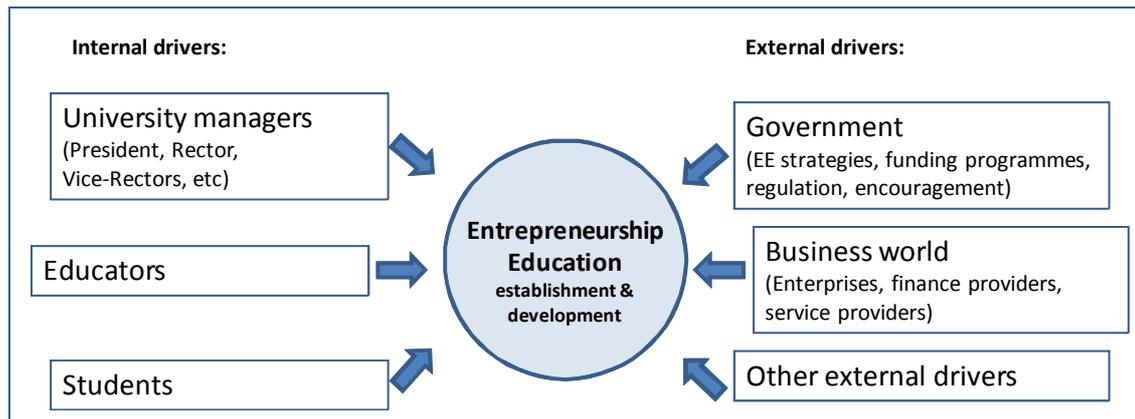
⁹ The first three factors are similar to those identified by the author of the case study about Kozminski University.

3.1.2 Drivers and impediments of entrepreneurship education

Overview about drivers for EE

The case studies showed that there can be many different drivers of implementing and developing EE at universities. There are internal and external drivers. Internal drivers include university managers, university educators, and students. External drivers include governments, the business world, and other external drivers. Exhibit 3-3 provides an overview.

Exhibit 3-3: Drivers of establishing and developing entrepreneurship education



Source: empirica / Bergische Universität Wuppertal 2015

The cross-case analysis suggests that **educators were the most important drivers** in the 20 case universities. This corresponds with the finding that EE programmes are often initiated and operated by enthusiast individuals. In about half of the cases, **university managers and students** as well as governments were also found to drive EE in a notable way.

Governments were found to take diverse roles in driving EE: they can implement strategies for supporting EE, they can establish specific funding programmes (e.g. Lüneburg, Southern Denmark), they can support specific universities (e.g. Kaunas), they can implement or modify the regulatory framework for EE, and they can informally encourage EE.

Other external drivers include for example influential individuals who see a specific importance of EE, as in the case of Kaunas, or incubators, accelerators and technology parks as in the case of Lund.

Impediments to establish and develop EE

The case studies revealed several impediments for implementing and developing EE. Such impediments may be internal to the university and also related to external framework conditions. The impediments reflect the fact that entrepreneurship education seeks to reconcile the conflicting objectives of scientific aspiration and practice-orientation.

Internally, establishing EE does not go without saying – there are impediments to be overcome on the part of a university’s management, staff and students. These impediments relate to unwanted commercial orientation, different cultures of academic disciplines, and students’ preferences for stable employment.

- **Unwanted commercial orientation:** There may be reservations against entrepreneurship as being profit-oriented, against fundamental principles of humanity and solidarity, and biased towards certain commercial interests (reported about a former university of an interviewee from one case), thus conflicting with neutrality and independence of science. In another case, an economic department opposed the subject of entrepreneurship, considering it as an unwanted capitalist concept.
- **Depreciating EE:** There may also be reservations against EE because it is considered as providing “soft skills”, as opposed to “hard science”. This may be a specific variation of

depreciating business studies by engineering professors and students (see for example case 4).

- **Different cultures** in academic disciplines prevail – the values, habits, and beliefs of representatives from economics and business studies tend to be different from other disciplines for example in engineering and health sciences.
- **Personal resentments:** Successful innovation in entrepreneurial education may also depend on individual initiatives and how the institutional environment supports them. Personal resentments such as envy from colleagues and administrators may hinder the implementation of novel ideas. This was found to apply even at universities where EE is generally highly appreciated.
- **Preference for stable employment:** Moreover, students may not be interested in entrepreneurship because they prefer becoming employees, not self-employed, after graduation. This applies to many of the case universities in this study, probably to the majority.

The issues of unwanted commercial orientation, depreciating EE and different cultures may apply to all groups involved: university managers, educators and students as well as external stakeholders. The issue of preferring stable employment applies only to students.

The universities' economic and social environments may also impede EE. Since EE should be practice-oriented in order to be successful, it needs to include external stakeholders: entrepreneurs can be invited as guest speakers and mentors, finance suppliers may contribute funding for new ventures by students and staff, service providers may be involved for issues like intellectual property protection. Together they are important parts of the entrepreneurial ecosystem of a region or country. Hence, if this ecosystem is weak, EE is also hampered. This may be the case particularly in Eastern European countries; it was for example mentioned in Kaunas. However, one case from South-East Europe, Osijek, provides an example that enthusiast people from a university can decisively contribute to create an entrepreneurial system in the region themselves.

Management support for EE

Support from top university management deserves special attention in this report because it was identified as a major driver – or inhibitor – of EE. Top management may support EE in various forms of commitment:

- Varying strength of commitment in terms of time: one-off, occasional or continuous support to EE.
- Resource support for individual EE activities, e.g. start-up coaching, training programmes.
- Active engagement: taking roles in single EE events, e.g. patronage of events or acting as judges in business plan competitions.
- Networking: e.g. providing bridges to external stakeholders.

The findings about management support for EE within the university are mixed. In cases where there has been notable promotion of EE in the university hierarchy, this was reported to be instrumental for entrepreneurship teaching, e.g. in establishing it in an otherwise non-entrepreneurial environment or in expanding EE offers across the entire organisation (see Huddersfield, Lüneburg and Osijek). In these cases support came from the level of department deans, the president or the university vice chancellor.

- At the University of Lüneburg, entrepreneurship is part of the tasks of one of the Vice Presidents. In the course of time, he became a powerful promoter who systematically promotes the subjects of entrepreneurship and innovation at the university. The President is also highly engaged in fostering regional development.
- The University of Lund has a strong emphasis on innovation since its foundation. The Pro-Vice Chancellor and the Dean of the School of Economics and Management stated that this emphasis increased throughout the years. This commitment from the university's management and faculty level has eased the process of advancing EE both in terms of funding and in terms of structure and design.

However, there have also been **incidents of lacking support**. In two cases the image of entrepreneurship as a soft academic discipline (and not a “hard science”) and just a singular field of business studies have been reported as potential barriers to management support in universities with a strong base in science and engineering. To combat possible intra-organisational conflicts between different university departments, positive experiences with a neutral umbrella organisation outside the university (but acting in close co-operation with it) were found at the University of Southern Denmark. In any way, within a public education setting entrepreneurship education (and in fact any other discipline) will face the challenge of competing for a organisational resource base with others – in contrast to the private funding context of Dublin City University where EE is offered through an academy for the purpose of fostering entrepreneurship in the first place. However, in both public and private institutional settings, issues of sustaining EE resources over time have arisen.

3.2 Curricular offers in entrepreneurship education

3.2.1 Introduction: a plurality of findings about curricular offers

The term **curricular entrepreneurship education** relates to offers such as courses, modules or tutorials at universities.¹⁰ These offers belong to regulated or accredited degree programmes or other formal study programmes. Hence, these activities are integrated into students’ formal curriculum and result in receiving formal credits for participation, e.g. within the European Credit Transfer and Accumulation System (ECTS) system. Some EE offers may be optional while others are compulsory.

Data collected on curricular offers in the 20 cases is extensive and represents the largest section in most case studies (see the second chapter in the respective case studies). However, while curricular offers may be the focal point of EE in all case studies, many cases focus a specific theme in extra-curricular activities, institutional aspects or outreach – see Exhibit 2-3.

On the whole, the 20 case studies reveal an **enormous breadth of curricular entrepreneurship offers**. However, the number of offers varies by university. Whereas some universities offer entire multi-disciplinary degree programmes in entrepreneurship education, other universities specialise on single courses with a particular focus on one academic discipline and one field of entrepreneurship.

In line with the analytical framework laid down in section 2.2, this chapter focuses on five aspects of curricular EE offers: Target groups (section 3.2.2), design (3.2.3), educators (3.2.4), setting in terms of timing and location (3.2.5), and management (3.2.6).

3.2.2 Target groups of curricular EE offers

Definition

As regards target groups of curricular EE offers, a distinction can be made between offers targeted at university students and offers for non-student target groups, such as staff members, alumni, researchers and managers from start-ups or established enterprises.

Overall characteristics of EE target groups

The **prime target group** of EE at the case universities is students, ranging from undergraduate and postgraduate to PhD **students**. Non-student target groups were found to play a minor role (see however Dublin City Ryan Academy as an exception). Offers for non-student groups like staff members, researchers and start-up managers were found in Cambridge, Dublin, Liège, Milan, Rotterdam, Southern Denmark and Tampere. A transfer-oriented approach supporting local start-ups was observed in a number of cases (e.g. Dublin, Ljubljana and Lyon).

¹⁰ The meaning of terms like “courses” and “modules” may differ between countries or even between universities within a country.

As the EE offers are diverse, the **target groups among students are also diverse**. Some offers target specific groups, e.g. students of particular academic disciplines, degrees or study levels, whereas others target a broader group of recipients or even all students on the campus.

Approximately a third of the case universities were found to offer EE to **all students** on campus. This may mean different things: EE offers may in principal be open to all students (e.g. Osijek); the university offers an EE course that is obligatory for every student (Southern Denmark); the university may seek that each student encounters EE at some point in his or her study (e.g. Huddersfield); or all degree programmes at the university include major parts about entrepreneurship (e.g. Lyon).

Curricular EE for students in particular academic disciplines

Most offers are for students of specific **academic disciplines**. All case universities target students from business and economics. However, many universities also have entrepreneurship offers for students from other disciplines. EE in engineering faculties was found to be fairly frequent (e.g. Cambridge, Coimbra, Kaunas, Kosice, Linz, Milan, Southern Denmark, Tampere, Valencia). At some case universities there are offers in faculties such as Humanities and Media, Applied Sciences, Tourism, Human and Health Sciences, Art, Design and Architecture (e.g. Huddersfield, Linz, Tampere). Only a few case universities do not extend curricular EE programmes to students of different academic disciplines. The majority offer at least one course which is dedicated to entrepreneurship for students outside of business and managements schools.

It was found to be a **challenge for many universities to move EE out of the business context** and to address students from non-economic disciplines. The University of Southern Denmark has therefore designed an obligatory entrepreneurship course for every student in order to tackle the lack of knowledge about entrepreneurship particularly in technical and healthcare faculties. Some EE programmes try to team up students from different study areas, e.g. business and design, to share their knowledge in the different areas and combine it in new ways to create new value. One example is the course "Patent-based Business Planning" in Linz which links business students with people from science and engineering to build business models on technical patents.

Only a few of the universities have **interdisciplinary curricular offers**. Teaming up students from several academic disciplines can be of added value, as different student groups can mutually transfer in-depth knowledge from one specialisation to the other. The universities of Kaunas, Ljubljana or Osijek provide related examples.

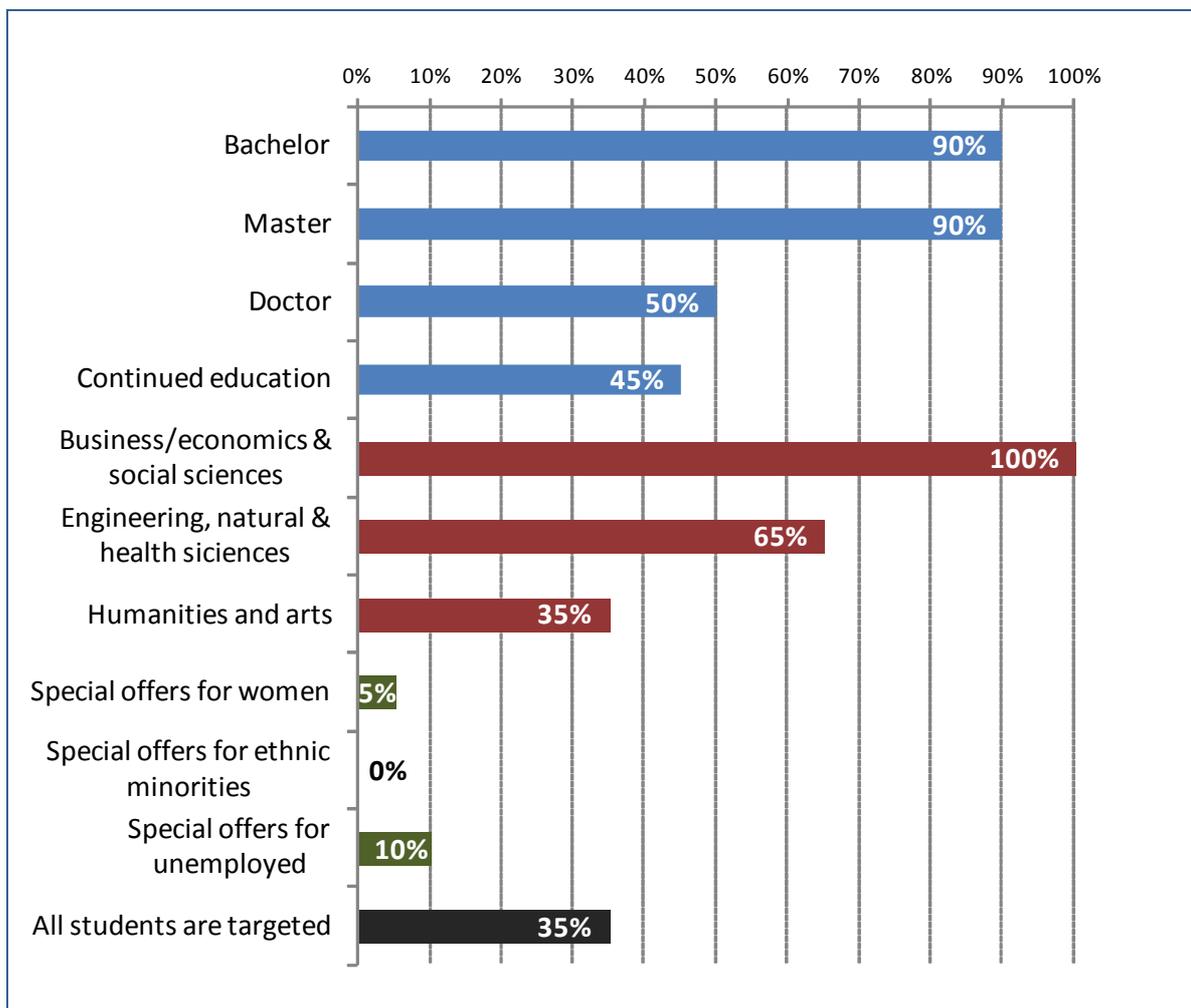
Curricular EE for students with particular backgrounds

Offers for students with specific **social backgrounds** were found to be rare. Two universities offer courses for unemployed (Dublin City, Ljubljana), whereas the offer of the Dublin City University Ryan Academy ended in 2014. One university had a specific offer for women (Dublin City).

EE offers for **target groups with specific professional backgrounds** were found to be rare. An example is the Dublin City University Ryan Academy which offers a number of accelerator programmes that help start-up companies to reach the next stages of development. A further example is the Master programme "Entrepreneurship and Business Administration in the Energy Sector" offered at the Bucharest University of Economic Studies. This Master programme is the first programme in Eastern Europe with a focus of Entrepreneurship in the energy sector.

In terms of **entrepreneurial ambition**, many universities especially target nascent entrepreneurs, future entrepreneurs, those who have recently started a business or who could become successors of a family business (e.g. Kozminski, Liège, Lyon and Tampere). There are however also universities which deliberately seek arousing creative or entrepreneurial thinking and behaviour in students, without necessarily driving them towards starting a business (e.g. Huddersfield, Kaunas, Ljubljana).

Exhibit 3-4: Target groups of entrepreneurship education at the 20 case universities



Source: empirica / Bergische Universität Wuppertal 2015

Exhibit 3-4 shows the shares of target groups at the 20 case universities, subdivided by level of education, academic discipline, and diversification. The category “ethnic minorities” is included because it was part of the research template, but no such focus was identified at the case universities.

Continued education in entrepreneurship

Continued education is an integral part of the EE curriculum at around half of the case universities.¹¹ It is mainly targeted at Master students, but in some instances it is open to alumni (e.g. Denmark, Huddersfield, Rotterdam) and an external audience made up of nascent entrepreneurs and people with an entrepreneurial interest (e.g. Liège, Lüneburg, Tampere). Some of these offers are restricted, e.g. in Huddersfield the offers extend only to alumni up to five years from their graduation.

Some case universities (e.g. Dublin City) offer curricular EE programmes which are especially designed for **alumni** in form of continued education or people who are **self-employed**. In most of the cases these programmes are not accredited (see section on extra-curricular EE).

¹¹ Information on continued education was not provided by all universities.

Bridges to secondary education

The universities in Coimbra, Huddersfield, Lüneburg, Lund, Lyon and Tampere actively build bridges to secondary education.

- Regarding primary and secondary schools, the University of *Coimbra* is offering 25 hour training courses for educators related to entrepreneurship and co-operation education
- The *Tampere University of Applied Sciences* organises annual roadshows, whereas *Lund University* puts on science and trade shows, arranges theme days and also runs a science centre for pupils.
- The *University of Huddersfield* is partner in a number of (regional) business competitions for secondary schools.
- *Lüneburg University* developed a start-up simulation game for schools in which, for example, they learn to set up a business plan. Additionally, certain activities of the Social Change Hub and the students' initiative ENACTUS are carried out in connection with high school students. There is also a project about fostering sustainable pupil start-ups at schools.

3.2.3 Design of curricular EE offers

Definition

Designing curricular EE offers means defining their objectives, content, methods and media as well as formal and informal evaluation of learning outcomes. These are basic decisions at the core of curricular EE offers.

Objectives

Objectives of curricular EE offers describe the **expected learning outcomes** of entrepreneurship teaching.

The majority of case universities were found to have similar intentions about overall learning outcomes. The overall common objective is the building of both **theoretical knowledge** about entrepreneurship and developing **entrepreneurial skills and competencies**. Hence, the universities aim at both, teaching *about* and teaching *for* entrepreneurship. As regards teaching for entrepreneurship, the universities seek that students learn to think and act entrepreneurially and consequently know how to develop ideas and possibly also create and run a business on their own. Therefore all case universities try to equip students with the capacities needed for solving typical entrepreneurial problems and by familiarising them with specific instruments of entrepreneurial management.

There seems to be **not much differentiation in overall EE objectives between different target groups**, i.e. undergraduate versus postgraduate or across different academic disciplines. However, there may be specific learning objectives for different levels of education and academic disciplines:

- The *Technical University of Kosice* familiarises first year bachelor students with basic concepts of entrepreneurial management and the role of entrepreneurs in society in a lecture-type format. Later, in a seminar on entrepreneurial skills development for third- and final-year bachelor students, the learning objective is to build specific skills as students pursue their own business ideas.
- The *University of Huddersfield* has a course for students of the School of Music, Humanities and Media, teaching journalism students how to launch a new magazine

Besides providing entrepreneurial knowledge, skills and competencies, some case universities pursue the additional objective of **supporting students in actively pursuing entrepreneurial opportunities**. Related examples are the University of Huddersfield's Enterprise Team and the Start-up Space at Kaunas TU. The University of Liège seeks establishing long-term relationships between students and the university's entrepreneurial ecosystem. While such support is usually provided beyond curricular offers, the supporters are not rarely the educators from the curricular offers.

Contents

Basic concepts of entrepreneurship

At the case universities there is not much differentiation noticeable regarding the basic entrepreneurship concepts and tools of entrepreneurship teaching. Educators seek to familiarise the students with basic entrepreneurship concepts so that they learn the various facets of entrepreneurship. Theories about entrepreneurship and entrepreneurs are introduced and theoretical knowledge on the entrepreneurial process is provided, including topics like opportunity recognition, evaluation of opportunities, entrepreneurial finance, growth management and marketing. With regard to specific start-up and strategic management tools, the **business model canvas, business plan writing and business modelling** were found to play a crucial role in many curricular offers (e.g. Dublin, Huddersfield, Kaunas, and Milan).

However, the **core content sometimes does not clearly distinguish between different target groups**. For example, the contents may originally be designed for business students with fairly advanced understanding of business issues but not really suitable for students from non-economic disciplines. Oftentimes in entrepreneurship courses, the same content is offered to different target groups.

In the majority of the universities the core content of curricular EE activities is oriented towards **traditional business entrepreneurship**. However, there are some universities like Coimbra, Dublin City, Liège or Lüneburg, which have curricular EE offers with a focus on **social entrepreneurship** and social enterprise. These offers combine contents for creating a business in the social sector with entrepreneurial principles and management tools.

Differentiating between entrepreneurship and enterprising

The University of Huddersfield pursues a particular approach. It distinguishes between **enterprise education** ("having an idea and making it happen") from **entrepreneurship education** ("new venture creation") in order to potentially reach all students. "Enterprise education" has a broader meaning of realising innovations, not necessarily involving to start a business. The university's Enterprise Team does not even promote using the term "entrepreneur" but prefers terms like "business owner", "freelancer", and "self-employed". "Entrepreneur" may be used in programmes where the lead academic deems it to be appropriate, for example in the BA Enterprise Development degree.

Using results from entrepreneurship research for teaching design

Some case universities (e.g. Cambridge, Huddersfield, Lund, Lyon, Milan, Rotterdam, and Southern Denmark) seek to implement the **results of entrepreneurship research** in curricular EE programmes to facilitate understanding of the theoretical basis of entrepreneurship and to transfer new insights to students.

Providing practical insights

The vast majority of universities involved in this study offer practical insights to become entrepreneurial or enterprising. In nearly all case universities students have the opportunity to or are even obliged to deepen their theoretical knowledge by using it in a practical way. Frequent curricular EE modules include, for example, the development of business ideas, respectively models and business plans, as well as different models for opportunity evaluation. Here the curricular EE offers of the Universities of Cambridge, Kosice, Liège, Linz, Ljubljana, Lund and Tampere University of Applied Science may stand out as exemplary. Specifically, the University of Linz offers a model how to link the required theoretical knowledge with developing real business opportunities in patent-based business planning.

Entrepreneurship-related modules at non-business schools usually familiarise students with business issues that are related to their school's area of subjects, thereby offering them the knowledge and ability to actually launch a business.

Personal skills training

Beyond providing relevant theoretical knowledge and practical insights about entrepreneurship, curricular EE offers at some case universities also include **personal skills training**. This is to promote the development of an entrepreneurial mindset among students so that they are able to formulate practical solutions to specific problems independently. Examples include the PGD

programme at Cambridge, Business Innovation Program at Dublin City University, Technology Entrepreneurship Course at Kaunas, and HEC-ULg Entrepreneurs Program at Liège.

Methods and media

General observations about methods and media

The case universities employ different teaching methods and approaches for achieving the aspired learning outcomes. The range of methods and media applied differs according to the type and the context of the respective course as well as the level of experience and the knowledge of the participating students.

Action-oriented approaches are widespread

None of the case universities provides curricular EE content solely in lectures. In every case university a combination of both, **ex-cathedra as well as action-oriented and experience-based learning approaches**, are firmly embedded in the entrepreneurship curriculum. A commonality across the cases is the universities' efforts to offer more practice-oriented teaching in curricular EE. The design of these practice-oriented learning approaches is multi-faceted and the case universities provide various methods to pursue this teaching objective.

Some methods imply involving practitioners in teaching:

- (1) **Guest lectures of experts** from practice or academia in various areas related to new venture creation and entrepreneurship as well as **case studies** play a crucial role in the curricular EE programmes of the case universities.
- (2) At some case universities (e.g. Bucharest, Kaunas, Osijek) a **team teaching approach** is a key component in curricular EE. In addition to the university lecturers from different disciplines, a guest speaker from practice may also take part in discussions providing theoretical knowledge as well as practical insight. At the University of Bucharest international academic experts are also involved.
- (3) In a few case universities, **mentoring programmes** play a major role within curricular EE activities (e.g. NVC Program at Lund University and Propeller Program at Dublin City University Ryan Academy for Entrepreneurs).

Some methods imply co-operation with businesses:

- (4) The universities of Huddersfield and Lund as well as EM Lyon facilitate **internships** in companies or enterprise placements for practical learning so that students gain real life experience. In the case of Lyon international internships are also possible.
- (5) Some universities (e.g. Cambridge, Liège, Linz, EM Lyon, and Rotterdam) **co-operate with businesses** for offering students the opportunity to work on real business projects.

Other methods focus on practice-orientation without direct involvement of practitioners:

- (6) Some case universities (e.g. Huddersfield, Kosice, Linz, Lüneburg, Osijek, and Rotterdam) use simulations like **role plays** and **business simulation software** in order to analyse and solve typical entrepreneurial problems.
- (7) Some case universities (e.g. Kaunas, Ljubljana, Milan, Rotterdam, and Tampere) use **flipped-classroom concepts** where the educator takes the role of a moderator instead of a lecturer. The students' learning process is to a large degree self-determined. Students acquire traditional lecture content through home exercises, while they use time in the classroom for discussions and reflection of the acquired knowledge.

Many case universities use **close links with business partners**, mainly from the region, for curricular EE purposes. Such partners may for example be start-ups or companies involved in start-up support but also larger enterprises. Such practical support may however pose problems. The institutional process of accreditation and administrative procedures involved for integrating industry partners can be complicated. Moreover, such pursued first-hand experiences depend on the goodwill of industry partners.

The University of Ljubljana uses the **Design Thinking approach** in the majority of its curricular EE activities. Design Thinking is an action-oriented, iterative problem-solving as well as idea-generating and human centred approach. Curricular EE programmes comprise a combination of theoretical EE and hands-on applications of the Design Thinking approach in which students develop entrepreneurial projects and business ideas through engaging and interacting with potential customers, generate team based ideas as well as build and test prototypes of potential products. Applying the design thinking approach was found to help to create an action-oriented mindset and develop entrepreneurial skills, as it links creativity techniques with business thinking. Therefore it helps in building the bridge between theoretical knowledge and practical application.

Online media not very widespread

Both traditional media (e.g. white boards, flip charts) and electronic media (e.g. videos, presentations) are used to facilitate curricular EE teaching among the case universities. However, online tools were not found to be widespread. Not many case universities (e.g. Cambridge, Dublin, Kaunas, Kozminski, EM Liège, Lund, Lüneburg) include online tools like webinars and massive open online courses (MOOCs) or e-learning platforms like Moodle as a support measure to provide and work on the content.¹² As a specific example, Cambridge and Kozminski University provide a more self-regulated learning approach by means of e-learning without a specific location. The usage of these virtual learning environments, implemented through several online platforms such as Moodle, ranges from the upload of pre-course materials, video-lectures and interviews to group-discussions and video-conferencing.

The use of such media was found to make teamwork, interaction and communication among students easier and to encourage students' self-responsibility and self-organisation. Furthermore, online platforms can be utilised to collect knowledge and make it accessible to students, especially for students from different academic disciplines.

3.2.4 Educators of curricular EE offers

Definition: types and roles of EE educators

Curricular EE can encompass different types of educators from inside or outside universities. Internal university staff engaged in curricular teaching activities can include full professors, assistant or junior professors, teaching fellows or assistants, PhD students and administrative staff. Next to that, external instructors can participate in EE. External instructors may stem from academia, such as visiting professors or academics, or from practice, such as entrepreneurs or other business people. Both internal and external staff can have different roles: They can act as lecturers, course moderators, mentors, coaches or facilitators. In the case universities, the majority of curricular entrepreneurial teaching and course design was provided by university staff. External instructors were oftentimes involved.

Internal university staff

Number of internal staff involved

Little information about the numbers of university employees engaged in EE was provided in the case studies. There are several reasons: At some universities, the offers are so comprehensive that it would require time-consuming efforts to keep an overview about all EE educators. This is particularly true when offers are developing and frequently modified. Even universities with a relatively small number of EE offers may involve numerous people with different levels of engagement (e.g. Kaunas). Counting EE educators is next to impossible when entrepreneurship is "everyone's responsibility" as in Huddersfield. Counting may be fairly easy when there are a confined number of professors dedicated to entrepreneurship (e.g. Lüneburg).

¹² However, many case studies do not provide detailed information about media so that the use of online media might in fact be more widespread and stronger than identified.

Staff affiliations and specialisation

Some case universities initiated **centres, institutes or chairs** specifically devoted to entrepreneurship teaching (e.g. Cambridge, Denmark, Linz, Lund, Lüneburg, Rotterdam). If such a unit exists, it is mostly located within the Business and Economic Schools. Besides chairs for entrepreneurship in general, two universities (Liège and Lüneburg) established chairs focused on social entrepreneurship. Other cases do not have such dedicated units for entrepreneurship (e.g. Bucharest, Cambridge, Kosice, Lüneburg, Milan and Rotterdam).

Qualifications and selection criteria for internal staff

Concerning the qualifications and selection criteria for university staff for curricular EE, as in most other academic disciplines **advanced degrees** such as MBAs or PhDs were frequently desired or required. Some universities like Lund require excellent knowledge in both business and entrepreneurship. **Experience as an entrepreneur** was mentioned as a requirement and selection criteria only in a very limited number of cases (e.g. Bucharest). **Complementary skills** in terms of theoretical and practical knowledge were explicitly sought in the case of Southern Denmark. Here, some lecturers with an academic background and others with a foremost practical background and action-oriented teaching methods were desired in order to create strong links between theory and practice. A further example is Bucharest, where PhD students engage in voluntary, unpaid EE activities to gain teaching experience for an academic career.

External instructors

Practitioners

Practitioners are involved in curricular EE in the majority of the case studies. These practitioners may be entrepreneurs, intrapreneurs, business managers, patent scouts, sector-specific experts as well as venture capitalists, business angels, start-up consultants and trainers (e.g. Dublin, Linz, Lyon, Rotterdam, and Southern Denmark; see also section 2.5 on external stakeholders).

- At *Linz University* approximately ten external lecturers who are entrepreneurs, start-up or business consultants, incubator managers and specialised experts participate in entrepreneurial teaching activities. These experts can be selected from a pool of external lecturers to ease the administrative process and to ensure continuity.
- At the *University of Liège*, outside practitioners – mostly experienced and successful entrepreneurs – undertake approximately 90% of all teaching activities.

Entrepreneurs as teachers

In the vast majority of examined case universities, entrepreneurs are actively involved in EE. This teaching involvement predominately takes place in the form of **single activities**. Such single activities relate in most instances to guest lectures by entrepreneurs (e.g. Huddersfield, Kaunas, Kosice, Kozminski, Lund, Lyon). At EM Lyon, guest speakers are oftentimes alumni of the university. Besides lecturing, at some universities entrepreneurs provide coaching, facilitating and mentoring. Further forms of engagement include co-operation between students and entrepreneurs through projects, internships or employment (e.g. Linz, Lund) as well as networking through events or social activities and excursions, company visits or negotiation exercises (e.g. Cambridge). At the University of Southern Denmark, entrepreneurs are invited for storytelling and sharing of experiences, acting as role models rather than educators.

There are however cases of regular, core involvement in EE, also in the design of courses (e.g. Kosice, Linz, Ljubljana). A few cases have **entrepreneurs in residence** (e.g. Huddersfield, Liège). In Ljubljana two entrepreneurs are fully employed at the University teaching courses in design thinking while running their companies. Thereby they provide students with valuable, real-life feedback.

The case universities in Bucharest, Huddersfield, and Osijek engage **visiting professors** in entrepreneurship from other national or international universities in educational activities.

Selection criteria for entrepreneurs as educators were rarely described in the case studies. Entrepreneurs' qualifications may differ depending on the target audience, e.g. ICT entrepreneurs for engineering students or owners of a family firm for a family business course

in Tampere. Similarly, little information was provided concerning the preparation of external instructors for their teaching activities.

- In *Cambridge*, external instructors are selected based on recommendation and official approval. The university appreciates a practical background as real entrepreneur, and entrepreneurs should generally be highly experienced and successful. After the selection of suitable entrepreneurs, a pre-course meeting is held for preparing the teaching tasks.
- In the case of *Kozminski*, guidelines for entrepreneurship lecturers on how to prepare and effectively manage the contribution of invited entrepreneurs are distributed to university staff for the purpose of quality assurance.

Several case studies emphasise problems with the involvement of practitioners in EE, such as low commitment, limited time, last-minute cancellations, bad teaching abilities and low curricula fit.

Separate roles and team teaching

The case studies indicate a generally strong separation between the role of academics and practitioners in EE. University teachers often focus on teaching the academic side of entrepreneurship whereas practitioners provide insights into the practical side of entrepreneurship mostly through their real-life experience.

Within the scope of involving external instructors, the cases of Bucharest and Osijek use **team teaching** methods with national or international external instructors from academia or practice.

Mentors, coaches, and facilitators

A particularity in several case studies is the engagement of mentors as part of curricular entrepreneurship activities (e.g. Cambridge, Coimbra, Kaunas, Liège, Milan and Tampere). The mentors possess a practical background as entrepreneurs, business managers, venture capitalists, business angels or start-up mentors or an academic background as professors, academic researchers and PhD students specialising in entrepreneurship. Mentorships can be financially reimbursed (e.g. Cambridge) or occur on a pro-bono basis (e.g. Lund, Tampere). At Cambridge University, a duty of care for mentees is formally established to strengthen the commitment of the mentors.

Concerning their **tasks**, mentors may provide students with feedback on entrepreneurial ideas or projects and offer guidance and support to student start-up teams (e.g. Tampere). Thereby they share their personal experiences in the field of entrepreneurship.

- At the Corporate Entrepreneurship and Innovation Master Programme at *Lund University*, students have to engage in a project-based internship. The project leader serves as a mentor for the students' professional development and further acts as a supervisor. Both the student and the mentor work at the company and meet at least once per week.
- The Career Service at the Entrepreneurship Hub in *Lüneburg* provides counselling and mentoring services to students. There is also a start-up café that can be used as a co-working space and event location providing mentoring to nascent entrepreneurs. Alumni entrepreneurs provide workshops in the café.

Ensuring a high skill level of mentors was identified as crucial. Some universities highlighted practical experience as entrepreneurs or managers of small and medium-sized enterprises or family firms as an important **selection criterion**.

- In *Milan*, mentors are selected from a pool of experienced practitioners and academics with experience in markets and technologies related to the students' business ideas.

Several case universities provide **coaching and facilitating** services to students (e.g. Cambridge, Denmark, Rotterdam, Tampere). Coaching may be considered as a deeper and more regular support to students than mentoring. "Facilitating" is lighter support, for example occasionally putting student entrepreneurs into contact with other experts.

3.2.5 Setting of curricular EE offers

Definition

Settings of curricular EE offers describe their framework conditions. They involve the location where the offers take place and their timing. Entrepreneurship education can take place at the university itself but also at external premises such as businesses, or even independent from a physical location in virtual classrooms. The range of possible time settings for curricular EE offers is very wide. Carefully considering places and times may be important for reaching the offers' teaching objectives.

Location

Most of the curricular offers take place in conventional lecture halls, tutorial rooms or seminar rooms within **university facilities**. Some offers are provided in **specific learning environments** to facilitate more action-oriented teaching: universities use studios, workshop rooms, laboratories, prototyping rooms equipped with relevant tools (e.g. Ljubljana), meeting rooms and various other work spaces. These locations can be located on the main campus (e.g. Huddersfield, Ljubljana), ancillary campuses (e.g. Tampere) or in off-campus research institutes (e.g. Rotterdam).

Moreover, some EE offers are situated in **business premises** (e.g. Huddersfield, Liège, Lund, Rotterdam). These may be visited at occasional excursions to local enterprises but also on a regular basis. For example, the University of Rotterdam moves parts of its EE programmes to company premises where students work with external business stakeholders. EE may also include gaining work experience through internships in companies (e.g. Huddersfield, Lund).

Using such specific learning environments and business locations is intended to enhance the students' learning motivation, give them access to real business contexts, and provide the opportunity of gaining practical experience.

Only a few universities use **self-regulated learning** approaches. Kozminski University has tried to implement distant learning but the focus still remains on conventional on-campus teaching. Cambridge University, however, has been able to combine presence-based EE and a virtual learning environment by using different platforms tailored to the respective entrepreneurship offers and educational needs. E-learning has become a central component of EE education at Cambridge and is used extensively.

Timing

Universities were found to use a broad range of different timings for the curricular EE offers. The **duration** of curricular EE activities and programmes ranges from weekend courses and summer schools to one-semester courses (e.g. Lüneburg) and degree programmes taking several years (e.g. Cambridge, Kosice, Lund). Many courses are offered annually or biannually and some offers are consecutive, i.e. they start with an introductory course and then advanced courses follow (e.g. Kosice).

The scheduling differs between **continuous weekly sessions** of a few hours and **block sessions** on several consecutive days. Time slots for weekly sessions range from 90 minutes (e.g. Lüneburg) and two hours (e.g. Denmark) up to three hours (e.g. Milan). Block seminars cover at least two days (e.g. Lüneburg) and a maximum period of two weeks (e.g. Cambridge, Lüneburg). The daily work load of block seminars is about four to eight hours. The Master's programme at Lund University presents an exception, as it is designed as a daytime, full-time study. It is an intense programme with a time span of at least 40 hours a week.

Several universities apply a **flexible timetable** without fixed scheduled classes (e.g. Linz, Milan, Tampere) – here the frequency of sessions is lower while their time-slots tend to be longer, up to daylong sessions. The schedule is tailored to the contents and objectives of each session. Determined residential periods are used for coaching and team meetings (e.g. Tampere). Beside these presence times, self-regulated learning approaches, e.g. via e-learning, dissolve boundaries between study and leisure time.

Universities may face challenges when the timing of entrepreneurship courses depends on the availability of external funds, e.g. for outreach activities. This can create delays which may disturb efficient project implementation (e.g. Kozminski University).

3.2.6 Management of curricular EE offers

Definition

Supporting the entrepreneurial potential of higher education is not confined to designing related offers and providing adequate settings. It is also necessary to embed and develop the subject of entrepreneurship education in the teaching and learning environment – implying thoughtful management, i.e. leadership, co-ordination and negotiation. EE management impacts upon the didactical core of student learning in curricular EE offers. According to the analytical framework of the sepHE study, the management of curricular EE offers encompasses the following six issues: (1) management of educators and trainers with respect to staff development, (2) management of support services provided to students such as start-up consulting for student enterprises, (3) management of internal and external networks, (4) management of curricular integration in particular with regard to attracting students and the form of evaluation of curricular courses and programmes, (5) formal and informal feedback to students, and, finally, (6) the management of continued education with regard to the university's life-long learning approach.

Educator and trainer management

Educator and trainer management relates to the **development of staff** involved in entrepreneurship education. Some universities have an official approach for educators and trainers management (see below for examples), others do not have it (e.g. Kaunas, Liège, Lüneburg, Milan).

The **selection criteria** and procedures are far more formal for internal university staff – often through the use of selection committees – as opposed to external instructors for which official selection procedures are rarely employed (e.g. Bucharest). The same applies to staff **evaluation** where internal university staff generally undergoes extensive, regular evaluation procedures, while there is limited formal evaluation for external instructors (see however Bucharest). One exception is EM Lyon where external lecturers are supervised through a mentoring and coaching system with regular discussions and reflections.

Several case studies show the importance of approaches for **educating the educators** and related initiatives for staff development (e.g. Huddersfield, Kaunas, Lund). Examples of methods used include internal and external training, coaching or consulting services, workshops, events and conferences as well as mentoring, peer evaluation and team teaching (e.g. Huddersfield, Kaunas, Kozminski, Linz, Southern Denmark and Tampere). Some countries have a dedicated national institution for educating entrepreneurship educators, such as Enterprise Educators in the United Kingdom¹³.

- The **University of Huddersfield** applies the following methods for educating the educators: (1) Informal information through talks at networking events; (2) Internal consulting on demand in response to inquiries; (3) Internal workshops for open audiences; (4) External training as Best Practice Workshops; and (5) Internal and external conference participation in entrepreneurship education. These initiatives aim at encouraging and empowering educators to teach EE themselves.
- When a new course is introduced at **Kozminski University**, a course leader prepares the course materials and runs a pilot course for students in which other lecturers participate. Newly recruited teaching assistants always start with participating in a course run by an experienced lecturer. Moreover, according to recently adopted university-wide regulations, Heads of Chairs are obliged to regularly inspect teaching of all staff and give their inputs.
- In terms of educator management, the Sten K. Johnson Centre for Entrepreneurship at **Lund University** runs meetings and seminars for discussing and sharing pedagogical beliefs. The

¹³ See <http://www.enterprise.ac.uk>.

programme director is responsible for introducing staff to educators. Extensive management is required for the mentors who play a crucial role in the programme encompassing the acquisition of individuals, effectuation and evaluation of the process. Introductory meetings with all mentors, where responsibilities are discussed, are held at the beginning of a new programme.

- At the **University of Osijek**, in order to build up competent staff, the method of “shadowing” is used: Younger faculty members are assigned to experienced external lecturers, building up competence by visiting the classes and working together with the external lecturers. Another key element for educators’ development is the training sessions carried out mostly by international staff, either in Osijek or abroad.
- At **Tampere University of Applied Sciences**, the EE unit named Y-kampus provides training for all types of teaching staff, including those from third party organisations. The education for EE coaches comprises three topics: (1) From educator to coach; (2) Coaching tools; and (3) Personal coaching philosophy.

Managing student support

In most case universities, **external partners** provide student support for aspiring entrepreneurs (e.g. start-up consultants, incubators or accelerators; see also section 3.5 on external stakeholders). This is due to limited university funds for university-based support. In some cases student support activities are consequently also managed by external partners (e.g. the National Institute for Entrepreneurship and Innovation in Kaunas which is located at the university). At times these support activities are directly linked to and promoted by the university through co-operation and active encouragement for participation or integration into curricular offers (e.g. Junior Achievement for Bucharest, VentureLab for Liège and Lund). In certain cases, direct coaching, mentoring and support of start-ups is also provided by university staff (e.g. Bucharest, Milan, Southern Denmark) in addition to customised workshops, events and free infrastructure for student entrepreneurs (e.g. via the Career Service and the Entrepreneurship Hub in Lüneburg, via Y-kampus in Tampere).

- The *University of Huddersfield* possesses a unit dedicated to managing student support in the field of entrepreneurship called the Enterprise Team. It supports students and recent graduates in turning ideas into successful businesses. The Enterprise Team also offers a free events series providing an introduction to various aspects of business and self-employment.
- The *University of Liège* introduced a new student status, the “student entrepreneur”, targeted at students aiming to launch an own enterprise. The status provides those students with specific advantages and support in their pursuit of a study programme, by offering them to do parts of their studies through projects related to their start-up, providing infrastructure, research, tutoring as well as privileged access to the university’s incubator and advice. Students can apply for this status for a period of twelve months and later renew the status.

Internal and external network management

Regarding the universities’ **network management**, a distinction has to be made between the internal network within the institution and the external network in terms of interaction with external stakeholders such as alumni, enterprises or other research institutions. Moreover, one has to differentiate between formal and informal networks.

Several case studies have a **university representative** who is responsible for network management (e.g. Kaunas, Lund). In order to establish and maintain close networks, networking events, workshops and activities are organised (e.g. Cambridge, Liège, Lund, “Entrepreneurship in Action” workshops in Lüneburg).

The universities’ entrepreneurial units were generally found to be responsible for the co-operation and co-ordination of **internal networks** (e.g. Entrepreneurship Hub in Lüneburg, IDEA Entrepreneurship Centre in Denmark, Y-kampus in Tampere; see section 3.2.3 and 3.2.4 above). Some cases emphasise the informal provision of internal networking possibilities for (interdisciplinary) students (e.g. Lund).

Concerning **external networks**, the regional entrepreneurial ecosystem plays an important role in numerous universities (e.g. Cambridge, Coimbra, Kosice, Liège, Linz, Lund, Osijek, Rotterdam and Tampere).

- The Demola Network in *Tampere* is a programme for collaboration between students, universities and business partners. It was launched in Tampere in 2008 but is today an international network (e.g. Demola is also employed at Lund University). Demola participants work in a project with a multidisciplinary team to solve real-life cases together with partner companies.
- The *University of Osijek* built up its entrepreneurial ecosystem itself, fostering the establishment of several entrepreneurship-related organisations in the university's proximity.

Not all universities seem to tap into co-operation with alumni entrepreneurs. One insightful practice in this respect is Linz University which currently collects data about its alumni in order to keep track of their careers and entrepreneurial behaviour.

At the case universities there is **limited collaboration with other universities** in terms of EE, which may be a result of competition for students and financial resources.

- One example of how regional co-operation between universities can be fostered is *Tampere University of Applied Sciences*. Unipoli Tampere is an initiative for greater co-operation between higher education institutions in the Tampere region. Its aim is improved quality of education, more efficient use of university resources, and international promotion of the Pirkanmaa region as a centre of knowledge-based development.

Some case universities possess specific **formal networks** for university entrepreneurs (e.g. FABIZ Entrepreneurs Club in Bucharest, The Sustainable Business Hub in Lund) whereas others have university or alumni networks with no direct focus on entrepreneurship (e.g. Lüneburg).

- One example of a formal network for university entrepreneurs is the "Entrepreneurial Society of Lund University" which was formed in 2013 as an invite-only network to gather entrepreneurs in Lund for guest lectures, research cases and for spreading knowledge of entrepreneurship. It invites entrepreneurs from the Lund region for meetings on entrepreneurial topics, such as "Africa as a new market" or "growth of small and medium-sized enterprises".

In contrast, several universities emphasise an **informal networking culture** where external partners such as alumni or entrepreneurs are contacted as needed, e.g. for guest lectures (e.g. Huddersfield, Liège, Linz, Lund). Start-up or founder cafés may serve as meeting point for informal networking (e.g. Linz).

- One example for a profound informal networking culture is *Cambridge University*. The Centre for Entrepreneurial Learning manages its network on the basis of trust. A close relationship with all network partners is kept through regular contacts. Each programme has its own list of network partners. The Centre acquires new partners mostly through recommendations from current network partners.

Management of curricular integration

Management of curricular integration relates to integrating entrepreneurship courses into accredited study programmes and co-operating with other academic disciplines. Moreover, it includes the marketing of entrepreneurial offers for attracting students. At the case universities, information about the management of curricular integration was limited. Co-ordination and integration of courses in accredited study programmes is usually organised via the universities' central entrepreneurship units, centres or chairs, either in isolation from or in co-operation with the university management. Since most entrepreneurship offers take place at the business faculties, the integration of EE courses is most advanced within their programmes (e.g. Liège). At times entrepreneurship education offers are part of degree programmes.

- The *Erasmus University Rotterdam* which integrates entrepreneurship minors in Bachelor programmes. For Bachelor students, the Rotterdam School of Management and the Erasmus School of Economics offer two campus-wide electives to undergraduates: a) Minor Entrepreneurship and New Business Venturing and b) Minor Entrepreneurship in the Modern Economy.

- Another example is Linz University with its courses “Entrepreneurial knowledge for students from science, and engineering” and “Entrepreneurship in the creative industry” for bachelor students in the mentioned areas.
- At *University of Lüneburg*, entrepreneurship courses are integrated in numerous study programmes, for example in various Bachelor study programmes where entrepreneurship is an integral part of “complementary studies”, and in several Master programmes in the fields of business, economics and education. Entrepreneurship courses are also integrated in the professional school’s extra-occupational certificate courses, namely in the study programme “Innovation Management” as continued education.
- The *University of Southern Denmark* uniquely points out the explicit goal of implementing at least one compulsory EE course in each accredited study discipline in an entrepreneurial and innovation-oriented content.

Several universities do not possess a formal approach for the integration and co-ordination of EE offers. Instead, educational units act autonomously and courses are integrated in an ad-hoc manner.

Concerning the **marketing of EE offers** to students, some universities apply tailored approaches course by course (e.g. Milan, Southern Denmark). Marketing activities include professors’ presentations of the courses in advance to students (Milan), announcements at the university’s website or in university-wide newsletters, promotion events (e.g. Milan) and posters (e.g. Southern Denmark). Such activities usually emphasise the strengths of the entrepreneurship offers and the expected benefits for the students (e.g. credit points, competencies).

- The *Polytechnic University of Milan* markets its EE offers by presenting the contents of the three courses to students and highlighting the benefits of attending the whole stream. The presentation of the stream and of its courses by the professors usually lasts between 15 and 30 minutes and takes place at the beginning of the second study year. Programmes are further marketed through the University’s website and through an ad-hoc event that takes place some weeks before the course starts. This event is organised to discuss topics related to entrepreneurship and present the course. Prospective students are invited to attend the event using both the University’s mailing list and website. In marketing the activities, the experience-based approach is highly emphasised as the main strength of the EE offer.
- *Tampere University of Applied Sciences* conducts three basic types of activities for attracting students: (1) Entrepreneurship-centred events and happenings (one or two per month), which are a marketing device for increasing awareness among faculty members and students for entrepreneurship offers; (2) Nine different course programmes on entrepreneurship for beginners as well as advanced students lasting between three and six months; and (3) Mentoring and coaching of nascent (student) entrepreneurs.

Evaluation of courses and programmes

Mechanisms for feedback and **evaluation** of entrepreneurship education were found to be diverse and manifold. Numerous universities emphasise the importance of evaluation and feedback for the modification and continuous improvement of its educational offers (e.g. Cambridge, Dublin, Lund and Milan). Examples of **forms of evaluation** offered include (1) standardised evaluation tools and questionnaires (e.g. Cambridge, Coimbra, Lüneburg, Milan, Southern Denmark, Tampere); (2) Official course evaluation and accreditation committees (e.g. Cambridge, Dublin, Lund); (3) Evaluations of pilot programmes (e.g. Dublin); (4) Focus groups (e.g. Liège); and (5) Regular feedback and evaluation meetings with students and internal and external instructors (e.g. Cambridge, Linz, Tampere). Further illustrations of evaluation mechanisms include the following:

- *Cambridge University* strictly monitors and assures the quality and alignment of its curricular entrepreneurship offers through the university’s teaching and admission committee, the degree committee and the review board. Members of the teaching and admission committee include all teaching staff involved in the programme, a student representative and an academic representative from the university. The degree committee is even wider and includes additional faculty members. Next to that, the accreditation committee is responsible for the accrediting process of EE. To obtain further feedback on its educational activities,

external partners and participants convene to reflect upon a programme after its termination. In order to evaluate the participants' opinion on the programmes in a formal manner, all students are asked to fill out a standardised, online feedback form at the end of a course.

- The *University of Liège* possesses a focus group for programme evaluations which involves representatives from the Management School, former students, entrepreneurs and two external academics. A commission is responsible for the redesign of the programmes. Key performance indicators for the impact evaluation encompass the number of start-ups and respective jobs created.
- At *Tampere University of Applied Sciences*, courses are extensively evaluated through the University's quality, assessment and feedback system. Students' feedback is discussed annually in the performance analysis of degree programmes. After each course, it is possible to give feedback through the electronic feedback system in the University's intranet. Moreover, a uniform student feedback form about the whole degree programmes is collected from all graduating students.

Feedback to students

Formal feedback to students

The case universities apply a variety of types of formal evaluation of students' learning outcomes and related feedback to students in entrepreneurship courses. These can be divided into eight **categories**: (1) Written final course exams which can comprise exercises close to business practice or scientific theories; (2) Oral presentations, e.g. in the form of elevator pitches; (3) Development of business plans and related reports; (4) Academic essays; (6) Logbooks about the learning process and reflective journals; (7) Participation (online or presence-based); and (8) Other assessment (e.g. short written tests, course work, synopses).

Formal evaluation is mostly carried out in a traditional way, i.e. in the form of exams, the presentation of business plans and additional course assignments. Such evaluation can be of written or oral nature. Feedback other than that is scarce; hence the offer of weekly voluntary, non-credited assignments to obtain a preliminary feedback at Cambridge is considerable. The Polytechnic University of Milan provides a "revise and resubmit" option to obtain a better mark and "evaluation committees" composed of both academics and practitioners are employed.

Some universities strive for assessments as close to reality as possible, for example in business plans and exercises close to business practice. Milan puts special focus on this aspect, accordingly presentations of business ideas are designed in form of elevator pitches. Formal evaluation, however, also faces challenges. Intangible values, such as the entrepreneurial mindset are hard to assess and the methods employed for evaluating learning outcomes are very limited with regard to the diversity among students.

In cases of **teamwork**, the performance is either evaluated for student groups collectively or on an individual level. Rotterdam and Tampere University set assignments without grading on a pass-or-fail basis.

The evaluators of learning outcomes can be divided into three **groups**: (1) academic staff; (2) Practitioners (i.e. entrepreneurs, business manager, venture capitalists, business angels, business consultants); and (3) Peers.

Informal feedback to students

Informal evaluation of students' learning outcomes is a distinct part of EE at about half of the case universities. The extent to which it is carried out differs greatly. It usually takes place in class when educators and students provide feedback on course assignments and performance. Feedback is often presented in form of **coaching by the course instructors** or in moderated team discussions and in **peer-review assessment**. The scope of informal feedback can be limited depending on the class size; thus formal evaluation instruments tend to occupy centre stage in larger groups.

At some universities feedback regarding project contents and communication skills is not only provided by educators and fellow students, but also by **external partners** involved (e.g. Lüneburg, Milan, Linz, Southern Denmark).

- *Lüneburg University*, for example, has implemented a breakfast event for a reflection upon the contents and experiences of the recent module during which students can also get in contact with successful start-up founders.
- At the *Polytechnic University of Milan* guest speakers provide students with suggestions after listening to the synthetic presentations of their business ideas.
- *Linz University* provides informal evaluation of student learning by different sorts of people in various informal course settings. Apart from classical in-class feedback by students and instructors, bilateral meetings with the instructors are scheduled for individual assessment before specific course milestones. Entrepreneurs are involved in business planning courses so as to offer discursive feedback to students' problem analysis and their process to derive management implications. Moreover, the business plans prepared in the course are submitted to a nationwide business plan competition ("i2b").
- At *Tampere University*, emphasis is put on informal feedback discussions and dialogues than on any formal evaluation through exams, even replacing these entirely.

Management of continued education

Continued education is addressed by approximately half of the examined case universities (e.g. Denmark, Huddersfield, Liège, Lüneburg and Rotterdam). In terms of the **management** of continued education, little information can be obtained on employed concepts, events or training offers. Some universities (e.g. Kaunas, Tampere) explicitly state that they do not focus on continued education or an approach to its management.

- The *Polytechnic University of Milan* has a concrete approach to continued education. As part of its Start-up Programme it organises free events and short, for-pay courses between one to three days on entrepreneurship topics, such as Business Planning or Financing through Crowdfunding, for aspiring entrepreneurs.
- The *University of Lüneburg's* Entrepreneurship Hub has developed an educational concept for a Massive Open Online Course on entrepreneurship education in co-operation with Deutsche Telekom. The lecture series "Spirit of Entrepreneurship" aims at integrating alumni in entrepreneurial activities. Moreover, the Entrepreneurship Hub organises workshops with regional SMEs to create new business ideas and innovations and to raise awareness for intrapreneurship.

3.3 Extra-curricular activities in entrepreneurship education

3.3.1 Introduction to findings about extra-curricular activities

Extra-curricular entrepreneurship education refers to activities such as business plan contests, entrepreneurship clubs, and start-up training that are offered by higher education institutions but do not belong to regulated or accredited degree or other formal study programmes. Extra-curricular activities are optional and students do not gain formal credits for participating in these activities, e.g. within the ECTS system. **Data collected on extra-curricular activities** in the 20 cases does not feature the same breadth and depth as compared to curricular entrepreneurship teaching. This is because curricular activities were found to be much more comprehensive and detailed.¹⁴ Notwithstanding the university cases allow for the exploration of a number of interesting extra-aspects and issues.

Overall, there is a multiplicity of diverse extra-curricular entrepreneurship activities occurring at the universities in the sepHE study. This may likely be because of two different reasons: first, the different characteristics of the 20 higher education institutions (e.g. faculty profile and resources, stakeholders in their region) and second, the very nature of extra-curricular teaching itself with regard to its informality and flexibility beyond regulated degree programmes. From

¹⁴ There are also some cases where extra-curricular entrepreneurship education is centre-stage, for example Rotterdam, Kosice, and Cambridge.

the cases studied, the heterogeneity of extra-curricular entrepreneurship education appears to be both opportunities as well as challenging issues to be put forth in the following sections of chapter 3; these issues will be discussed further in the conclusions sketched out in chapter 4 of this report.

Not being tied to specific degree programmes, extra-curricular entrepreneurship activities may cater for many different **target groups** (section 3.3.2) both outside and inside higher education institutions. The **design** (3.3.3) of extra-curricular activities encapsulates a tool box of many different formats and contents. The **educators** (3.3.4) and instructors delivering extra-curricular entrepreneurship typically come from different contexts. Finally, in the **management** (3.3.5) of extra-curricular EE education institutions will need to appreciate not only the crucial role of individual actors but also the general fragility of the inventory of extra-curricular entrepreneurship activities. Specific observations and particularly important findings will be highlighted at the end of each of the abovementioned sections.

3.3.2 Target groups of extra-curricular EE activities

Definition

The target groups of extra-curricular entrepreneurship education may comprise more differentiated sets of people, reflecting that these entrepreneurship activities may not have the same strict access requirements as accredited degree programmes. Participants in extra-curricular EE activities may thus not only be enrolled students but also other members inside higher education institutions, e.g. staff, as well as external stakeholders, e.g. nascent entrepreneurs in a university's region. Often, extra-curricular activities are deliberately directed at, or attract audiences from various target groups. These groups may be segmented in different ways, e.g. according to academic discipline and department affiliation (science and engineering, humanities and arts, and in particular business and non-business faculties), status of study (current students, graduates, alumni), level of education (bachelor, master, PhD), and socio-economic characteristics of participants (gender, ethnicity, occupation and self-employment).

Audiences of extra-curricular EE

Since extra-curricular EE is not bound to institutionalised and accredited degree programmes, not surprisingly the case universities have a **multiplicity of extra-curricular entrepreneurship education offers** in store for a range of target groups; however, the main target groups (in terms of participant numbers and frequency of offers) are similar to curricular entrepreneurship teaching. These groups regularly include undergraduate, postgraduate, and PhD students. Target groups are less often defined around university staff and external people from outside the campus (in particular alumni, entrepreneurs, small business managers, entrepreneurship educators, and students from other HEIs) and only rarely around gender and diversity characteristics (such as *EnterpriseWISE* for female scientists at Cambridge).

Externals are often involved in mixed audiences together with enrolled students, e.g. formats that bring together students and companies in innovation projects as at Southern Denmark or Kosice and broader entrepreneurship offers involving the community in the university region like Enterprise Tuesday and Day@theCampus in Cambridge and Rotterdam. Occasionally, extra-curricular offers also address certain external audiences such as school pupils or people from the creative industries. However, specific elaborated programme offers in continued education for external target groups, e.g. for start-up entrepreneurs and small business owners, seem less widespread as compared to EE activities for students. However, there are exceptions, e.g. specific entrepreneurship training in course or workshop formats in small business and corporate entrepreneurship at Erasmus University Rotterdam and Cambridge University as well as extra-curricular start-up and venture coaching for regional entrepreneurs, e.g. at the case universities in Kosice, Milan, Linz, and Southern Denmark as well as others.

Internally, extra-curricular offers for bachelor and master students are most prominent, mainly for those from social science - in particular business economics - as well as engineering and natural science. Formats targeting audiences from humanities and arts have been reported to be (still) less common. There are specific offers, e.g. in cultural or social entrepreneurship (e.g.

at Lüneburg, Ljubljana, Lyon, Osijek, and Rotterdam) and venturing in the creative industries (e.g. at Kozminski), which aim at students from these as well as other academic disciplines.

Overall, a common theme across the cases is the **broadness of defined internal target groups** of individual extra-curricular activities. Many offers are open to students from all disciplines and departments on campus. Typical extra-curricular formats corresponding to these broad target groups entail activities for raising initial entrepreneurial awareness and thinking, platforms for pitching entrepreneurial ideas and business plans, as well as networking and start-up counselling formats. While less common across the cases, there are also examples of more specific internal target groups (and corresponding extra-curricular EE formats tailored to these groups):

- PhD students, research and teaching staff: offers for doctoral students and staff mostly concern the commercialisation of research and developing business ideas for example in technology entrepreneurship, e.g. Innovator at Kozminski University, Science Innovator at Southern Denmark, Summer School with TUTECH and Think Tank at Lüneburg or Enterprisers and EnterpriseWISE at Cambridge, but also broader enterprising projects (Collabhub at Huddersfield) and entrepreneurship teaching (European Entrepreneurship Education Workshop at Lund, Professors Summer School at Valencia).
- Students from specific faculties and academic disciplines: e.g. formats such as Designværk at Southern Denmark and Innovation and Creative Exchange (ICE) and Honeypot at Huddersfield that bring together engineering, design, and arts students to transform creative ideas into a business context.

Specific characteristics and observations

Two strategic issues are imminent with regard to target groups of extra-curricular entrepreneurship education in the cases – cooperation and scalability across disciplines and stakeholders (a) and, in view of the sustainability of extra-curricular EE, targeted for-money education offers to certain target groups (b).

(a) Because of their nature as “add-on” offers in higher education, extra-curricular activities do not per se benefit from institutionalised cross-faculty co-operation in university organisations. Rather than being initiated through an institutionalised process at the university as a whole – which could bring people from different departments and faculties together – often extra-curricular activities are run ad hoc by single entrepreneurship hubs, chairs or even individual members of teaching staff at the case universities (e.g. start-up support activities by staff members at Kosice or events with technology entrepreneurs at Rotterdam). The cases further indicate that extra-curricular EE mostly offers scope for **bottom-up co-operation** across interdisciplinary target groups induced by the activities themselves, e.g. student teams from different faculties developing business ideas or solving social entrepreneurship challenges. For this bottom-up co-operation across target groups, the format and structure of these activities is critical. The case universities do offer extra-curricular activities in which interdisciplinary teamwork and collaboration is encouraged and an integral part of education. However, there are also typical “open-to-all on campus” activities. Principally, such activities can be platforms for co-operation but often may simply follow other objectives such as providing an introduction to understanding entrepreneurship in a lecture-type format or counselling offers to support individual start-up founders.

In addition, the case universities often appear to scale activities to external students from other universities and stakeholders. Many extra-curricular formats are also open for students and (nascent) entrepreneurs as a platform for regional cooperation and **scalability** in higher education. For example, the *Graduate Entrepreneurship Project* at Huddersfield or *Leapfrogs* at Lund both provide support to student start-up teams from their own university and from other HEIs in their region for an extended period of time to really bring forward student venture projects.

(b) In view of the challenge to sustain entrepreneurship education offers in general and extra-curricular EE in particular in entrepreneurship centres over time, the target group approach of Erasmus University Rotterdam may provide a way forward. Beyond university members (students and staff) and people from outside the campus as start-up founders, Erasmus University has added small business owners, established entrepreneurs, and business managers (e.g. in innovation and business development) to its portfolio of target groups. The Erasmus

Centre for Entrepreneurship offers for-money training and workshops in entrepreneurial management and leadership to this group interested in continued education within corporate entrepreneurship. This extension of traditional target groups of EE contributes to the **sustainability** of entrepreneurship education itself and offers university faculties a path for valorising their academic expertise in entrepreneurship.¹⁵

3.3.3 Design of extra-curricular EE activities

Definition

The design of extra-curricular EE entails the objectives of individual entrepreneurship activities, typical formats and contents (e.g. networking activities within start-up support, business idea challenges or social entrepreneurship projects), and their setting, for example in terms of timing and use of methods (e.g. one-day or weekend events versus courses running throughout the semester).

Objectives of extra-curricular activities

The **general aims** and educational objectives of extra-curricular entrepreneurship education activities appear to be **fairly similar to curricular offers** (see Section 3.2.3 above): activities aiming for opening participants' minds and introducing them to entrepreneurship in a broad sense; and EE offers focusing on developing singular skills and bundles of competencies relevant for different phases within an abstract entrepreneurial process of turning ideas or inventions into business concepts - as business models and plans or innovations - and focal venture projects.

Opening minds for entrepreneurship is typically delivered in activities introducing participants to fundamental principles of entrepreneurship. This is often around a certain theme (e.g. technology or social entrepreneurship), opportunity (e.g. to collaborate with start-up companies), or event (such as idea challenges or business competitions). Having such extra-curricular activities, which offer opportunities for gaining practical experience in entrepreneurship, seems important in view of the need to provide additional incentives to participate in extra-curricular education - see the discussion of incentive issues in the section on the management of extra-curricular activities below. Extra-curricular EE serves the important function of providing practical insights into entrepreneurship that curricular education sometimes cannot or does not yet offer, e.g. because of degree programme regulations or a lack of teaching resources for practice-oriented curricular courses. For example, at the Technical University of Kosice extra-curricular offers are considered as chances for students to become active and practice their entrepreneurial (and) business skills during their studies.

The main emphasis of efforts to **develop students' entrepreneurial competences** in extra-curricular activities at the case universities is on the nexus of entrepreneurial idea generation and turning these ideas into business concepts and venturing projects. This comes about on different bases (e.g. based on scientific inventions, innovative product ideas, or student-led entrepreneurial opportunities), in different forms (e.g. business concepts, models, or plans), and with different outcomes (establishing campus or student start-ups, preparing business plans or idea sketches).¹⁶

However, bearing in mind the flexibility of extra-curricular EE to craft offers also for enterprising behaviour in broader societal and business contexts, there is potential for the further expansion of igniting entrepreneurship beyond the objective of start-up entrepreneurship. Good examples for this broader focus are the various social entrepreneurship offers outside the regular curriculum at Lyon and Rotterdam, as well as, in particular with a range of activities, Lüneburg and Osijek. Further down the road of the entrepreneurial process, there are also offers that focus on solving entrepreneurial management problems in existing business, either for students in co-operation with business owners and entrepreneurs (e.g. *Student2Start-up* at Lüneburg) or

¹⁵ For details see the single case study on Erasmus University of Rotterdam. Similar for-money offers for different target groups also from outside the university exist, for example, in Cambridge.

¹⁶ See the next sub-section on formats and contents for examples.

for business managers and entrepreneurs themselves in further education (e.g. *Training Reeks* in entrepreneurship at Erasmus University Rotterdam). Overall, expanding **entrepreneurship further to distinct themes such as social, eco or green, and cultural entrepreneurship** and to also integrate **small business and corporate entrepreneurship** may allow to attract novel target groups within and around universities (e.g. from the humanities) outside the business context and the genuine domain of start-up venturing.

Formats and contents of extra-curricular activities

Given the open, bottom-up nature of extra-curricular EE at the case universities there is a wide variety of different formats and core contents. About two thirds of the case universities were found to have guest lectures or workshops as well as start-up competitions and awards. Half of the cases carry out entrepreneurship fairs, and a quarter has entrepreneurship clubs.

There are many insightful examples of extra-curricular EE practice in the cases of the study. Two examples may be particularly worth highlighting. "With Creativity and Innovativeness to an Enterprising Mindset" from the University of Ljubljana (Slovenia) introduces primary school pupils (aged between 12 and 15) to innovative problem-solving (based on the design thinking method) and getting active in real projects relevant to their daily lives. "Get Started" from Erasmus University Rotterdam (The Netherlands) is a ten-week programme created specifically to empower ambitious first-time start-up entrepreneurs in a group-coaching format with university staff and experienced entrepreneurs (see the two respective university cases for details). These activities, likely not yet well known, address the broader theme of building entrepreneurial mindsets as well as start-up entrepreneurship, and feature an interesting approach to integrate the community of entrepreneurs as instructors and coaches. Beyond these individual offers, frequent extra-curricular activities at the case universities include (often overlapping) formats:

- For raising initial entrepreneurial awareness and encouraging entrepreneurial thinking among students and other people: e.g. *Enterprise Tuesday* at Cambridge, *AZU* at Kosice, or *You can start a business* at Valencia.
- For developing and pitching business ideas and plans: e.g. *Startup Sauna* at Kaunas, *Venture Cup* and a *Entrepreneurship Summer School* at Southern Denmark, *24h Business Plan Camps* and *Start-up Weekends* (at Southern Denmark, Rotterdam, Ljubljana, and Kosice), *Honeypot* at Huddersfield, *Business Creation Competition* at Cambridge, *Switch2Product* at Milan.
- For networking and student start-up support: e.g. *Founders Fairs and Cafes* at Liege and Linz, *How to start your own business* at Warsaw, *Start-up Support* and *Graduate Entrepreneurship Project* at Huddersfield, *Leapfrogs* at Lund, *Student2startup* at Lüneburg, *Get Started* at Rotterdam as well as various start-up counselling formats for students (e.g. at the universities in Kosice, Linz, Milan, Rotterdam, and Linz through centralised entrepreneurship education units such as institutes, centres, or hubs).
- For solving societal (e.g. social, ecological or technological) challenges: e.g. *Entrepreneurs Without Borders* and the *Community Work Programme* at Osijek, *Enactus* and *SCHub Lectures* at Lüneburg, *EMicrocredit* at Lyon, *SEM social entrepreneurship* at Rotterdam or the series of *Design Thinking* activities at Ljubljana.

Methods and media in extra-curricular activities

In these course-type activities running over an extended period of time the case universities seem to put substantial efforts in coaching and mentoring participants as they work through entrepreneurial challenges and prepare course outputs. This is not only between meetings in class but also during class sessions where instructors take a **coach or moderator role** in EE, rather than a traditional lecturing role. Such a **flipped-classroom approach** (e.g. in *Get Started* at Rotterdam) is considered to be a good way to maximise time for interactive discussion, application of entrepreneurial management tools, and solving entrepreneurial challenges in class while leaving initial learning and familiarisation with theoretical concepts for studying at home. **Blended learning** does play a role to some extent at the case universities in this context as content is provided online and also online feedback and instruction elements are used occasionally (e.g. via moodle or blackboard systems). However, fully-fledged **extra-**

curricular online courses in entrepreneurship have only been reported very rarely (e.g. a Massive Open Online Course (MOOC) on entrepreneurial spirit development at Lüneburg or distance learning tools within entrepreneurship training courses employing a flipped-classroom approach at Rotterdam). This is likely a domain of future growth, in particular, offering opportunities for higher education institutions to scale their extra-curricular EE to widespread target groups outside their own campus.

Specific characteristics and observations

With regard to the different formats identified in the cases there are two issues of particular strategic relevance for the management of extra-curricular EE activities. These issues may be important for higher education institutions and likely also for further education policy support. The issues are centred on the flexibility in designing individual extra-curricular activities and integrating them into an entrepreneurship teaching portfolio in addition to curricular offers. This flexibility (or indefiniteness) to design activities outside a set curricular programme of study provides opportunities and poses educational challenges at the same time.

(a) As extra-curricular EE activities do not have to go through an institutionalised process of accreditation and administrative establishment in the same way as curricular offers (e.g. concerning departmental resource decisions on long-term teaching resources and assessment), they are reportedly more flexible and somewhat easier to set up in the first place.¹⁷ This offers scope for education institutions without a tradition in entrepreneurship education and only a narrow range of curricular entrepreneurship courses to **jump start, showcase, and build entrepreneurship activities through extra-curricular offers**. For more established institutions, it allows augmenting their curricular EE offers by expanding and tailoring especially practice-driven EE offers to different target groups on campus and in their region. In particular, the case universities frequently **leverage EE through** offering and integrating **extra-curricular entrepreneurship activities organised by external others**, for example initiatives like *Startup Weekend*, *Entrepreneurs Without Borders*, *Junior Achievement*, and *Enactus* as well as various national and international business idea and business plan competitions (e.g. *Venture Cup* in Denmark and Lund, *Arrisca C* and *Cre@tive C* initiatives in Coimbra or *i2b* in Austria or overseas competitions such as the *Richards Barrentine Values and Ventures Business Plan Competition* or a *Silicon Valley Business Plan Challenge* where students from Osijek and Kaunas took part). Reportedly, such contests and competitions allow the effective use of teaching resources by employing established formats and existing organisational infrastructure while focussing teaching efforts on coaching students throughout the activity and navigating the learning process (particularly when an external activity such as a business plan competition is integrated into a larger entrepreneurship course format such as a business planning course). These “third-party” activities and also self-developed **extra-curricular EE offers provide scope for experimenting with and tailoring formats and contents** for different target groups over time so as **to identify suitable activities** in terms of attractiveness for students and other target groups, achievable learning outcomes, scope for co-operation with external stakeholders, and overall reach.

(b) The substantial **heterogeneity of extra-curricular offers in terms of objectives and educational formats** (content taught, method use, and audience) is most notable and striking across the cases in the study. However, this heterogeneity bags the **issue of choosing and tailoring the various elements of educational formats adequately** for corresponding course objectives, target audiences, and envisioned learning outcomes which can all be “sliced and diced” in different ways. Often those universities offering a broad range of extra-curricular EE activities themselves have reportedly structured their offers – either implicitly or explicitly – alongside a process, e.g. of an entrepreneurial career path or life cycle (at Lüneburg and Rotterdam) or of venture project stages (Valencia). A particular example is the *Entrepreneurial Journey* concept pursued by the Centre for Entrepreneurial Learning at Cambridge embracing extra-curricular activities from initial inspiration across intention, information, and implementation towards entrepreneurial growth. Such structures not only allow to position and market extra-curricular EE to different stakeholders, but may also help to develop a clear focus

¹⁷ Note though that at the same time this may make it harder to sustain them over time as they lack such initial curricular institutionalisation (compare the discussion of sustainability and incentive issues).

on learning objectives and corresponding formats and teaching methods in each phase of the journey.¹⁸

3.3.4 Educators of extra-curricular EE activities

Definition

People from both inside and outside universities may be involved in extra-curricular entrepreneurship teaching. Members of academic staff who serve on the regular curriculum may also contribute to extra-curricular activities, for example acting as coaches or instructors. This is sometimes also the case in team-teaching with external stakeholders in EE, such as entrepreneurs or business people who, at the same time, may also have roles in curricular entrepreneurship teaching. In particular, student associations or organisations may themselves be active in delivering extra-curricular entrepreneurship activities to their student peers.

People involved in teaching extra-curricular EE

The **types of educators** of extra-curricular entrepreneurship activities in the 20 cases have different backgrounds and come from different professional fields. While also teaching entrepreneurship curricula at their institutions, **university staff** is often involved in extra-curricular entrepreneurship teaching, for example people from entrepreneurship institutes and chairs (e.g. at Linz, Kosice, Ljubljana or Rotterdam) or entrepreneurship hubs and centres (e.g. Milan, Lüneburg, or Kozminski). Also, **students** themselves - often within the context of student associations engaged in entrepreneurship - regularly participate in organising and delivering extra-curricular EE (see the section on specific characteristics at the end of this section). Externally, the case universities frequently take **entrepreneurs** on board as educators in a substantial way, e.g. in coaching or mentoring student teams and moderating entrepreneurship workshops over a number of sessions beyond one-off events with mere guest speaker roles for entrepreneurs. These entrepreneurs may come from the local entrepreneurial ecosystem of the university, often alumni entrepreneurs (e.g. in *Ignite* at Cambridge with its fertile Cambridge “technopole” region or *Get Started* at Erasmus University Rotterdam), but also from the broader national context (e.g. in Slovakia at the Technical University of Kosice within the *AZU programme*). With regard to the broader entrepreneurial support infrastructure, the case universities also integrate **other practitioners** such as start-up consultants, incubator staff, investors, as well as trainers and business managers in different forms of teaching and segments of extra-curricular activities. These external professionals typically teach on specific functional areas or entrepreneurial management problems such as legal and technology issues or finance and marketing.

The **forms and roles** in which academic staff and external instructors from entrepreneurship and business practice are engaged in extra-curricular teaching vary. University staff is frequently coaching student teams or individual students in different settings: coaching groups of students in tackling entrepreneurial management challenges at start-up enterprises or in setting up social entrepreneurship projects (e.g. at Lüneburg and Rotterdam); providing coaching to individual start-up projects of students (e.g. at Bucharest, Milan, Ljubljana, Kosice, Linz, and Huddersfield and others). Often, traditional start-up coaching is also provided by people from outside universities, e.g. by business consultants (e.g. in the *How to start your business* activity at Kozminski University and also at other universities) and entrepreneurs themselves (e.g. in the Start-up Sauna accelerator programme at Kaunas or in *Get Started* and *Get Business* at Rotterdam).

Specific characteristics and observations

The central issue with regard to the people outside of extra-curricular EE is the participants’ **benefit** both in terms of (a) external instructors from entrepreneurship practice and (b) the engagement of university members including the opportunity to involve students themselves in running entrepreneurship activities.

¹⁸ See CfEL Annual Review, 2011 and the case on the University of Cambridge in this study.

(a) In the case studies, two typical benefits have been reported. First, the **integration of external teaching staff** (in particular from the university region) **helps to familiarise students with typical entrepreneurial management and resource acquisition challenges** together with possible solutions and the support infrastructure for entrepreneurship already in their studies. For example, at Johannes Kepler University Linz start-up consultants from the economic chamber, local incubator managers, and entrepreneurs are integrated in teaching both extra-curricular and curricular courses as well as in start-up consulting. In addition to learning about immediate sources of support for potential (later) self-employment of students, university graduates often follow career paths in these sectors of the entrepreneurship infrastructure in Upper-Austria they know from their studies. The second benefit pertains to the **typical motivational aspect of local entrepreneurial role models visible in entrepreneurship teaching**. This has been reported e.g. at Kosice where Slovakian entrepreneurs serve as coaches and lecturers in the *AZU programme* that develops students' inter-personal and management skills through entrepreneurship including the pitching of business ideas.

The critical issue in all this appears to be the universities' ability to **establish a pool of suitable entrepreneurship educators from practice to select from over time for their extra-curricular activities**. Where the regional entrepreneurial ecosystem as a source pool of entrepreneurship educators (both academics and instructors from entrepreneurship practice) is just developing, universities established co-operation projects with higher education and professional institutions at the national and international level. An example for this approach to enlarge one's pool of entrepreneurship educators and concepts is Kaunas University of Technology cooperating with foreign universities (Aalto, Finland; Berkeley and Stanford, US) to engage educators, build teaching concepts, and run venture support programmes together.¹⁹ At Kosice, professionals from the Slovakian Union of Young Entrepreneurs teach entrepreneurial management workshops and coach student venture teams within the *AZU programme*. Within the group of universities (such as Linz and Cambridge) with a strong regional entrepreneurial ecosystem and support network, Erasmus University Rotterdam has developed an insightful approach of engaging a whole **community** of entrepreneurs **both participating in entrepreneurship education and acting as coaches and instructors** (see the Get Started Programme in Rotterdam).

(b) Unlike curricular education in the context of formal degree programmes, **extra-curricular entrepreneurship activities open the door for student associations, initiatives, and organisations to take active co-ordinating and even teaching roles in entrepreneurship education**. Student associations present in extra-curricular activities are sometimes local institutions on campus at the case universities, for example *ECE Students* of the Erasmus Centre for Entrepreneurship at Rotterdam, *CUE – Cambridge University Entrepreneurs*, or *EMicrocredit* at Lyon. However, there are also (inter-)national student organisations with local branches or origin such as *AZU* at Kosice, *FENA* at Lund, or *EWoB* at Osijek.

As for extra-curricular EE in general, the activities offered by student associations vary across the case universities. That said, there seems to be a focus on activities such as idea and business plan competitions and games or networking events (e.g. *CUE*, *FENA*, *AZU*, *Junior Achievement*, *ECE Students*), some with a particular goal like fostering projects in social entrepreneurship (e.g. *Enactus*, *EWoB*, or *EMicrocredit*). In Bucharest, the *VIP* (Volunteers for Ideas and Projects) student organisation is home to three student communities promoting projects in personal leadership training, economic policy and start-up entrepreneurship. Student institutions are typically the organisers and co-ordinators of these activities and often bring in entrepreneurs, business people, and university staff acting as coaches, judges, or presenters. Notably, representatives from the student associations may also be active educators, for example leading project teams working on entrepreneurial challenges and coaching fellow students who participate in an activity. A manager of the entrepreneurship centre at Rotterdam emphasised that the engagement of student organisations (in this case *ECE Students*) is very useful in offering low-barrier activities to raise awareness for entrepreneurship at the peer level on campus. An important element with regard to this is the **actual integration of student**

¹⁹ Note that international educators are also employed in establishing curricular entrepreneurship teaching such as at Osijek.

organisations into the overall co-ordination of EE at higher education institutions. E.g., at Rotterdam, the student organisation is part of the university's entrepreneurship centre itself and aligns its activities with the other activities co-ordinated by the centre's management team. However, there are alternative approaches where student organisations are not immediately linked to or associated with entrepreneurship units at the case universities.

3.3.5 Management of extra-curricular EE activities

Definition

Managing extra-curricular EE in higher education involves the co-ordination of people and organisational networks from within universities and their (regional) environment. Also, management entails the support of students, in particular with regard to their ambitions to engage in start-up and other entrepreneurial projects as extra-curricular activities during their studies.

Organisation of extra-curricular EE and student support

At the case universities, extra-curricular EE activities are **predominantly co-ordinated by specific entrepreneurship units**, i.e. institutions or teams of people such as the *Entrepreneurship Hub* at Lüneburg, *Polihub* at Milan, the *Enterprise Team* at Huddersfield, the *ECE* at Rotterdam, *ADEIT* at Valencia, the *IUG* at Linz, and the *CfEL* at Cambridge. Typically, these units are entrepreneurship centres, institutes or chairs and their staff which is also involved in curricular entrepreneurship teaching and its organisation. Where there is no such unit, extra-curricular activities may also be initiated and organised by individual faculty members who are enthusiastic about entrepreneurship but come from other disciplines (Technical University of Kosice is an example of this).

A main task of entrepreneurship units, sometimes together with individual faculty members, is the **support of students'** entrepreneurial venture projects and career steps. This is typically in the form of individual or team counselling, e.g. by a start-up centre, or regular extra-curricular programmes in which students or staff with a business idea or start-up project can participate. Typical education-related **barriers with regard to starting a business during studies** include time restrictions to engage in a complex task such as starting-up as well as a self-perceived lack of competences and entrepreneurial self-efficacy beyond mere material resource requirements for entrepreneurial venture projects. At some of the case universities specific programmes exist which address such barriers. For example, the *Leapfrogs* programme at Lund allows students to work on their business idea for three months full-time to really make substantial progress. At Rotterdam, a programme has been set up to improve the compatibility of running one's own business while studying (*StEEP*, Students Entrepreneurs Excellence Programme). At Cambridge, different extra-curricular formats explicitly aim to raise entrepreneurial self-efficacy in different target groups such as students and research staff. Together with the university's Career Service, the Entrepreneurship Hub at Leuphana University of Lüneburg currently sets up a *development programme for entrepreneurial students along a "compass of competences"* to guide students towards learning sources, course offers, and stakeholders useful for building a career as an entrepreneur. The University of Huddersfield provides financial and infrastructure resources at the Duke of York Young Entrepreneurs Centre. It also provides coaching to student and graduate entrepreneurs through a continuous *start-up support* programme as well as the *Graduate Entrepreneurship Project* where resources to support entrepreneurship for students and graduates are assembled at the regional level.

Specific characteristics and observations

Two notable issues have been highlighted in the cases by the interviewees with regard to the organisation of and resources for extra-curricular EE (a) and the participation of students (b). Both issues may take root from the optional, informal character of extra-curricular activities.

(a) Extra-curricular EE provides many options to integrate a university's region and its stakeholders flexibly into a wide range of different extra-curricular formats on offer at the case universities. At the same time, universities need to keep an eye on situations where the **continuity of extra-curricular EE** may be fragile. Often, extra-curricular activities appear to

be sustained by the motivation of individual actors, even within established entrepreneurship units. For example, there is teaching staff with regular curricular teaching loads and duties who, in addition, get involved with extra-curricular entrepreneurship activities, e.g. as instructors or coordinators sometimes on a “one-soldier” basis. While this is, of course, also a good form of bridging curricular and extra-curricular EE at the individual level, from the point of view of a university institution such elements of informal, solely personal, co-ordination of extra-curricular EE carry a sustainability issue. This may be, for example, in terms of dependence of education activities on the relationships of individual actors and their commitment. Similar to the dedication of individual people, the resource infrastructure needed to run extra-curricular activities occasionally seems to depend on the support of individuals or single external organisations, e.g. acting as sponsors. While informal extra-curricular entrepreneurship activities or events allow taking on board such singular, one-off forms of informal support, they will need to be managed by higher education institutions to ensure continuity in their extra-curricular branch of entrepreneurship education.

Moreover, the **educational quality of extra-curricular EE** needs to be managed by universities with regard to the informal integration of external teaching staff. For the coordination and integration of people in extra-curricular entrepreneurship teaching from outside entrepreneurship units – be it external stakeholders or university personnel from disciplines other than entrepreneurship – proper briefing, instruction, and training is important. While such training of trainers is not very common especially in extra-curricular teaching, some universities are to set up (Lüneburg) or have established programmes in this context. For example, the facilitators in Cambridge’s *Enterprisers* programme receive one-day training upfront and Valencia offers a *Summer School* for non-business professors from the university and other education institutions to learn about and train entrepreneurship teaching before putting it into practice.

(b) Since extra-curricular education activities are optional by their nature it is important to note that in some cases challenges with **student motivation** and available time resources **to participate in extra-curricular EE activities** have been reported. With regard to this, the cases feature interesting approaches to raise the attractiveness of extra-curricular EE offers. First and most commonly, in the extra-curricular offers typical benefits are promoted. Examples are the development of personal skills (e.g. in the AZU entrepreneurship programme at Kosice), gaining network contacts useful for students’ later professional career, the opportunity to “do good” for society (e.g. in social entrepreneurship activities), or the fun inherent in the activity (e.g. working in teams with other students). Second, in some activities incentives such as prizes and awards or funds for venture projects are provided (e.g. the MOTIVEM awards for students’ entrepreneurial projects at Valencia). The third, more strategic, option employed to make activities more attractive for students is **curricular (re-)integration** so that students can gain credit points for their participation and coursework. This can be immediately at the course level where complete activities are transferred into the curriculum (e.g. at Lüneburg, Lund, Southern Denmark, and – with informal credits in an *entrepreneurship passport* incentive – Liège). Alternatively, typical extra-curricular activities may become elements of curricular entrepreneurship courses. For example, at Bucharest and Kosice (*Junior Achievement*) and Linz (*i2b competition*) student participation in national business plan competitions and idea challenges is integrated in curricular entrepreneurial skills and business planning courses.

3.4 Institutional aspects of entrepreneurship education

3.4.1 Organisational set-up and change

Institutional aspects considered: organisation, formal institutions, and mindsets

The sepHE study considers three types of institutional aspects: (1) organisational set-up and change related to EE, (2) regulation, i.e. laws, statutes and codes related to EE, related incentives for becoming involved in EE in particular, and (3) mindsets of students, staff and university management.

The case studies show that two issues are particularly relevant with regard to organisational set-up and change related to EE: the implementation of organisational units dedicated to

promoting or delivering EE, and the establishment of specific management positions for entrepreneurship and EE.

Organisations promoting or delivering EE

The case studies suggest that there are three **modes of organising EE: centralised, decentralised, and mixed**. Centralised means that there is a central unit carrying out, designing and managing EE, representing a so-called “magnet” approach.²⁰ This includes responsibility for EE resources and acting as a contact point for university members interested in entrepreneurship. EE is decentralised (“radiant approach”) when there is no such hub but several organisational units. In a mixed approach, some EE functions are centralised while others are decentralised.

The majority of the 20 case universities of the sepHE study were found to have a centralised approach. Some were found to have a mixed approach (see Bucharest, Cambridge, Huddersfield and Valencia) and a few have a decentralised approach (see Kosice and Lyon).

The principal entities of a centralised approach may be entrepreneurship centres, institutes or chairs. Examples of case universities with **central units** for supporting entrepreneurship in general, and EE in particular, at the university include the following:

- The University of Southern Denmark has an IDEA institute, organisationally located outside faculties, which co-ordinates entrepreneurial activities and EE throughout the university.
- Kaunas University of Technology implemented an Institute for Innovation and Entrepreneurship in 2012. One of the institute’s experts is in charge of co-ordinating curricular and extra-curricular EE activities at the university.
- The University of Lüneburg has a dedicated “Entrepreneurship Hub” to offer extra-curricular as well as curricular activities, to help to develop the establishment of EE offers across the university, and to support nascent entrepreneurs.

While there is no single best way to organise EE, some advantages and disadvantages were reported in the case studies. Centralisation was assessed in the following ways:

- Centralisation allows accumulation of knowledge and expertise in EE as well as a multiplication effect in training of EE instructors, in particular from non-business backgrounds (see Rotterdam and Southern Denmark).
- Centralisation at a rather small and peripheral unit such as an entrepreneurship chair in the business department may be a barrier to establishing EE campus-wide as a university theme and to acquiring additional resources for entrepreneurship teaching. It may be regarded as the sole academic field of this chair (see the case of Linz).
- A centralised approach may need to be supported by the university’s leaders and may have to aim at implementing EE in the faculties to guarantee sustainability after a period of initial public funding (see Lüneburg).
- Central units play an important role in promoting, developing and sustaining EE across the university, even if their contributions to EE as such are limited. It may not in all cases be adequate to consider these organisational units as representing “hubs” of EE because their influence on what is actually happening in the “spokes” may be limited. However, they may nurture the university’s EE ecosystem in important ways.

The University of Huddersfield has a **mixed approach**. On one hand, it has a central unit, the “Enterprise Team”, for supporting educators in teaching entrepreneurship as well as staff and students in their entrepreneurial activities. However, while the Enterprise Team also provides some teaching sessions, teaching is largely decentralised. This facilitates the diffusion of entrepreneurship education to almost all Schools. It also fosters tailoring teaching approaches for different disciplines with educators from the same disciplines, rather than from the business department or the Enterprise Team.

²⁰ See Streeter et al. (2002) for the distinction between the “magnet” and the “radiant” EE approach.

A de-centralised approach was reported to have challenged co-ordination and the development of coherent strategies for entrepreneurship teaching and support in Rotterdam. The university has recently changed to a centralised approach with a university entrepreneurship centre.

Specific management positions

EE can be institutionalised by creating specific entrepreneurship-related management positions. Such positions may possibly help sustain and further develop an entrepreneurial direction of a university. The University of Huddersfield was the only university in the 20 cases found to have implemented dedicated positions for entrepreneurship in top management: a Pro-Vice Rector for Research and Enterprise as well as a Director for Enterprise.

Specific management positions for EE can be considered as a clear sign that a university takes EE very serious. This may help in promoting EE within a university and it may also help in attracting new students, educators and external stakeholders interested in entrepreneurship. However, vice versa, the non-existence of such dedicated positions may not necessarily mean that the university has no interest in EE. Entrepreneurship may be a pronounced task of a Vice-Rector for Research (e.g. Kaunas) and entrepreneurship education may be a specific task of a Vice-Rector for Teaching without including the term "entrepreneurship" in the title.

3.4.2 Regulations determining incentives for entrepreneurship education

Types of regulations and their impact

Regulations, i.e. **laws, statutes and codes**, play an important role in delivering entrepreneurship education. The sepHE case studies revealed several notable insights. Regulations may, first of all, provide incentives or disincentives to engage in EE on the part of educators and students. They may also determine the extent to which external experts can be engaged or would like to be engaged. Furthermore, regulations may make the importance of EE visible to university members and thus act as a promoter and guide for entrepreneurial thinking and behaviour at the university.

EE codified in strategies

The dedication of a university's top management towards entrepreneurship education may become visible in its **strategy**, which can be considered as a kind of code and "soft" regulation. In approximately half of the case universities, entrepreneurship education is explicitly mentioned in the university's strategy. Selected examples include the following:

- *University of Huddersfield (UoH)*: Entrepreneurship and entrepreneurship education are core parts of the UoH's strategy. One of three aims of the UoH's "Teaching and Learning Strategy 2013 – 2018" is "to inspire employable and enterprising graduates". The two other aims are "to inspire our students to attain the highest academic and professional standards" and "to inspire our students to enjoy an outstanding university experience". "Enterprising Students" is the second of seven "enabling strands" of the overall aims.
- In the development plan of *Linz University* for 2013 – 2018, six fields of excellence are defined. The excellence field "Management and Innovation" includes four areas, one of them "Entrepreneurship in the Economy and Public Administration" (Entrepreneurship in Wirtschaft und Verwaltung).
- At the *Dublin City University Ryan Academy*, the target of fostering entrepreneurship is clearly stated in the vision and mission statement: "DCU Ryan Academy (...) aims to be the leading supporter of entrepreneurs and innovation in Ireland."
- *Lüneburg University* has identified "Entrepreneurship and the Economy" as one of seven main themes that will characterise civil society in the 21st century. Furthermore, they point out on their website: "Entrepreneurial activity is not an end in itself. Entrepreneurs do more than develop new markets – they also create social value added."

Some universities mention EE but not very prominently (e.g. Kosice). Other universities' strategies refer implicitly to entrepreneurship (e.g. Bucharest, Cambridge, Kozminski, Southern Denmark):

- At Kozminski University, entrepreneurship it is not specifically mentioned in the mission statement, but entrepreneurship is crucial in the implementation of four of six strategic programmes implemented during 2011 – 2016: strengthening the position in academic research, internationalisation and worldwide brand reception, high level of student satisfaction, and development of long-term relationships with industry and community.

At a few universities, entrepreneurship or entrepreneurship education was found to not play a role so far in the strategy (e.g. Kaunas, Milan). These are the universities where EE has been established fairly recently. It may take some time until EE is also codified in the university's strategy, also because strategy documents are endorsed for periods lasting several years.

Laws potentially hampering entrepreneurship education

A few universities reported legal framework conditions that may hamper entrepreneurship education in specific ways. These universities are located in East European countries, which might point to specifically rigid regulations in former Soviet countries but which could also be due to other circumstances.

- The case study about the *University of Ljubljana* mentions legal barriers in Slovenia influencing the students' mindsets and behaviour and consequently, the work of the academic unit. A major barrier may be that students lose their privileges when they start and register their own business. This is independent of the income they earn. Students' privileges comprise, for example, low taxes for student work and low cost board and lodging. The students also have to pay extra taxes as soon as they are legally registered as a "solo entrepreneur". Furthermore, selling a product without having a company is prohibited. The barriers were seen as key factors in reducing students' entrepreneurial intention and motivation throughout the courses.
- The case study about the *University of Osijek* provides another example. While Croatian higher education law was not generally found to be a barrier to bringing guest speakers from the field in the classroom, it is not possible to be in charge of the whole course at the University without having a PhD degree. This makes the combination of academia and practice much more difficult. The University eludes the restriction by building tandems of academics and practitioners with various degrees of mutual engagement.
- At *Kozminski University* it was found to be very difficult to go beyond the invited guest speaker formula for engaging entrepreneurs in entrepreneurship teaching. This was found to be due to the formalisation of the didactic process with specific requirements for course delivery and assessment. There are national and EU-wide regulations which must be followed. Entrepreneurs were reported to not feel comfortable in such an environment.

While it would have been worthwhile to follow up and analyse the specific regulations, this would have been beyond the scope of the sepHE study. It may however be an insightful engagement for future research.

Incentives for educators

Educators may have various incentives to offer EE courses. The case studies found **no specific material incentives**. EE offers were found to be mostly within the curricular duties of the respective educators, so EE offers are part of the normal salary they receive. Gaining insights into profitable investment opportunities and possibly actually investing into start-ups from the university may be a potential material incentive. There were, however, no hints to such incentives in the case studies. In fact the involvement of university educators in start-ups is a difficult legal aspect which would have deserved closer attention but which was beyond the scope of this study. There were also no hints that involvement in EE would enhance a university educator's career.

Incentives to engage in EE were rather found to be immaterial. **Immaterial incentives** may first of all include the pleasure to do something with enthusiasm. They may also include certain kinds of continued education and networking benefits, for example if entrepreneurship educators receive special funds for attending training sessions or conferences abroad. For instance, selected entrepreneurship educators from Kaunas University of Technology took part in a two-week summer training event at the Stanford Technology Venturing Programme (STVP).

Incentives for external stakeholders

External stakeholders involved in EE may receive a more or less small remuneration for their lectures or support activities plus a compensation for their travel costs. Several universities stated that lecturers from established enterprises would not receive any material incentives. Their incentive would be “applause from the students” (Kaunas), possibly access to future employees, and reputation to be involved in university teaching.

3.4.3 Entrepreneurial mindsets

The development of entrepreneurial mindsets – among students but also educators and university managers – was found to be a very important issue in developing EE. It may be an objective for establishing EE: EE is often considered to be a medium for changing mindsets towards becoming more entrepreneurial. However, mindsets may also be a precondition for establishing and sustaining EE offers – if there is no interest in entrepreneurship among students, the offers may vanish from the curriculum. In any case, mindsets may be the most difficult category covered by the study. This is because they are difficult to operationalise, difficult to measure and rarely actually measured with quantitative methods. Statements about entrepreneurial mindsets often rely on qualitative assessments and anecdotal evidence – which may nevertheless be insightful, valid and thus worth quoting.

Many case universities seek to change mindsets at the university towards becoming more entrepreneurial with specific approaches. However, framework conditions may be challenging and can outcomes sometimes be unpredictable:

- At *Kozminski University (KU)*, a significant percentage of students were already exposed to entrepreneurship before attending the university, either by running an own business or due to family business traditions. Therefore, KU attempted to shape their mindsets and attitudes not towards entrepreneurship in general but to ambitious forms of entrepreneurship. However, shifting mindsets turned out to be challenging: experience with extra-curricular activities showed that non-business students and graduates from other universities so far showed more promising efforts to develop ambitious enterprises than students from KU.
- The case study about the *University of Ljubljana* found that post-socialist mindsets are still very prevalent in Slovenia, especially among the students’ parents. They prefer a career in public administration or large enterprises. Entrepreneurship has a negative connotation due to times of system change after 1989 when so-called “entrepreneurs” took advantage of a corruptive environment with lacking governance structures. Furthermore, profit is often seen as negative and failure has a strong negative connotation. On the other hand, the enthusiasm of many students in EE courses applying the Design Thinking approach and the large number of participants in voluntary entrepreneurial workshops indicate a mindset change among young people.
- *EM Lyon* was found to follow a differentiated strategy of encouraging entrepreneurial behaviour through EE, comprising three parts: basic EE, specialisation, and practice. At a basic level, all students of all programmes are exposed to at least one course unit about entrepreneurship. Second, EM Lyon offers to specialise in a course related to entrepreneurship as part of the study programme. Third, EM Lyon provides a wide range of opportunities to practically engage in entrepreneurship, e.g. through the university’s incubator or student associations.

At the case universities, several possible **indicators** for the development of entrepreneurial mindsets were identified: the number of start-ups from the university, also the quality of these start-ups in terms of competitiveness and growth, the share of nascent entrepreneurs, enterprising activity without starting a new business as well as the number of students participating in voluntary curricular offers and extra-curricular activities. Each of these indicators has their shortcomings but taken together they may reflect the strengths and specifications of entrepreneurial mindsets at universities.

3.5 Outreach to external stakeholders

3.5.1 Overview about external relationships related to entrepreneurship education

Definition

This section explores the involvement of external stakeholders in curricular and extra-curricular entrepreneurship education. Stakeholders in entrepreneurship education encompass all groups that are directly or indirectly affected by EE either through active involvement in the provision of education (e.g. instructors, co-operation partners) or by being recipients of education (e.g. students). External stakeholders in this respect include all **non-university stakeholders** that are directly involved in, or related to, EE of the respective universities.

Main characteristics of universities' relationships with external stakeholders

All of the 20 universities which were examined, engage in some form of collaboration with external stakeholders. The principal **reason** for involving external stakeholders is accessing practical experience, advice and resources which the university's educators normally do not have.

The findings from the case studies highlight enterprises, financial institutions, support services as well as incubators, accelerators, and science and technology parks as **primary stakeholder groups**. Other stakeholders include partner universities, student organisations and alumni.

The **type of involvement** varies and covers a broad spectrum of activities. External stakeholders may contribute to curricular EE offers, extra-curricular EE activities, organisational matters (e.g. board membership) or to a combination of these. Involvement ranges from providing finance (funding, investment and sponsoring) to providing expertise (lecturing and mentoring) as well as the organisation of events, competitions, trainings and workshops.

Next to local, regional and national partnerships, **international relationships** play an important role in several case studies. This applies in particular to international university partnerships, for instance through the joint organisation of EE events, training sessions or conferences.

The **importance** of the relationships with external stakeholders also varies among the cases. Several case studies pointed out that stable and extensive, long-term stakeholder relationships can be crucial for the successful provision of EE. Some case studies explicitly focus on relationships with external stakeholders (e.g. Coimbra, Kaunas, Linz, Lund and Valencia).

As regards **management**, stakeholder collaboration in EE is oftentimes organised by the chairs or units for entrepreneurship (e.g. Cambridge, Denmark, Lund). In some cases separate individuals are determined, who are responsible for managing external relations (e.g. Bucharest, Lund).

- The *Bucharest University of Economic Studies* possesses a separate entity that deals with managing and extending relationships with external stakeholders. A Vice Rector for inter-institutional relationships and partnerships with the socio-economic environment is especially assigned for this task.

Stakeholder networks play an important role (see also the section on network management above; e.g. Cambridge, Dublin). This may imply a pool of possible contacts to choose from, for instance, lecturers, mentors or partners in EE. In particular, the role of entrepreneurship-related clubs was stressed (e.g. the FABIZ Business Club in Bucharest or the Slovakian Union of Young Entrepreneurs in Kosice). The case studies also show that the establishment and development of such networks can be facilitated by dedicated management. However, network management requires financial and human resources; and the availability of such resources may determine the scope and strength of the stakeholder network.

Characteristics of involving stakeholders from certain geographical levels

Based on the 20 case studies, several specific observations can be highlighted. First, the importance of certain stakeholders varies. On a **local, regional and national level**,

enterprises were identified as the most important stakeholders in EE with extensive collaboration in the vast majority of the case studies. In contrast, collaboration with science and technology parks as well as with student organisations and alumni was found to be scarce. Furthermore, while collaboration with universities in the same country may be the easiest way to the exchange experiences, not much collaboration with other local, regional or national universities was reported. This may be due to competition.

Second, at the international level, collaboration with international universities was emphasised as important in the majority of the case studies. Engaging experts from abroad in EE as practiced, for instance, in Bucharest and Kaunas may be of value if certain competencies are lacking internally but may simultaneously induce considerable costs. However, only a **few international relationships with non-university stakeholders**, such as international enterprises, support services or student organisations were identified.

Moreover, **building a local or national infrastructure** to support student and graduate entrepreneurs through organisations beyond the university may be helpful. External incubators, accelerators or venture capital organisations may be partners in such an infrastructure (e.g. Coimbra, Ljubljana). The University of Osijek provides a specific example in this respect. Facing a lack of suitable external support services for entrepreneurs, the University created entrepreneurship foundations and institutions itself.

- In *Osijek*, in response to the need for the financing of local entrepreneurs, the microfinance institution NOA was established based on a USAID donation and with the help of the Open Society Institute in New York in 1996. Besides the challenge of financing new enterprises, there was also a need for training. Hence, the Centre for Entrepreneurship was founded in 1997. The role of specific external stakeholders involved in EE

Overview about external stakeholders

Exhibit 3-7 provides an overview about the stakeholder groups and their type of involvement in EE which will be described in more detail below.

Exhibit 3-5: Overview of external stakeholders involved in Entrepreneurship Education

No.	Stakeholder	Type of involvement in entrepreneurship education
1	Enterprises	Provision of financial support; organisation of events; collaborative (start-up) projects; provision of networks, contacts and internship placements; lecturing and story-telling; judging, coaching and mentoring of students; participants, attendees or customers of EE
2	Financial institutions	Provision of funding, sponsorship and investments; guest lecturers and panel members
3	Support services	Provision of training and funding; intellectual property screening and patenting support; platform for networking; lecturing and representation in the board of external lecturers in entrepreneurship; advising, mentoring, coaching or consulting for university entrepreneurs
4	Incubators and accelerators	Guest lecturers; knowledge exchange and networking; provision of funding, coaching, business advice and co-working space; joint organisation of seminars, projects, workshops, conferences and other events
5	Science and technology parks	Location for networking events of workshops; provider of co-working space to start-ups
6	Student organisations	Joint organisation of activities, competitions or other networking events
7	Universities	Networks or partner universities for the exchange of best practices or engagement in strategic partnerships
8	Alumni	Lecturers, advisory board members and evaluators; provision of start-up support to student entrepreneurs

Enterprises

Enterprises were found to play a particularly important role in EE as a stakeholder group. Many of the examined universities have strong ties to enterprises (e.g. Bucharest, Cambridge, Huddersfield, Kaunas, Kosice, Liege, Linz, Lüneburg, Lund, Lyon, Tampere, Valencia). The

enterprises were **mostly small and medium sized**, although some case universities (additionally) co-operated with large enterprises (e.g. Bucharest, Kosice, Lund, Tampere). In contrast to most other universities, in the case of Tampere it was explicitly pointed out as a challenge that small and medium-sized enterprises were underrepresented.

The **types of involvement** of enterprises in EE were found to be **very diverse**. Financial support may be provided to EE or to university start-ups through sponsoring or investment activities by firms (e.g. Cambridge, Kosice, Lund and Valencia). Moreover, enterprises may be involved in the organisation of events, such as integrated business plan competitions, entrepreneurship-related summer schools or business evenings (e.g. Bucharest, Kosice and Tampere). Further forms of engagement include partnerships and collaboration in (start-up) projects (e.g. Bucharest, Kosice, Linz, Lund and Rotterdam) and the provision of networks and contacts (e.g. Dublin) as well as student internship placements (e.g. Bucharest, Huddersfield, Linz, Lund and Valencia). Representatives from enterprises may also be involved in EE through (guest) lecturing (e.g. Bucharest, Cambridge, Kosice, Lund, Lyon and Milano), story-telling (e.g. Cambridge, Valencia), by being a judge at a start-up weekend (e.g. Kosice) or via the coaching and mentoring of students or young entrepreneurs (e.g. Cambridge, Kosice, Lund, Rotterdam and Valencia). Besides being involved in EE, entrepreneurs and business representatives can also be customers or users of EE by participating in the entrepreneurship offers or by attending events of the respective universities (e.g. Cambridge, Dublin and Rotterdam).

- *Dublin City University Ryan Academy* has built a network of more than 150 active members from practice. Moreover, more than 200 companies are registered in the Academy's database for hosting practical research projects in EE programmes.
- The *University of Lüneburg* carried out more than 500 projects such as master theses or internships in co-operation with regional companies between 2010 and 2014.
- At the *University of Huddersfield* enterprises play a particularly important role. All of the university's study programmes are required to have industry or professional input into the approval process. In many instances this will involve small business and entrepreneurs.
- At *Bucharest University of Economic Studies*, the most important external stakeholders are the CEOs from the FABIZ Business Council. The FABIZ Business Council provides support to students with entrepreneurial ideas. Prof. Tantau has formed a FABIZ Business Council in October 2013 in order to foster entrepreneurship-related programmes at FABIZ (in particular in the new Energy Master Programme at FABIZ).

Financial institutions

A minority of the case studies report about interactions related to EE with **financial institutions** (e.g. Cambridge, Huddersfield, Kosice, Liege, Lyon and Valencia). These institutions may have a public or private origin. Forms of collaboration include provision of funding (e.g. Huddersfield, Valencia), sponsorship of consulting or mentoring services, events or competitions (e.g. Kosice, Lüneburg and Rotterdam) and investments in start-ups (e.g. Cambridge). Besides, representatives from financial institutions might be directly engaged in EE through guest lectures (e.g. Lyon) or by being a panel member for the evaluation of idea pitches (e.g. Cambridge).

Support services

Numerous case studies mention the provision of external support services for EE (e.g. Cambridge, Huddersfield, Liege, Lüneburg, Lyon, Tampere and Valencia). Support is, for example, provided by chambers of commerce (e.g. Lüneburg, Lyon and Tampere) or other public support service organisations as well as private consultancies (e.g. Linz). Support services can either be paid or executed on a pro-bono basis. They are at times exclusively targeted at students and graduates with entrepreneurial intentions.

The type of support ranges from the provision of training courses (e.g. Tampere, Valencia) and funding through loans and venture capital (e.g. Lund) to intellectual property screening and patenting support (e.g. Lund) and the provision of networks (e.g. Cambridge, Tampere). Further involvement in EE is through lecturing (e.g. Linz, Lyon), representation in the board of external lecturers in entrepreneurship (e.g. Linz) as well as advising, mentoring, coaching or consulting for university entrepreneurs (e.g. Huddersfield, Linz, Lund, Tampere and Valencia).

- The Business Training for the Development of Business Ideas and the Mentorship Programme for university entrepreneurs are two of the successful programmes offered by the University of Valencia. These programmes are aimed at graduates and graduate entrepreneurs from the University of Valencia supported by business people acting as mentors, who advise on different aspects of start-up establishment and company management.
- EM Lyon provides a special case of involving the local chamber of commerce in its entrepreneurship teaching. The Chamber of Commerce facilitates practical student projects and research projects, for example concerning the impact of entrepreneurship policies and practices. In order to discuss such activities, the management school and the Chamber of Commerce Lyon meet two to three times every year. Vice versa, members of EM Lyon faculty are advising the French network of the Chambers of commerce and industry in the area of entrepreneurship.

Incubators and accelerators

Several case studies reveal an active collaboration with **incubators or accelerators** in the provision of EE (e.g. Coimbra, Cambridge, Denmark, Huddersfield, Kaunas, Linz, Lüneburg, Lyon, Milan and Osijek).²¹ The forms of engagement range from guest lectures by representatives from incubators or accelerators (e.g. Lyon), extensive knowledge exchange and networking between academics and practitioners (e.g. Denmark, Kaunas, Lüneburg, Lund) to the encouragement and support of innovative start-ups through the provision of funding, coaching, business advice or co-working space (e.g. Cambridge, Kaunas, Linz, Lund). Further types of collaboration include the joint organisation of seminars, projects, workshops, conferences or other events (e.g. Cambridge, Denmark, Lund). To illustrate the involvement of incubators and accelerators in a university context, the following examples can be given:

- There are numerous incubators for entrepreneurship in the *Cambridge* region. For instance, the Social Incubator East is funded by the government. Its educational activities include the Social Venture Weekend where 40 – 50 people receive the basic tools and inspiration for starting a venture with their business ideas (tackling issues such as legal structures, intellectual property rights, cash flows, market research or business model development).
- PoliHub, the incubator of the *Polytechnic University of Milan*, is a major co-operation partner in EE. PoliHub is partially involved in some EE initiatives by the University and is responsible for extra-curricular initiatives. EE lecturers interact with PoliHub staff, particularly in the “High-Tech Entrepreneurship” course. Since 2013, PoliHub offers free incubation services also to the best projects in the University’s “Start-up Programme”.
- Five national incubators are located in *Lund*, and four of them are located within the IDEON Science Park. Parts of Lund University are also located within IDEON Science Park, which facilitates strong co-operation with the university, e.g., joint organisation of lecturers, seminars and events and the provision of funding, coaching, business advice and co-working space to student start-ups.

Science and technology parks

A limited number of the case studies display strong relationships with local **science and technology parks** (e.g. Coimbra, Liege, Lund, Lüneburg and Tampere). If cooperation with such parks is nonetheless described, it generally involves providing locations for networking events within workshops or co-working space to start-ups (e.g. Linz, Lüneburg, Lund).

- *Lund University* is deeply embedded into its environment through its location next to IDEON Science Park, which was formed in 1983 as one of the first science parks worldwide. It is Scandinavia’s largest science park.

²¹ In some cases the incubators are in fact entities of the university (e.g. Lyon, Milan) but they are included here because they act rather autonomously.

Student organisations

As a further external stakeholder group of EE, a small number of case studies emphasise **student organisations** (e.g. Bucharest, Cambridge, Kosice, Lund and Rotterdam). Co-operation takes place through the joint organisation of activities, competitions or other networking events (e.g. Bucharest, Cambridge, Kosice and Lund).

- The *Bucharest University of Economic Studies* and the *TU Kosice* collaborate strongly with the international student organisation Junior Achievement. The organisation provides lecturing support and a platform for business idea competitions and is integrated as part of entrepreneurship courses.
- At *Lund University*, student organisations are deeply embedded into EE. Examples include Venture Cup, FENA and LUSIC. Lund University Social Innovation Centre (LUSIC) is a social and humanities student organisation that aims at creating a cross-sectoral, interdisciplinary social innovation hub that addresses social problems in an entrepreneurial manner.

Other universities

A few case studies report about collaborations with other local, regional and national universities (e.g. Bucharest, Dublin, Tampere). The universities exchange good practices in EE or even engage in strategic partnerships.

- *Tampere University of Applied Sciences* is engaged in cooperation with the other two higher education institutions in Tampere to identify and exploit synergies and to market the region as a national and global centre for innovation.

Alumni

Few of the case universities describe initiatives to co-operate with **alumni** in the provision of EE (e.g. Bucharest, Kozminski, Linz, Lund; see also sections 3.2 and 3.3 on curricular and extra-curricular instructors above). Alumni were found to be integrated in EE as lecturers, advisory board members, evaluators or through the provision of start-up support to student entrepreneurs (e.g. Linz, Lund, Rotterdam). Moreover, alumni may be part of university networks or entrepreneurship clubs (e.g. Bucharest, Kosice).

- *Kozminski University* has built a strong Alumni Club with regular meetings, communication through a dedicated website, newsletters and social media. Each year three alumni with the most successful career paths receive special awards (the "Kozminski Lions"). One of the awards is given to the most successful entrepreneur.
- *Lund University* and its Sten K. Johnson Centre for Entrepreneurship collaborate strongly with its alumni in its entrepreneurship education (e.g., alumni surveys, promotion of alumni entrepreneurs, advisory board membership).

3.5.2 International relationships

In terms of international stakeholder relationships related to EE, a distinction can be made between university and non-university stakeholders. The cases did not reveal many international relationships with non-university stakeholders. Exceptions include the co-operation with international student organisations in *Liege* and *Lund*. However, numerous case universities collaborate with **international universities** (e.g. Bucharest, Dublin, Lüneburg, Southern Denmark, Tampere and Valencia).

Co-operation with international universities may be informally or formally established. Examples of formal links include the status of an official partner university or member of an international network in the cases of Lüneburg and Lund). Networks, partnerships and conferences can represent an informal form of collaboration (e.g. Lüneburg, Lund and Lyon). Conferences may sometimes be jointly organised, e.g. the European Entrepreneurship Education Conference 3E of the European Council for Small Business and Entrepreneurship in the case of Lüneburg. Universities might also co-operate in the joint organisation or mutual participation of other events, training sessions or boot-camps in the field of entrepreneurship (e.g. Cambridge, Huddersfield, Kozminski, Lüneburg and Tampere). These events or training sessions can be targeted at students or university staff or both. Research projects may also be executed in

partnership with other universities (e.g. Cambridge). Besides, co-operation can take place through the engagement in international team teaching approaches in EE (e.g. Bucharest, Tampere). Further types of co-operation include the mutual exchange of students within EE programmes (e.g. Bucharest, Cambridge, Lund and Valencia) or the establishment of international double-degree programmes (e.g. Milan). Several examples for international university collaborations are described below.

- A flagship global event for *EM Lyon* is the World Entrepreneurship Forum that brings together delegates from over 70 nationalities to promote entrepreneurship. It was founded by EMLYON, KMPG, OnlyLyon, Nanyang Technological University, Action Community for Entrepreneurship and Zhejiang University.
- In September 2014, the *Polytechnic University of Milan* signed a formal agreement with Solvay Business School (Brussels, Belgium) concerning a Double Degree for an “Advanced Master in Innovation and Entrepreneurship” that will be jointly offered by the two business schools starting from September 2015.
- At the *University of Southern Denmark*, the Interreg4a project SPICE (Student Programme for Innovation Culture and Entrepreneurship) is one recent example of international co-operation, where five Danish and German institutions collaborate on enabling and fostering on-campus start-up activity.

3.6 Impact measurement and key lessons learned

3.6.1 Measuring impacts of entrepreneurship education

Findings about EE impact measurement from literature

A central verdict in the academic literature about EE is that its **impacts are still unclear and not well understood**. There are comprehensive meta-analyses and reviews of studies on the relationship between EE provision and impacts on students. They assert that the extent of impacts on students’ and graduates’ entrepreneurial intent or subsequent entrepreneurial outputs (e.g. founding a business) is still unclear (Pittaway and Cope, 2007), methodically vague (Rideout and Gray, 2013) and sometimes not significant (generally Bae et al., 2014 and in individual studies, e.g., Volery et al., 2013; Støren, 2014). This unclear relationship between EE and entrepreneurial outputs or behavioural precursors, like entrepreneurial intent, may have several reasons. Martin et al. (2013) suggest that the relation between EE and its entrepreneurial outputs may be moderated by various context factors such as student differences, features of the learning situation, and cultural effects. In sum, there is apparently no one-size-fits-all format for EE impact measurement and no “silver bullet” instrument available to date. The case studies did not identify hints to such ideal formats.

The most important recommendations in the literature to enhance EE impact measurement are to **broaden the scope of EE output measures** and to establish **platforms for longitudinal impact evaluation**:

- Broadening the scope of output measures of EE means to not focus exclusively on business-related outputs like new venture creation. Impact measurement may also include other dimensions like effects on graduate employability (e.g. for innovative and creative positions; EC 2012a) or effects on participants’ entrepreneurial competences and mindset. For the dimensions of entrepreneurial competences and mindset, the ASTEE initiative (Assessment Tools and Indicators for Entrepreneurship Education) developed a measurement concept (EC, 2014a). Expanding the evaluation agenda was also suggested by three experts interviewed for the sepHE study, in particular with regard to the current narrow focus on new venture creation as the core envisioned output of EE.
- The second issue is providing platforms for longitudinal impact evaluation of EE over time (EC, 2012a; Vanevenhoven and Liguori, 2013) and, ideally with control groups to avoid self-

selection biases²²(Duval-Couetil, 2013). One expert interviewed for this study noted that this is often expensive because of the required substantial time horizon and typically high panel mortality as participants drop out of EE panel studies after leaving university.²³ It may be worthwhile for universities to collaborate in international research initiatives such as the Entrepreneurship Education Project²⁴ (Vanevenhoven and Liguori, 2013) or similar research thrusts like the Global University Entrepreneurial Spirit Students' Survey (GUESSSS)²⁵ or JA-Ye²⁶ and the project Assessment Tools and Indicators for Entrepreneurship Education (ASTEED)²⁷.

Overview about impact measurement methods at the 20 universities

Overall, case universities were found to not pay particularly strong attention to measuring the impact of entrepreneurship education. There is no consistent or continuous use of a tool box of impact measurement instruments across the 20 university cases. Approximately a fifth was found to not measure the impacts at all.

Most widespread was **keeping track of start-ups** by students and graduates, a method which approximately two thirds of the case universities apply. Records may be fairly complete of new ventures that licensed intellectual property from the university, or new ventures located in or supported by university-related incubators or technology parks. However, it is difficult to achieve a comprehensive record of start-ups from a university because students or graduates may start a business without telling any official unit.

Another fairly widespread method is **evaluating the impact of entrepreneurship courses** by measuring students' entrepreneurial awareness, skills and behaviour at the beginning and at the end of the course. Kaunas UT and the University of Southern Denmark developed individual measuring methods for this purpose. They found that entrepreneurship education indeed helped to increase entrepreneurial indicators among course participants.

Some universities conduct **surveys of their students and alumni** including entrepreneurship issues (Kozminski, Linz, Lund, Rotterdam, Southern Denmark, Valencia).

Only two universities (Linz, Rotterdam) were found to participate in **international surveys** related to entrepreneurship education such as GUESSSS.

Impacts on the regional economy

Some universities were found to be **hubs for entrepreneurial activity in the region**. For example, the central unit for entrepreneurship of Lund University is located in a regional environment which is a hub for entrepreneurship in a rather densely populated area. Altogether around 50 institutions with a focus on entrepreneurship and innovation are located in the region. The unit for entrepreneurship is part of a science park where five incubators as well as numerous supporting organisations and start-ups are situated. Collaboration between actors is frequent, with regular mingling and network events such as Tuesday breakfast, business and beer, business and running.

Universities may also conduct studies about the impact of their entrepreneurial activities in the region. The Polytechnic University of Milan's Business School carried out two special studies about the impact of graduate start-ups on the regional economy over ten years.

²² That is a bias effect attributed to decisions to take part in an EE activity rather than causal impacts of the EE intervention itself.

²⁴ See <http://www.trepeducation.com>.

²⁵ See <http://guesssurvey.org>.

²⁶ See <http://www.ja-ye.org>.

²⁷ See <http://asteeproject.eu>.

3.6.2 Key lessons learned from the case studies and transferability of approaches

Overview about key lessons learned from the 20 cases

The 20 case studies offer numerous lessons to be learned – for other universities, for policymakers, and for stakeholders seeking to support entrepreneurship education.

One of the most important overall lessons may be that there is a **wealth of approaches** to entrepreneurship education all over Europe, curricular and extra-curricular. There are many highly motivated educators and university managers developing EE, and students are becoming more and more interested in entrepreneurship. This study could only present snapshots, even though they are fairly detailed snapshots. It may be worthwhile to draw a bigger picture with a more quantitative approach sometime in the future.

Moreover, the exploration of 20 cases of EE across Europe revealed that the **context** of entrepreneurship teaching is very important. This applies to, for example, education policy, structures of universities, the resource situation in tertiary education, and – perhaps most difficult to examine – the organisational culture of universities in different countries. This also has implications for the transferability issue discussed below, as EE concepts will need to be tailored to the individual environment of universities.

Another overall lesson is that there are **significant challenges** to further developing entrepreneurship education. Resources are limited and mindsets are not always tuned towards entrepreneurship. The case studies, however, also show that there are possible solutions. Many solutions are with the universities themselves, but policy makers may need to become active in order to support universities in their endeavours to further develop entrepreneurship education. Chapter 4 of this report will elaborate on these challenges, possible solutions and implications for policy making.

Transferability to other universities

The transferability of an EE approach, or elements of it, from one university to another may depend on many criteria. Against the background of the 20 case studies the transferability criteria may above all be money, mission, mindsets, networks, and people:

- **Money:** Funds are required to establish an approach, and available funds at the adopting university may be limited. For example, the IDEA centre at the University of Southern Denmark was established with considerable support from the Danish government so that similar centres may not be easily set up elsewhere.
- **Mission:** A university's academic profile and tradition – in short: its mission – may determine its ability to adopt certain EE approaches from other universities. For example, it may not be suitable or advisable for a university with particular strengths in humanities to adopt an approach from a business school like EM Lyon.
- **Mindsets:** Certain EE approaches may require certain mindsets among educators, students and university managers in order to work. Such mindsets cannot easily be changed so that approaches to be adopted may need to be modified in order to suit local conditions. The case of Kaunas UT provides a related example: methods developed in the US were adjusted to suit Lithuanian culture and KTU's situation.
- **Networks:** Networks with external stakeholders were found to be important for being able to offer practice-oriented EE. Hence, approaches requiring strong networks with specific types of experts – for example entrepreneurs, finance providers or incubators – may not be easily adopted elsewhere.
- **People:** Some EE activities depend on key persons, e.g. with regard to their individual teaching competences, extra-curricular initiatives, and contacts. The University of Liège is a good example. Such personal human and social capital can only be transferred to a limited extent, e.g. through temporarily inviting or counselling EE leaders from other universities. A transfer may, of course, be possible in terms of "alpha leaders" changing the university but this may cause a big gap at the university they leave.

Against these criteria, it may be difficult to transfer complete approaches from one university to another – even though some case study gatekeepers said it would be quite easy to apply their

approach elsewhere. There are likely to be specific obstacles to be overcome in any case so that approaches need to be modified or only parts of certain approaches can be transferred.

For example, EM Lyon's approach to "train entrepreneurs for the world" may be rather difficult to adopt; it seems to be tailor-made for full business schools or business departments of universities. In any case, certain elements from Lyon such as using MOOCs may nevertheless be worthwhile for consideration at other universities.

Interest to learn from other universities – and to support others

At the end of the sepHE study's analysis there is good news. The case studies found that there is much interest in learning from other universities: Academic staff involved in EE was found to be strongly interested to learn about concrete and detailed EE concepts and offers at other universities. Vice versa, there is apparently also interest on the part of other universities to provide guidance and support or to exchange experiences. Such learning may, on one hand, take place through **learning from experienced experts** with more advanced experience in EE. In addition, there is also interest to **learn from peers**, i.e. from universities at a similar stage of developing EE with similar objectives.

This finding may be encouraging for the future development of EE in Europe. The ecosystem of entrepreneurship educators, students, university managers and external stakeholders is likely to become broader and deeper in the near future, for the benefit of European economies and societies.

4 Conclusions for developing entrepreneurship education in Europe

Challenges, possible solutions and policy implications

The findings presented in chapter 3 lead to six principal conclusions for further developing entrepreneurship education in Europe. The conclusions are related to the study's main themes: curricular offers, extra-curricular activities, institutional aspects (mindsets and finance), stakeholder involvement, and impact measurement. The conclusions deal with challenges, possible solutions for these challenges and related policy implications:

Challenge 1: Overcoming reservations against entrepreneurship education

Challenge 2: Assuring sustainable finance for entrepreneurship education

Challenge 3: Assuring high quality of entrepreneurship teaching and learning

Challenge 4: Assuring sustainability and quality of extra-curricular activities

Challenge 5: Assuring strong networks for supporting entrepreneurship education

Challenge 6: Measuring outcomes and impact of entrepreneurship education

The issues were derived from the 20 case studies and validated with independent experts (see section 2.4). The conclusions may help universities all over Europe to establish or improve EE, they may give stakeholders such as professional associations and businesses ideas how to support EE, and they may show policy makers how to promote EE. The policy implications are addressed to policy makers on all geographical levels: European, national, regional, and local. However, some implications may only or predominantly apply to a certain level.

Three caveats need to be made which apply to all six challenges. Overall, as regards educational objectives, the solutions and policy implications are meant to increase entrepreneurial **skills and mindsets** in a broader perspective. They do not only address venture creation. Furthermore, there is an overarching challenge of great **heterogeneity** among universities – among those included in this study and beyond. Universities teach under different socio-economic, political-legal and cultural conditions. Hence there are no one-size-fits-all solutions. EE may need a tailored approach at each university. Third, the sepHE study deliberately focused on educational aspects. However, entrepreneurship education may possibly thrive best when it is part of an “**entrepreneurial university**” that is also strong in commercialising research and that is managed in an entrepreneurial manner.

Challenge 1: Overcoming reservations against entrepreneurship education

Specific challenges: reservations from managers, educators, and students

The case studies revealed several common reservations against establishing, expanding and anchoring EE at universities. These reservations may be the most basic challenge to EE because they question EE as such.

There may be reservations against EE on the part of university leaders and educators, for example: entrepreneurship as a practical field does not fit the academic mission of a university, entrepreneurship cannot be taught at all at a university, entrepreneurship is no hard science and an inferior intellectual engagement, entrepreneurship as a profit-oriented activity does not fit with a university's neutrality and independence, dealing with entrepreneurship can hamper one's academic career, or entrepreneurship education can drive students into failing business.

There may also be reservations against EE from students, e.g. preferences for becoming employees, rejection of entrepreneurship as a profit-oriented activity or non-acceptance of professors from the business school teaching in other faculties.

While interviewees from many universities reported such reservations, the study was not designed to quantify them. All in all, the study team gained the impression that the reservations represent a minority of university members and that there are more proponents than opponents of EE. The situation may however differ by university, and the situation may be more difficult in Eastern Europe.

Possible solutions: sophisticating, institutionalising, widening the EE approach

Overcoming such reservations may above all mean to reveal that they are based on misperceptions. The case studies pointed out the following possible solutions:

In order to overcome reservations on the part of educators and university leaders, it may be helpful to **sophisticate EE design and management**. This may convince opponents that entrepreneurship actually can be taught, that it is a pedagogically valuable effort for all students, that it is a valid career option, and that it is a socially beneficial thing beyond individual striving for wealth. The social dimension may particularly be stressed through teaching social entrepreneurship (e.g. Dublin City, Liège). Related efforts may be supported through learning from other universities' practice, e.g. through targeted networking with experts from abroad (e.g. Kaunas, Osijek).

Establishing bridgeheads may help. EE proponents may first seek convincing heads of departments and faculties as well as opinion leaders and particularly renowned researchers. It may also be helpful to assign informal "ambassadors" for EE in faculties and departments, i.e. proponents of entrepreneurship who can actively contact other educators and students or be contacted if need be (e.g. Huddersfield).

In order to anchor EE within the university, the proponents of EE may seek to **institutionalise EE** through including it in the university's strategy as well as through establishing EE-related units and possibly also management positions (e.g. Southern Denmark, Rotterdam, Kaunas, and Huddersfield).

In order to reach the largest possible amount of students, it may be helpful to widen the approach: teaching not only "entrepreneurship" as "venturing", i.e. starting a new business, but **also teaching "enterprising"**, i.e. having an idea and making it happen, which does not necessarily imply to start a business. The universities of Huddersfield and Lüneburg provide related examples.²⁸

A further aspect of widening EE is involving educators from other disciplines: In order to reach students from all faculties in teaching offers, universities may encourage and support teaching entrepreneurship (or "enterprising") through **educators whose primary expertise is not in entrepreneurship** or management (e.g. Huddersfield). This may help to ensure that students accept the educators.

Showcases may also help increase awareness about the benefits of entrepreneurship and related education. Universities or entrepreneurship units may celebrate role models: outstanding entrepreneurs linked with the university, outstanding researchers who are also successful entrepreneurs, or outstanding entrepreneurship educators. Universities can, for example, establish awards or prizes and report about successful student entrepreneurs in university media (see University of Linz). One of the interviewed experts said that "if there are no role models around as an input and if there is no entrepreneurial ecosystem at the output side, entrepreneurship education will not deliver the impact that we would like to have".

Nota bene, reservations against EE may sometimes be a disguise for rather material concerns about **resource allocation**. Since a university's financial resources are normally quite restricted, EE needs to compete against other disciplines and established courses, particularly if entrepreneurship is meant to be taught at non-economic faculties. Deans and educators may be more easily convinced about EE when their resources remain untouched or are possibly even expanded.

Policy implications

Policy makers in education and science, as well as university-related associations, can help in **spreading knowledge about how to overcome reservations** against EE. Specifically, the European Commission may spread related insights across Europe. Policy makers can present the issue at related conferences and workshops and in related publications. For example, the Finnish Ministry of Education and Culture published a guideline paper on entrepreneurship education in 2009 which, according to the Ministry, helped in raising awareness and triggered a

²⁸ See also "Enterprise and entrepreneurship education: Guidance for UK higher education providers" in QAA (2012).

public debate. The Rectors' Conference of Finnish Universities of Applied Sciences also drafted related recommendations.

National and regional policy makers can also **encourage university managers** to introduce and expand EE and EE-related units at the university. They can be open for EE activities when they (e.g. ministries of education) need to formally approve them. They can also contribute to funding EE chairs and entrepreneurship-related units.

Challenge 2: Assuring sustainable finance for entrepreneurship education

Specific challenges: EE as a young and personnel-intensive discipline

Case study research found that assuring sustainable finance is a crucial challenge for EE. This may be the second most important challenge to EE because it fundamentally questions the establishment, continuance, and quality of EE.

Sustainable finance is a challenge because EE is a relatively young academic discipline. As such it is often not firmly rooted in the universities' curricula and thus not stably financed through baseline funds or student fees. EE may have a rather weak position in competing for scarce financial resources with established disciplines. EE is also relatively personnel-intensive because it requires, in order to be successful, interdisciplinary engagement of educators from several faculties, practical work on the part of students, and involvement of practitioners. Furthermore, if EE is based on funding from public programmes with fixed-term finance, follow-on funding needs to be assured.

Possible solutions: good management, continuous projects, and paid education

The overall solution to the funding challenge may be a commonplace: If EE is to be sustained in a university's teaching offers, it needs to become part of the university's general efforts to sustain long-term public baseline funding through **competent management**. This may mean, beyond attracting the right amount of students, diligently complying with demands from funding agencies and effective negotiations with them. Inherently, all case studies may provide examples for this solution.

Universities may also diligently submit proposals to European and national funding agencies to receive **continuous project funding** for developing EE (e.g. Kaunas). Large private companies and foundations may also help funding EE, for example through endowed chairs (see Linz, Lund).

There is also a specific solution that can directly build on EE competences: Offering EE in **paid education** to specific target groups. Universities can sell continued education services for example to chief executive officers (CEOs) of small and medium-sized enterprises (SMEs) and also to managers from large enterprises. The Universities of Rotterdam and Lüneburg provide related examples. The institutes or departments offering paid education can use the surplus from it to sustain other EE offers within their realm, for example as offers that were so far funded through fixed-term public finance fade out.

Policy implications

National and regional policy makers can ensure EE funding in several ways. They can **design funding regulations** in a way that universities offering EE benefit from additional public funds (see e.g. University of Lüneburg).

They can also provide dedicated funding for EE in **national or regional programmes**. Programme support may be granted as gradually fading out over a certain period of time, and the applicants to public programmes may have to describe in detail how they will seek to sustain their offers after public funding is over.

Furthermore, national innovation and education policy makers could provide **funds to certain universities** that are well-prepared for EE and that show clear and strong efforts to develop EE, e.g. for establishing entrepreneurship centres (e.g. Southern Denmark, Kaunas).

To the extent that universities may be restricted in offering paid education, education policy makers could review and possibly revise related regulations.

Challenge 3: Assuring high quality of entrepreneurship teaching

Specific challenges

Beyond fundamental reservations and financial constraints, assuring high quality of curricular entrepreneurship teaching turned out to be a major issue at many universities (see section 3.2 above). This may be an initial challenge when EE is being introduced or has been introduced recently so that the university does **not have much experience**. Even if EE is already established, there may be a problem for the quality of teaching because many educators have no or no deep practical entrepreneurial experience, as found in the case studies.

Universities may also be challenged when seeking to improve EE teaching in the light of new insights gained about how EE could and should be designed or when facing changing demand from students. Universities may then not know how to tackle the aspired changes for using **new contents, methods and media**. For example, the use of online media such as massive open online courses (MOOCs), blogs or communication platforms in EE was not found to be very prevalent in the case universities.

A further challenge may be to design **offers for specific target groups**. The case studies found that curricular offers are mostly directed towards students of business and economics, not so much to students in other academic disciplines. Moreover, EE offers in continued education, for example for SME owners or managers of large enterprises are apparently not widespread. The same applies to links with secondary education.

Moreover, while the case studies substantiate the importance of interdisciplinary teaching for EE, there are still strong **boundaries between different academic schools** and departments.

Assuring EE quality may be a particular challenge in cases of **personnel changes**, e.g. when EE educators who built up the programme leave the university. Challenges may also arise when mid-level educators leave the university – there is typically a high fluctuation of mid-level university teaching staff.

Finally, in some countries or at some universities there may be **unfavourable legal framework conditions** for specific aspects of EE. Students may lose their student-related benefits when they engage in commercial activities even on a very low scale (see e.g. Ljubljana). There may also be regulations impeding involvement of entrepreneurs and other business people into teaching (e.g. reported from Kozminski and Osijek). The study could however not look deeper into national or EU regulation and analyse such reports in more detail. The approach to possible solutions and policy implications thus needs to be cautious. There may also be regulations impeding joint EE teaching or awarding degrees between universities and universities of applied sciences.

Possible solution: using innovative methods and enhanced teaching the educators

The solution for ensuring high quality of entrepreneurship teaching may be in involving external experts, introducing dedicated approaches for teaching the educators as well as introducing innovative methods of teaching entrepreneurship.

- As regards **innovative methods of teaching** entrepreneurship, universities may consider making more comprehensive use of online media (see e.g. Kaunas). Media such as MOOCs may be important for further scaling EE, i.e. reaching not only students on campus but also outside (see Lyon). New media may also help improving the efficiency of EE – teaching content and material developed at one place to be used and distributed online by others.
- As regards **educating the educators**, universities may offer local instruction to individuals or groups of educators by the university (e.g. Huddersfield). Furthermore, national networks of EE educators and their training offers may help sustain or increase EE quality (e.g. Kozminski, Cambridge, and Huddersfield). Such national networks may also provide repositories for teaching material (see Kozminski for Poland). There are also international EE networks such as the European Forum for Entrepreneurship Research (EFER) and platforms like HEInnovate – a joint initiative by the European Commission and the OECD – which foster good practice exchange.
- Universities seeking to establish EE may use targeted **support from experts from abroad** and peer universities in other countries (see for example Kaunas and Osijek).

- In order to enhance entrepreneurial mindsets and commercialisation opportunities, universities may seek **more interdisciplinary teaching** through linking educators and students from departments of business, design, and engineering as well as other disciplines (see for example Lund).

Policy implications

National policy makers can support the establishment or development of **national EE networks** through encouragement, bringing relevant actors together or co-funding. In regions with a larger number of higher education institutions there could even be regional networks (see for example the German FGF e.V., Förderkreis Gründungsforschung). Policy makers could also support or encourage international EE support networks, for example for creating databases of EE educators or entrepreneurs ready to act as guest speakers.

Policy makers could also introduce national or international **accreditation schemes for EE**. Formal standards may help sustain and increase the quality of EE teaching.

To the extent that legal framework conditions are not conducive for entrepreneurship education while their modification would not seriously harm other objectives, governments may consider **revising existing regulation**. This may first of all be a task of the governments in charge of higher education policy. This may be the national level in most Member States and the regional level in some. Governments could consider introducing or modifying wider **strategies and programmes related to EE** which imply legal changes. Some countries like Denmark already introduced legal requirements to establish EE (see Southern Denmark). At the time of writing this report, Finland is about to revisit its policies for entrepreneurship education.

As regards possibly hampered involvement of practitioners and students' entrepreneurial activity, universities may encourage **modifications of related legal framework conditions** through lobbying or positions in advisory councils.

Challenge 4: Assuring sustainability and quality of extra-curricular activities

Specific challenge: Fragility of extra-curricular entrepreneurship activities

The informal "add-on" nature of extra-curricular EE beyond curricular offers provides opportunities essential for expanding entrepreneurial skills and behaviour in higher education (see section 3.3): The flexibility of extra-curricular EE enables rapid introduction of emerging entrepreneurship themes and crafting hands-on, problem-based learning activities for different target groups.²⁹ This opportunity allows universities experienced in EE to expand their teaching portfolio, and universities just establishing EE to initiate and showcase entrepreneurship activities. This informal character of extra-curricular EE, however, also appears to have specific problems:

- **Potentially compromised quality:** Extra-curricular formats carry risks of poor educational content due to a lack of institutionalised evaluation and monitoring procedures and sometimes untrained external instructors. There may also be particular shortcomings in the assessment of students' learning outcomes and feedback mechanisms.
- **Lower incentives to participate:** Entrepreneurship activities depend on engaged students and teaching staff. However, continuous commitment to extra-curricular EE was reported as a problem: Students by definition do not gain credits and staff face potential opportunity costs against curricular teaching and a lower academic credibility of extra-curricular teaching.
- **Volatile extra-curricular EE educators:** Extra-curricular EE activities regularly depend on the commitment of individual educators and their personal networks, for example to entrepreneurs, consultants or sponsors.³⁰ If these educators stop their engagement, the extra-curricular activity may come to an end.

²⁹ E.g. social entrepreneurship activities in addition to curricular offers in business entrepreneurship or providing start-up support not possible in a curricular format. See also NIRAS et al./ EC (2008).

³⁰ This was also identified as the prime barrier in NIRAS et al. / EC (2008).

- **Vague support:** Continuous support for personnel and funding of extra-curricular EE is often uncertain.

Overall, these potential detriments may make **extra-curricular EE activities fragile**. Long-term and complex extra-curricular activities are thus difficult to establish.

Possible solutions: curricular integration and paid extra-curricular offers

Sustaining and expanding extra-curricular EE may require an increased appreciation of their benefits and, to the extent it is meaningful, their institutionalisation. There is a dilemma, however, as one expert put it: "Sometimes these activities are so new that you should not kill them by putting university bureaucracy on them." Trying to keep a fruitful balance between flexibility and formality, university managers could do the following:

- **Bundling:** Assembling individual extra-curricular EE activities into a fully-fledged extra-curricular education programme consisting of the previously single activities, for example into continued education schemes, and institutionalising them loosely by having them managed through entrepreneurship centres at the university (see the cases of Cambridge and Rotterdam).
- **Integrating:** Enhancing the credibility of the activities – for students and staff – by integrating former extra-curricular formats into curricula. For example, a social entrepreneurship project competition could be incorporated into a curricular programme. However, if such curricular integration is targeted right at the beginning of a new activity, it may be hampered due to a lengthy accreditation process.
- **Paid education:** Offering chargeable extra-curricular offers may create incentives for departments and entrepreneurship centres to sustain them (see Cambridge and Rotterdam). In some countries and at some universities, regulations governing such commercial offers would need to be changed, and academic acceptance of such commercialisation would need to be managed.

Policy implications: supporting platforms, establish certification body

Policy makers could further **support national or pan-European extra-curricular entrepreneurship platforms** like challenges, competitions, or contests. Many case universities use platforms like Enactus, Junior Achievement and Start-up Weekend, which are organised by third-parties (see for example the cases of Bucharest, Kosice, Lüneburg, Linz, Lund, Osijek). They offer internationally recognised activities, well-established concepts, and operational routines. Education policy makers may use their infrastructure to raise awareness for them through conferences or workshops in communication with European universities.

Policy makers could also support the initiation or further development of **certification bodies** or procedures for evaluating extra-curricular entrepreneurship activities. Certified assessments could provide at least some quality assurance and provide external legitimating effects for entrepreneurship education formats through independent third-party endorsement. An example is the Small Business Charter Initiative in the UK which evaluates universities' entrepreneurship-related activities on-site. An alternative and less formal approach than certification bodies would be a procedure similar to the UK kite mark system, in which product and service quality elements are marked with a quality symbol.

Challenge 5: Assuring strong networks for supporting entrepreneurship education

Specific challenges: limited scope and strength of external networks

All case studies show the importance of collaborating with external stakeholders in EE. Strong networks with external partners may indeed be a key success factor for EE (see section 3.1.1), i.e. for changing mindsets, improving skills and also creating ventures. There are however a number of related challenges. The case studies found that networks with external stakeholders are often quite weak in scope and strength:

- Few universities have established **databases, formal networks or regular events** for managing external stakeholders.
- Collaboration with **alumni** in EE was found to be limited and there are few formal alumni associations bound into EE.

- There are few examples of start-up **support services, incubators and accelerators** dedicated to start-ups from the university.
- The number of **science and technology parks** designed for and actively supporting entrepreneurial activities by students, graduates and the university's researchers appears to be limited.
- Regional and national **collaboration with other universities** for developing EE was found to be rare, possibly due to competition. Collaboration with international universities was found to be more prevalent but it may also be more resource-consuming.
- Some countries have a limited entrepreneurial ecosystem, i.e. relatively weak ties between universities and **enterprises** and a lack of venture finance. This may apply particularly to Eastern Europe. International collaboration with non-university stakeholders (e.g. enterprises) was also found to be scarce.

Possible solutions: widening and strengthening external networks

The solution would be to strengthen networks with external stakeholders:

- Establishing **entrepreneurship-related stakeholder databases and networks**: They can foster collaboration and serve as a platform for the organisation of regular events where stakeholders can meet. Examples include formal membership in the Erasmus Centre for Entrepreneurship at the University of Rotterdam, a regular start-up fair at Linz University as well as the FABIZ Business Council and the Fabil Entrepreneurs Club in Bucharest.
- Involving **alumni** in EE may be a simple, cheap and trustful way to find guest speakers, mentors, coaches, and finance providers. Formal alumni networks could be established if not yet existing in order to improve alumni management (see Liège, Rotterdam and Linz).
- Fostering start-up **support services, incubators and accelerators**: Instead of relying on external support services, universities could establish own offers, such as university incubators, accelerators or entrepreneurship foundations (see Huddersfield for support services as well as the Kaunas TU start-up space and the EM Lyon incubator).
- **Science and technology parks** could be oriented more towards fostering entrepreneurship of university members. They could serve as a meeting point for EE stakeholders and facilitate interaction due to their close proximity to the university (see the examples of Coimbra, Lund and Linz).
- Extending regional, national, and international **collaboration among universities** and building a network of entrepreneurship-related universities may help to exchange good practices (see Kaunas for international co-operation with peers, Kosice for co-operation with other universities in Eastern Slovakia in coaching student start-ups and venture projects).
- Developing **networks with enterprises** may enhance the availability of guest speakers, mentors, and funding providers. Enterprises can also be bound in through an advisory board.
- Increasing **international collaboration** with non-university stakeholders, e.g. enterprises or student-organisations, may foster the exchange of good practices in EE. It could also broaden the focus beyond local actors to an international entrepreneurship scene.

However, such activities may require considerable time, funding, and personnel. It may be advisable for each university to define primary stakeholder groups to focus on and to plan stakeholder involvement thoroughly.

Policy implications: support for building networks

Policy makers could **promote databases and networks** for connecting universities with enterprises such as the Enterprise Europe Network³¹ and initiatives like the University-Business Forum³² which facilitate collaboration. Standardised databases or networks for entrepreneurship education could be created on a European level.

³¹ See <http://een.ec.europa.eu>.

³² See <http://ubforum2015.teamwork.fr>.

Moreover, **regular meetings between key stakeholders** in entrepreneurship education could be organised. A European or National Stakeholder Board for Entrepreneurship Education could be established which includes representatives from universities, governmental actors and the private sector.

Some of the possible solutions may require significant investment so that **targeted support** from governments would be necessary. Governments or governmental agencies could provide dedicated funds to create or develop incubators and accelerators and build a support infrastructure for start-ups. They could establish or develop entrepreneurship-related science and technology parks to foster local collaboration between stakeholders.

Challenge 6: Measuring outcomes and impact of EE

Specific challenges: Difficult and resource-consuming measurement

There are often high expectations about positive impacts of EE on students' mindsets, skills, behaviour, venturing, and ensuingly on the regional economy. There are also demands for tracking EE effects systematically (Vanevenhoven/Liguori, 2013; Martin et al., 2013; Rideout/Gray, 2013; Bae et al., 2014). Measuring outcomes and impact of EE may be a possible or even a mandatory means to legitimate EE and ensure funding for it. However, few case universities use sophisticated, EE-specific, and institutionalised instruments to measure EE outcomes and impact (see section 3.6.1). The reason is that such measurement may be difficult as well as time- and resource-consuming (see also Duval-Couetil, 2013):

- **Difficult choice of measurement instrument:** There is no "silver bullet" to a universal impact measurement tool which may be employed in entrepreneurship teaching.
- **Need to collect data over a long time:** EE impacts may occur in the long run. In order to get a clear picture, outputs and impacts need to be examined longitudinally across career paths and choices of students, graduates, and professionals.
- **Need to collect and preserve large samples:** Large numbers of participants are required to measure impacts because there is a typical "panel mortality" – participants drop out of EE panel studies after leaving university.
- **Need to measure a range of impacts:** Merely measuring the number, growth and survival of business ventures as an output is not sufficient. Additional tools to capture further impacts such as social or ecological outputs of entrepreneurial projects are required. Indirect effects, for example on general graduate employability, may also be useful (see section 3.6.1). Measuring changes in mindsets may be particularly rewarding but is conceptually and empirically difficult.
- **Difficult justification of specific measuring tools for EE:** Since other academic disciplines use university-wide course evaluation tools, they may not easily accept specific tools to evaluate entrepreneurship teaching because such specific tools would draw from the university's scarce resources. This may hamper the implementation and institutionalisation of specific measuring tools for EE.

Possible solutions: Evaluating EE, tracking start-ups

Possible ways forward for measuring impacts of EE may be the following:

- **Developing national databases for EE** for enabling evaluations across many universities. Such databases could enable researchers to analyse micro data linking students who participate in EE with outcomes in terms of employment, mindsets, and venture creation.
- Providing **support for entrepreneurship as a central theme** in universities that needs specific impact measurement. The institutional status of specific EE impact measurements could be improved as compared to other academic disciplines. Specifically, impact measurement in EE could be both ex-ante and ex-post (see Kaunas, Southern Denmark) – general course evaluation at universities is often only ex-post.
- Further **improving cross-university co-operation** in fine-tuning measurement instruments, building joint samples for EE evaluation, and fostering national evaluations across many HEIs. Such co-operation could also take place on an international level. It could build on existing efforts such as GUESSS, ASTEE, or the Entrepreneurship Education Project.

- **Expanding EE evaluation towards entrepreneurial mind sets:** Current evaluation instruments often focus mainly on new venture creation, including start-up or self-employment competences, preferences and intentions. In addition, enterprising mindsets could also be included in impact evaluation with regard to graduate employability, innovativeness, and creativity (e.g. as envisioned in the ASTEE approach). Building on these and other existing initiatives, establishing an open EU-level set of standard impact measurement tools (for a different context of entrepreneurship education activities) could be a medium-term goal.
- **Increasing the attractiveness of EE impact studies** for researchers by giving this field more space and a higher priority in academic research journals. This may attract more research and more sophisticated research about entrepreneurship teaching.

Policy implications:

Generally, education policy makers can further support and continue to **fund projects of EE impact measurement** in order to gain more insights. In particular, further conferences, workshops and platforms for discussion may be organised to propel the above-mentioned solutions and directions for the further establishment and institutionalisation of EE impact measurement. In this exchange, further stakeholders may be involved in order to jointly decide on priorities in EE impact evaluation. This may apply especially to measures going beyond traditional EE outputs like venture creation. Relevant stakeholders may include education policy makers, entrepreneurs, business associations and chambers of commerce, employment and career service representatives among others.

Concluding remarks

The aforementioned challenges, possible solutions and policy implications may help in enhancing entrepreneurship education in Europe. Universities, policy makers and stakeholders may benefit from the ideas presented. Future studies may take a broader perspective, including more universities with an even broader spectrum of contexts and educational offers. It may be worthwhile to also examine universities outside Europe to benchmark European EE. Further qualitative case studies may pay deeper attention to the economic, legal and cultural contexts under which the universities operate. This may for example include an examination of national EE networks and legal framework conditions. Follow-on studies could take a quantitative approach for data collection. This may also help in substantiating possible differences between Northern, Western, Eastern, and Southern Europe and help in finding adequate solutions for particular regions.

References

- Bae, T. J. et al. (2014): The relationship between entrepreneurship education and entrepreneurial intentions: a meta-analytic review. In: *Entrepreneurship: Theory & Practice*, Vol. 38, No. 2, pp. 217–254.
- Blok, V. et al. (2014): Managing the improvement of entrepreneurship education programmes: a comparison of universities in the life sciences in Europe, USA and Canada. In: Fayolle, A. and Redford, D.T. (eds.) *Handbook on the entrepreneurial university*, Cheltenham/Northampton: Edward Elgar, pp. 64-90.
- Cuhls, K. (2003): Foresight Tools Delphi Surveys. In: UNIDO (ed.): *Foresight Methodologies Workbook*.
- Day, J. and Bobeva, M. (2005): A Generic Toolkit for the Successful Management of Delphi Studies. In: *The Electronic Journal of Business Research Methodology*, Vol. 3, No. 2, pp. 103–116.
- Donohoe, H.M. And Needham, R.D. (2009): Moving Best Practice Forward: Delphi Characteristics, Advantages, Potential, Problems, and Solutions. In: *International Journal of Tourism Research*, Vol. 11, pp. 415–437.
- Duval-Couetil, N. (2013): Assessing the impact of entrepreneurship education. Programs: Challenges and approaches. In: *Journal of Small Business Management*, Vol. 52, No. 3, pp. 394–309.
- EC (2008): *Entrepreneurship in higher education, especially within non-business studies – Final Report of the Expert Group*. Brussels: Directorate-General for Enterprise and Industry.
- EC (2011): *Entrepreneurship Education: Enabling Teachers as a Critical Success Factor: A report on Teacher Education and Training to prepare teachers for the challenge of entrepreneurship education. Final report*, Brussels: Entrepreneurship Unit, Directorate-General for Enterprise and Industry.
- EC (2012): *Report on the results of public consultation on The Entrepreneurship 2010 Action Plan*. Brussels: Unit D.1 Entrepreneurship 2020, DG Enterprise and Industry.
- EC/OECD (2012): *A Guiding Framework for Entrepreneurial Universities. Final version*, 18th December 2012.
- EC (2012a): *Effects and impact of entrepreneurship programmes in higher education*. Brussels: Entrepreneurship Unit, Directorate-General for Enterprise and Industry.
- EC (2013): *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Entrepreneurship 2020 Action Plan: Reigniting the entrepreneurial spirit in Europe*. Brussels, COM(2012) 795 final, 9.01.2013.
- EC (2014): *Entrepreneurship Education: A Guide for Educators*. Brussels: Entrepreneurship 2020 Unit, Directorate-General for Enterprise and Industry.
- EC (2014a): *How to assess and evaluate the influence of entrepreneurship education, ASTEE project: Assessment Tools and Indicators for Entrepreneurship Education, A report of the ASTEE project with a user guide to the tools*.
- EC (2015): *Entrepreneurship Education: A road to success: A compilation of evidence on the impact of entrepreneurship education strategies and measures*. Brussels: Unit F.1 Entrepreneurship and Social Economy, Directorate F Entrepreneurship & SMEs, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. Luxembourg: Publications Office of the European Union.
- EC (2015a): *Entrepreneurship Education: A road to success: 13 Case studies prepared for the study 'Compilation of evidence on the impact of entrepreneurship education strategies and*

- measures'. Brussels: Unit F.1 Entrepreneurship and Social Economy, Directorate F Entrepreneurship & SMEs, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs. Luxembourg: Publications Office of the European Union.
- Fayolle, A. (2013): Personal views on the future of entrepreneurship education In: *Entrepreneurship & Regional Development: An International Journal*, Vol. 25, No. 7-8, pp. 692-701.
- Fayolle, A. and Redford, D.T. (2014): Stakeholder management and the entrepreneurial university. In: Fayolle, A. and Redford, D.T. (eds.) *Handbook on the entrepreneurial university*, Cheltenham/ Northampton: Edward Elgar, pp. 11-24.
- Ghina, A. (2014): Effectiveness of Entrepreneurship Education in Higher Education Institutions. In: *Procedia – Social and Behavioral Sciences*, Vol. 115, pp. 332-345.
- Halbfas, B. G. (2006): *Entrepreneurship Education an Hochschulen: Eine wirtschaftspädagogische und -didaktische Analyse*, Paderborn: Eusl.
- Helmer, O. (1967): *Analysis of the Future: The Delphi Method*, Santa Monica: The RAND Corporation.
- Howorth, C. et al. (2012): Social learning and social entrepreneurship education. In: *Academy of Management Learning & Education*, Vol. 11, No. 3, pp. 371-389.
- Klandt, H. and Volkmann, C. (2006): Development and Prospects of Academic Entrepreneurship Education in Germany. In: *Higher Education in Europe*, Vol. 31, pp.195-208.
- Küttim, M. et al. (2014): Entrepreneurship education at university level and students' entrepreneurial intentions. In: *Procedia – Social and Behavioral Sciences*, Vol. 110, pp. 658-668.
- Leitch, C. et al. (2012): Entrepreneurship education and context. In: *Entrepreneurship & Regional Development: An International Journal*, Vol. 24, No. 9-10, pp. 733-740.
- Lourenco, F. et al. (2013): Promoting sustainable development: The role of entrepreneurship education. In: *International Small Business Journal*, Vol. 31, No. 8, pp. 841-865.
- Matlay, H. (2009): Entrepreneurship education in the UK: A critical analysis of stakeholder involvement and expectations. In: *Journal of Small Business and Enterprise Development*, Vol. 16, No. 2, pp. 355-368.
- Martin, B. C. et al. (2013): Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. In: *Journal of Business Venturing*, No. 28, pp. 211-224.
- Morris, M. H. et al. (2013): A competency-based perspective on entrepreneurship education: Conceptual and empirical insights. In: *Journal of Small Business Management*, Vol. 51, No. 3, pp. 352-369.
- NIRAS et al./EC (2008): *Survey of Entrepreneurship in Higher Education in Europe. Main report*, Brussels: Directorate-General for Enterprise and Industry.
- O'Connor, A. (2013): A conceptual framework for entrepreneurship education policy: Meeting government and economic purposes. In: *Journal of Business Venturing*, No. 28, pp. 546-563.
- OECD (2010): *Universities, Innovation and Entrepreneurship: Criteria and Examples of Good Practice*. OECD Local Economic and Employment Development (LEED) Working Papers, 2010/10, OECD, Paris.
- Pardo, C. A. (2013): Is business creation the mean or the end of entrepreneurship education? A multiple case study exploring teaching goals in entrepreneurship education. In: *Journal of Technology Management & Innovation*, Vol. 8, No. 1, pp. 1-10.
- Pittaway, L. and Cope, J. (2007): Entrepreneurship Education: A Systematic Review of the Evidence. In: *International Small Business Journal*, Vol. 25, pp.479-510.

- QAA, The Quality Assurance Agency for Higher Education (2012): Enterprise and entrepreneurship education: Guidance for UK higher education providers. September.
- Rasmussen, E. et al. (2014): The influence of university departments on the evolution of entrepreneurial competencies in spin-off ventures. In: *Research policy*, Vol. 43, No. 1, pp. 92–106.
- Rideout, E. C. and Gray, D. O. (2013): Does entrepreneurship education really work? A review and methodological critique of the empirical literature on the effects of university-based entrepreneurship education. In: *Journal of Small Business Management*, Vol. 51, No. 3, pp. 329–351.
- Sternberg, R. (2014): Success factors of university spin-offs: Regional government support programs versus regional environment. In: *Technovation*, Vol. 34, No. 3, pp. 137-148.
- Støren, L. A. (2014): Entrepreneurship in higher education. In: *Education + Training*, Vol. 56, No. 8/9, pp. 795-813.
- Streeter, Deborah H.; Jaquette, John P.; Hovis, Kathryn (2002): University-wide Entrepreneurship Education: Alternative Models and Current Trends, Cornell University, Working Papers 2002-02. (Available for download at, http://dyson.cornell.edu/research/researchpdf/wp/2002/Cornell_Dyson_wp0202.pdf, last accessed 27/5/2015.)
- Vanevenhoven, J. and Liguori, E. (2013): The Impact of entrepreneurship education: Introducing the entrepreneurship education project. In: *Journal of Small Business Management*, Vol. 51, No. 3, pp. 315–328.
- Volery, T. (2013): The impact of entrepreneurship education on human capital at upper-secondary level. In: *Journal of Small Business Management*, Vol. 51, No. 3, pp. 429–446.
- Volkman, C. et al. (2009): Educating the Next Wave of Entrepreneurs – Unlocking entrepreneurial capabilities to meet the global challenges of the 21st Century, Cologne/Geneva.
- Volkman, C. and Grünhagen, M. (2014): Integrated support for university entrepreneurship from entrepreneurial intent towards behaviour: The case of the German „EXIST“ policy programme. In: Fayolle, A. and Redford, D.T. (eds.) *Handbook on the entrepreneurial university*, Cheltenham/ Northampton: Edward Elgar, pp.225-247.
- Walter, S. G. and Dohse, D. (2012): Why mode and regional context matter for entrepreneurship education. In: *Entrepreneurship & Regional Development: An International Journal*, Vol. 24, No. 9-10, pp. 807-835.
- Wright, M. (2014): Academic entrepreneurship, technology transfer and society: where next? In: *Journal of Technology Transfer*, Vol. 39, No. 3, pp. 322–334.

Annex: Detailed assessment framework

Theoretical framework

A principal task of the study is to “synthesise the interrelationships and dependencies of curricular, extracurricular, and institutional factors enabling the development of entrepreneurial potential of higher education” (tender specifications). In order to carry out such a synthesis, a thoughtful assessment framework needs to be developed right at the beginning of the study. This framework already guided the development of questionnaires for the first Delphi survey and the development of templates for carrying out case study research. The framework is developed from findings from the literature survey, the first round of the Delphi survey, as well as the wealth of knowledge and experience of the tenderers gained in many years of related research.

The suggested broad fundament served and will serve as thinking frame for two tasks within the delivery of the project:

- First, for mapping out the details of the assessment framework in the early stage of the project. In particular, the holistic education model allowed integrating more specific theoretical approaches towards and empirical knowledge about the impacts on (extra-) curricular elements to be researched and questions to be determined in close coordination with DG Education and Culture deciders (as mapped out below in the next section). Such conceptual aspects are, amongst others, management of trainers, reward systems, continued education, gender-specific education and diversity, as well as the heterogeneity of academic fields.
- Second, for pre-structuring the issues and dimensions of the case studies to be conducted, thus informing the preparation of semi-structured guidelines for case interviewing and additional on-site data collection at the case HEIs. A pre-structured, yet flexible approach towards case data will be essential to ensure replication of cross-case data in the multiple case study design while, at the same time, appreciating the heterogeneity of entrepreneurship education measures at the case HEIs, which will feature different resource- and institutional settings as well as diverse country-specific education policy contexts.

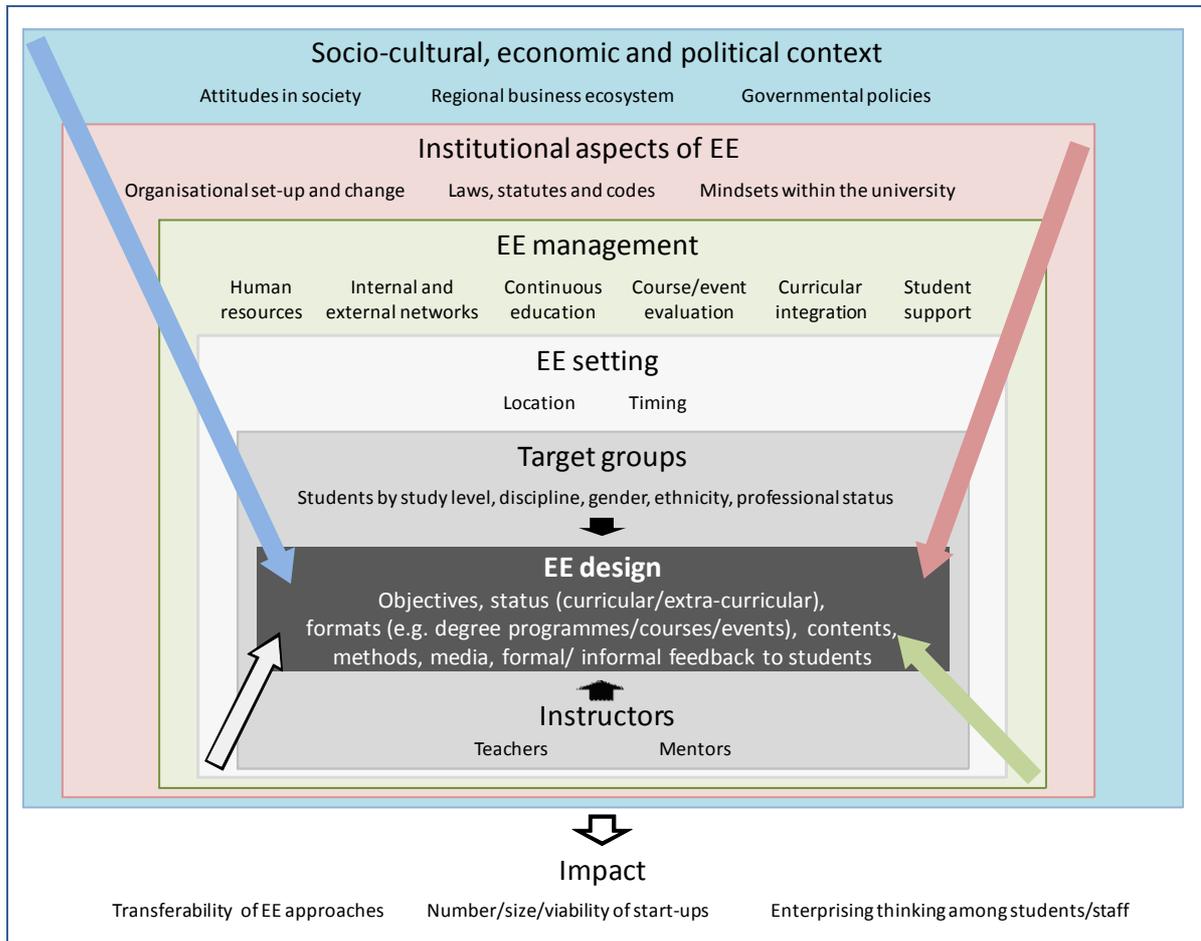
A holistic education model as a reference framework for entrepreneurship education in higher education

As a basis for developing the assessment framework the tenderers suggested a holistic education model to manage and control the exploration of curricular, extracurricular, and institutional questions. During the phase prior to the inception report, the framework was modified by taking into account latest findings in the literature and the results of discussions and cooperation between the Commission and the study team.

In the core of the model you find the basic curricular decisions. Professors, trainers and even persons who are responsible for extra-curricular activities first have to analyse the following questions:

Who is my **target audience**? What is the students’ current academic level? Do they have prior experiences with entrepreneurship and entrepreneurial thinking and behaviour? How diverse is the current group of students? What are their respective individual learning pre-conditions?

Exhibit 4-1: Reference framework for the sepHE study



Source: University of Wuppertal, iENTIRE / empirica

After that, they have to decide:

What aim should the students have reached at the end of the course/activity? What should they have learned? Which behaviour, values and attitudes should they have gained (learning intentions, learning objectives or competences; e.g. students should be able to evaluate the quality of a business model canvas and should be able to modify the canvas.)

Which content should be transferred to the students? Through which means should that content be delivered (e.g. business planning, business model canvas)?

How is it taught (e.g. short lecture by professors or trainers, e-learning-model, simulation game)?

Which media are employed (e.g. online-tools, flip charts, text-books)?

These four categories are closely interlinked and strongly interdependent.

They also have to decide, how to **evaluate** the **learning outcome**. This evaluation is understood as a feedback for students to get a realistic insight in their attained competences. For example: Are students able to handle the business model canvas at the aspired high level of evaluation? This can be measured for example by student self assessment, by observation of their behaviour, by reflecting their performance using dialogue oriented methods, up to oral or written exams.

At the **level of setting entrepreneurship in curricular and extra-curricular activities** decisions are required concerning the location (Where should the course or activity take place) and the timing (When should it happen?). It is easy to understand, that within a university

context the decision on time and location cannot be taken by a single person due to the organisational conditions. At this level one also has to ask about the qualifications and experiences of the trainers or other persons involved. In general, at the end of the course trainers and professors should evaluate the whole course or activity.

The **level of management of curricular and extra-curricular entrepreneurship education** involves aspects such as the selection and training of staff and other people involved as well as the design of incentive and reward systems and internal and external network management to guarantee an excellent and up-to-date entrepreneurship education. Furthermore, it encompasses curricular integration: What kind of new courses, intentions and methods should be integrated in our entrepreneurship-curriculum? Is there any so far extracurricular activity which should be integrated in the curriculum?

At the **level of institutional aspects of entrepreneurship education**, it will be a question of how different units of the organisation and their communication, interaction and relationship develop and how they innovate and change. This can be seen in laws, statutes and codes (such as mission statements) and also is reflected in the change of entrepreneurial mindset in the staff.

Finally, **the socio-cultural and political level** demonstrates that educational processes in general are embedded in a national framework of laws, norms, values and policy measures. Within the scope of this study it is rudimentary possible to consider concrete implications of that level as well as interdependencies between the levels and their internal layers. This could for instance take place in form of programs which foster entrepreneurship and entrepreneurial thinking and behavior on a regional and national level.

Empirical design

Based on the model presented above, a case study template has been developed, which refers in many places to the HEInnovate tool of the European Commission. The draft case study guidelines and template will serve as a basis for the development of a field manual which will be created in consequence of the Case-Study Selection Workshop. This field manual states which persons at which positions are to be interviewed on which particular topics. Moreover, it will be outlined which materials will be requested and evaluated.