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Promoting Successful
Graduate Entrepreneurship
at the Technical University
Ilmenau, Germany

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PROMOTING SUCCESSFUL GRADUATE ENTREPRENEURSHIP

AT THE TECHNICAL UNIVERSITY ILMENAU, GERMANY

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This report presents the findings of a review of current strategies and practices in entrepreneurship support provision at the Technical University Ilmenau. The report also presents a selection of international learning models with the aim of providing inspiration for new approaches at the Technical University Ilmenau.

The following questions have been investigated:

- What are current strategies and practices in university entrepreneurship support?
- How accessible is entrepreneurship support for students and graduates?
- How well is the university entrepreneurship support integrated into the wider local entrepreneurship support system?

The report presents achievements and challenges in light of the above questions and advances recommendations for future action. The assessment framework employed for the review is presented in the Annex of this report.

The report is based on a background report prepared by region+projekt, interviews held during a study visit to the Technical University Ilmenau on 27-28 June 2011, and comparisons with international experiences and good practices in university entrepreneurship support. The Technical University of Ilmenau is one of six case-study higher education institutions that are reviewed as part of an on-going joint project between the LEED Programme of the OECD and the German Federal Ministry of Interior. The Ministry of Economy of Thuringia and the Ministry of Education and Research of Thuringia have been the main partner institutions at Land level.

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TABLE OF CONTENTS

STUDY ISSUES AND FINDINGS	5
Rationale for university entrepreneurship support.....	5
Key achievements.....	8
Key challenges.....	8
Recommendations.....	10
INTERNATIONAL LEARNING MODELS.....	14
ASSESSMENT FRAMEWORK	18

Boxes

Box 1. The StartupWheel	15
Box 2. The “One-door-in”-approach – Copenhagen School of Entrepreneurship (CSE).....	16
Box 3. New cross-disciplinary education at Aalborg University	17

STUDY ISSUES AND FINDINGS

Rationale for university entrepreneurship support

“We pour considerable amounts of money into our educational systems, but we haven’t been able to create schools and institutions of higher education that develop people’s innate capacity to sense and shape their future, which I view as the single most important capability for this century’s knowledge and co-creation economy”. (Scharmer, 2007, p. 3)¹

Many different inputs are required for successful entrepreneurship, one of the most important being entrepreneurship skills. Motivated people need the right skills to identify entrepreneurial opportunities and to turn their entrepreneurial projects into successful ventures. Successful entrepreneurs follow a learning journey, which starts in education and continues with learning-by-doing processes; both formal and informal learning inside and outside the firm.

Higher education institutions provide unique environments for nascent entrepreneurship. Tailored practices have emerged in educating future entrepreneurs and in helping them to take their first steps in starting-up and growing a business (OECD 2010)². To best support entrepreneurship, universities themselves need to be entrepreneurial. Promoting entrepreneurship is very likely to have an impact on what most universities today perceive as their ‘first’, ‘second’ and ‘third’ missions, and what the best linkages are between education, research, and promoting social and economic development in terms of internal governance, positioning in local, national and global levels and strategic partnerships.

University entrepreneurship support³, considered on its own, has its limits. It prepares students for future entrepreneurial careers and promotes the commercialisation of research results. However, success depends upon the close co-operation and integration of the university internal support with the external entrepreneurship support system.

Assisting the establishment of new firms is a key objective of university entrepreneurship support, but not its only one. The co-existence of tangible outputs (e.g. the number of assisted new ventures) and intangible outcomes, such as the spread of entrepreneurial culture and the creation of entrepreneurial mindsets, renders assessing the impact of university entrepreneurship support a challenge that requires tailored approaches and systematic, long-term evaluation efforts.

Entrepreneurship education can play at least three legitimate roles in the development of an entrepreneurial society. First, it can present entrepreneurship to students as a possible career choice as

¹ Scharmer, C.O. (2007): “Theory U. Leading from the Future as it Emerges”, The Society for Organizational Learning.

² OECD (2010), “Universities, Innovation and Entrepreneurship: Criteria and Examples of Good Practice”, OECD Publishing. <http://dx.doi.org/10.1787/5km7rq0pq00q-en>

³ In this report, the term “university” is used for both universities and universities of applied sciences.

well as acting as a general advocate for the mindset and type of creativity employed in entrepreneurial endeavours. Second, it can assist students in developing the technical and business skill-set essential to having a successful entrepreneurial career. Third, professional educators can assume the responsibility of advancing the body of knowledge associated with the entrepreneurial phenomenon. Their findings should not only be disseminated to students but also to policy-makers and the public at large (Redford, 2006).⁴

When launching a new venture, the entrepreneur can either have a (somewhat) precise venture idea, or a set of competences, skills, resources, and contacts to dwell on. Moving from an either-or situation to a greater coincidence of ideas and competences is what entrepreneurship education programmes aim to achieve.

Education and training contribute to the development of the entrepreneur's knowledge of what Sarasvathy (2001) calls the "three categories of means". Ideally, entrepreneurs should know who they are, what they know, and whom they know. They should also be aware of their own traits, tastes, and abilities, and know the knowledge corridors they are in and the social networks they are a part of. For Sarasvathy the entrepreneur that possesses all three knowledge-means is an effectuation entrepreneur.⁵ She or he is less likely to use traditional types of market research (such as carefully designed surveys), but reverts to "seat-of-the-pants marketing" and selling alliances. Instead of long-term planning and net-present-value analyses, preference is on short term planning. Hierarchical structures based on power-related procedures are replaced by strong participatory cultures nurturing the entrepreneur's relational capital. Finally, despite the greater likelihood of failure, effectuation entrepreneurs are more likely to effectively manage failures, to re-start, and to create more successful firms in the long run. Hence, the idea is to take advantage of three core elements rooted in the individual rather than the product or the market:

- Who am I?
- What do I know?
- Who do I know?

There is increasing awareness amongst universities and local entrepreneurship support providers of putting more emphasis on action plans rather than business plans. The importance of drive and energy based on proactive conduct is better valued than academic and written intentions. There is a big difference between what you *do* and what you *would like* to do. Although market analysis and other relevant tasks and preparations surely could be proved valid and very important, the emphasis should be on the constant drive and development of the venture. Entrepreneurs rarely want to have to write long reports – they want development and results. Thus looking at the start-up as an organic, ever-changing entity should be supported. The following quote illustrates this:

The major difficulty that may arise when functional inputs are dominant – as they seem to be in many programmes – is that they may deny the capacity for development of the kind of holistic management that is central to the entrepreneur. Entrepreneurial managers are

⁴ Redford, D. T. (2006). Entrepreneurship Education in Portugal: 2004/2005 National survey. *Comportamento Organizacional e Gestão, Special Issue: "New Challenges in Entrepreneurship"*, 12(1), 19 - 41.

⁵ The website www.effectuation.org provides concrete ideas, article and papers, best practices as well as relevant perspectives for different stakeholders such as researchers, entrepreneurs, and investors.

managers of the ‘total’ business and thus able constantly to ‘feel’ it. Entrepreneurs seek knowledge on a ‘need to know’, ‘know how’ and ‘know who’ basis and, in the experience of the author working with many groups of entrepreneurs, will enthusiastically embrace new knowledge when it brings forward future recognisable contextual experience to them and helps them to conceptualise and give broader meaning to their existing problems and opportunities. (Gibb, 2005)⁶

Often business plans are invalid after just a short amount of time and/or actions. Instead a systematic, holistic “are-we-on-the-right-track” description is needed. Investors and other resources required for developing the venture are often much more interested in progress than in prophecies. Therefore, this way of looking at start-ups also needs to be communicated to those involved in financing, mainly banks. In contrast with banks, (private) business angels and early seed venture capitalists are advocating this as they see their investment from a more reliable stand point rather than being solely based on presumptions. A belief in the team and the ability to follow the day-to-day actions and developments of the business is more reassuring for the investor.

The emphasis in university entrepreneurship support, to date, has mainly been on entrepreneurship education, but the concept of the university as a main reference point in the entrepreneurial process chain, awareness *creation*→*competence building*→*action*, is gaining more and more ground. Students participating in entrepreneurship education are encouraged to undertake entrepreneurial activities whilst they are studying. Entrepreneurship education can not stand alone if universities want to create the right environment for nascent entrepreneurs and dedicated spaces, such as “hatcheries” or incubators. This implies, however, close interaction and co-operation between higher education institutions and private and public support structures outside the university. Successful local entrepreneurship support systems rely on easy access through clear referral, and tailored support.

Facilitating access to financing, premises and networks and enhancing teambuilding, mentoring and access to research results are key pillars of start-up support provided by universities. This requires, alumni have to be engaged as mentors and secure access to established companies. Local businesses have to co-operate more with universities regarding guest lecturing, project work, access to real-life cases, interaction with student start-ups, development of new solutions for existing challenges etc. Banks, business angels and VCs should frequently be present on campus and close contact with other higher education institutions should be facilitated. This is essential to creating platforms for teambuilding and networks.

Finally, entrepreneurship is a concept that can benefit not only those that wish to create new organisations but also those that wish to work in existing organisations. Organisational renewal that incorporates innovation, venturing and risk-taking relates to the concept of intrapreneurship. The pursuit of intrapreneurship in established organisations arises from the need to avoid stagnation and decline by helping companies deal with change, develop innovation, and improve their adaptive capacity in servicing the marketplace. Developing mindsets and skill sets for intrapreneurship with students can broaden their focus to incorporate leadership, innovation, changing the culture of organisations and furthering customer relationship development.

⁶ Gibb, A. (2005): “Towards the Entrepreneurial University”, Policy Paper # 3, National Council for Graduate Entrepreneurship.

Key achievements

Engagement

TU Ilmenau is in an optimal position for transition. The awareness and consciousness of entrepreneurship both as a profession and process makes it possible to act upon and increase the momentum of the university. The time is right, so to speak and in and around the university manifold initiatives, support possibilities, and prioritised efforts can secure the co-ordination and development. The local engagement at the university seems to have critical mass that will make it possible for TU Ilmenau to act upon existing initiatives. The involvement from management, educators/professors, and students is an optimal platform for progress.

Student engagement and auftakt

The engagement of students is a core asset for the development of entrepreneurship support at TU Ilmenau. auftakt can be considered a main lever for the current re-vitalisation efforts in university entrepreneurship support. An informative website and communication via Facebook prepares the ground for an enhanced communication strategy that can expose entrepreneurship to a wider group of stakeholders, and to the wider region.

Revitalised entrepreneurship education

At the TU Ilmenau entrepreneurship offerings are principally housed in the Department of Management. Students from other Faculties can take part in the majority of courses offered and there are several entrepreneurship related lectures, workshops and seminars in Media and Communication Science. The TU Ilmenau has recently revitalised its work in the area of entrepreneurship education and promotion. The “Unternehmensgründung und-führung” (“Business Start-up and Management”) certificate is open to all Faculties and areas of study as an open elective option. The courses at TU Ilmenau, including the Certificate program, bring in external partners for both paid and unpaid lectures. The survey conducted for this report showed that students that had taken entrepreneurship courses were very positively influenced by these external lectures.

Start-up support

The existing landscape of start-up support initiatives in and around the university with knowledgeable and dedicated people is the basis for a local support system that provides tailored support during all stages of venture creation and growth.

Key challenges

Absence of a clear mission statement and a strategy

TU Ilmenau recently created a mission statement for entrepreneurship education for a project proposal. However, it is yet to be fully developed, supported and communicated. Creating a clear and shared vision of the role of entrepreneurship education would prove valuable for future development. A written strategy that has specific goals and strategic indicators to measure entrepreneurship outcomes and effectiveness would greatly benefit the University's efforts. In this strategy there is a need to develop more interdisciplinary course offerings and to build further partnerships between Faculties. While professors from different Faculties are involved in the certificate course there are other opportunities yet to be realised.

Lack of an overall communication strategy

Even though the website of auftakt is professional and has an increasing awareness of entrepreneurship, an overall communication strategy in entrepreneurship support at university level seems to be lacking. The establishment of TU Ilmenau as “an entrepreneurial university” demands more presence on the university website, on campus, with regard to interaction with the local community, support providers and alumni. The signal from top management that entrepreneurship is a highly prioritised area seems to be missing.

Lack of facilities and premises for auftakt

Physical premises and facilities for auftakt to operate effectively are strongly needed. The organisers and promoters of auftakt need office space as well as premises for student business and activities. The lack of such can make an otherwise good initiative feel “homeless” and downgraded, and the enthusiastic students will soon lose their initial drive.

Small-scale entrepreneurship education efforts within faculties

The current approach at TU Ilmenau relies upon the individual commitment of a few faculty members and non-faculty staff. While great credit is due to these individuals a more systematic approach that encompasses curricular development and a dedicated budget would enhance the probability of future success of the programs. It is important to broaden the approach to entrepreneurship so that it can be viewed not only as an academic area of study or a component of community outreach (or, third mission) but also as a field of dedicated research with more faculty members doing research in the area.

A “business plan mind-set”

Generally there is a very strong focus on business plans as the only preparation and way to establish a business. A more diverse look at the possibilities for inter-disciplinary activities is missing. Personal values, drive, and engagement as indicators for successful start-up seem to be of secondary interest.

Little efforts to enhance teambuilding

The cross and interdisciplinary teambuilding is not well-enough planned or executed with regards to securing complementary competencies in coming start-ups. Even though TU Ilmenau is seen as a technical university, the range of academic fields is varied and the faculties should co-operate in order to secure an approach to entrepreneurship building in all of the university’s disciplines.

Co-ordination of activities and the offering of the right support for the right needs

TU Ilmenau does not have a Centre of Entrepreneurship and could benefit from a more formalised institutional structure. It is more difficult to promote interdisciplinary activities and mobilise resources without such a structure. TU Ilmenau has one person that dedicates 25% of their working time to entrepreneurship support at the University. As part of a Centre it might be possible to incentivise faculty and staff participation. It is also important to cultivate student leaders to continue to spearhead initiatives. Several years ago, the University had plans to create a chair for business start-ups but it could not be implemented due to a lack of resources. The co-ordination of the many good initiatives in and about the university could be more aligned. Many of the initiatives deal with the initial start-up support, but the support for instance for financing possibilities, growth opportunities,

establishing professional local and regional networks, and forums for knowledge sharing need to be re-defined. Clarification and targeting of individual needs has to be clearer to the start-ups and the external support providers. At present a “one-size-fits-all” approach seems to prevail.

No network of mentors

A network of voluntary mentors is missing. Access to mentors with real-life experience in ventures and companies is needed on a regularly basis for impartial and moral support of individuals and teams involved in start-ups. The use of professors and formal initiatives can be very helpful and rewarding, however the professors often have limited experience of running real-life businesses and the existence of the educator/student-relationship can provide complications regarding academic standards wanted by the university (the professor) and the start-up ambitions sought by the student(s).

Recommendations

Strengthening of auftakt

With such a well-thought and prioritised initiative as auftakt the entrepreneurship efforts within TU Ilmenau have a formidable platform for further development. The initiative has already proved its vigour and the backing and support of most stakeholders allows opportunity for ambitions to flourish further. It is important though that the initiative is embedded not only at student and educator level, but also at top management level. auftakt must be seen as an integrated entity and not as a detached unit at the university. Even though it is primarily graduates and dedicated educators and professors that are the backbone of the organisation, the support from top management has to be noticeable. This support can be derived through several efforts. First of all a base has to be established, i.e. premises on campus where the organisation can create and nurture the required efforts and activities. The allocation of such premises gives both an indication of the university’s will and wish to foster enterprising behaviour as well as providing facilities for the on-going work. A feeling of “belonging to” the university is essential, and this offers self-perpetuating effects that a visible and proactive “house” can give. The need for premises is understood as office space for auftakt-staff and space for workshops and seminars, but also premises for graduate business start-ups. The latter could on many occasions be linked to the academic milieus at campus to secure good interaction and synergy with professors. The synergy between the different start-ups at TU Ilmenau should also be found at workshops, seminars, and other joint activities that should secure vital knowledge-sharing among the graduates. The premises for the auftakt-staff (including office space, access to meeting rooms, seminar and workshop facilities) could be located in a central and visible place on campus. This will function as a strong communicative effort within the university; the visibility of TUI’s entrepreneurship effort as a centrally located flagship.

Improving the communication strategy

Even though a central location of auftakt can be part of the university’s engagement to entrepreneurship, communication overall needs to be strengthened. At many universities the involvement and efforts to enhance enterprising behaviour in all university activities (i.e. research, education, start-up support, tech-transfer, and outreach) can be seen as a paradigm shift. It is an on-going effort that demands for narrative communication and development. The university as an integrated and necessary part of the society's development calls for a strategy that underpins this effort. The university’s will and ambition to form a strategy, allocate resources, and support infrastructure as well as secure start-up support has to be carried out carefully in combination with a *communication strategy* for this work. Making efforts within the university, a *narrative story* will build on current hype and bring attention to the area. A part of such a strategy will have to do with the official channels

and platforms used by the university (i.e. websites, brochures, and other material), but also the use of social media and other communication platforms could be a lever for having a broader approach to the subject. In particular, the use of social media and events as storytelling activities could be helpful. These would show exactly what is actually being *done*, it can be used as an integrator between actors, and it can serve as tool to recruit both students and researchers. It is important that resources are allocated from top management and that the university exposes itself externally as an entrepreneurial university. The activities and what is understood by “an entrepreneurial university” are to be formulated by the day-to-day practitioners within auftakt and by the educators and professors.

Using teambuilding as a way to qualify projects, knowledge, start-ups, and awareness

In order to secure a cross-disciplinary approach to entrepreneurship the university needs to develop more cross-faculty initiatives. Successful start-ups are often based on complementary competencies, skills, and knowledge among the participants. To develop a business, define a product/service, and enter the market calls for diverse perspectives and cultural differences. This can be achieved in multiple ways. Cross-disciplinary courses and electives is one obvious way to get this started and to encourage and stimulate the blending of the students. Furthermore auftakt needs to spread its messages to all faculties at the university. The extra-curricular activities and events taking place at TU Ilmenau have to be open and relevant to all students with regards to their academic fields or other preferences. This is not to say that every activity should be aimed at attracting all kinds of students. Auftakt's strength should be in its rich variety of offers and action areas that contain both general and specific needs and areas of interest. The range of auftakt's offers could profitably incorporate the local and regional support organisations as co-arrangers. This would further strengthen auftakt as the university-platform within entrepreneurship.

Promoting a local “One-door-in” for TUI-students and graduate start-ups

The range of auftakt's offers could profitably incorporate the local and regional support organisations as co-arrangers even more. This would further strengthen auftakt as the university-platform within entrepreneurship and secure rich and developed support initiatives in the region, allowing for significant exposure on (graduate) start-ups and also aim the support more specifically at the concrete needs of the start-ups. Co-operation with the local and regional start-up support should therefore be an integrated part of TUI's offering to students (within the sphere of auftakt), so that graduate entrepreneurship at TU Ilmenau has tailored solutions and support for all kinds of needs and eventualities. The effort taking place at TU Ilmenau should consequently have auftakt as the “one-door-in” approach for all inquiries regarding entrepreneurship, but sustain and further develop individual support to meet the needs of its users.

Engaging alumni as mentors

To secure a balanced and more unrestrained line of advice for graduate start-ups, an additional voluntary basis of consultancy and mentoring can be initiated through use of TU Ilmenau alumni. The will and urge to “give back” to the university (and society) from experienced business people is a way to create relations and secure knowledge sharing that is not biased by any organisation's or governmental point of view. Alumni could act as guest teachers from time to time, present real-life experience and know-how at events arranged by auftakt, and more importantly act as non-partial mentors and providers of one of the crucial aspects within entrepreneurship support, namely the “know-who”-facet. Often the most valuable support and advice an entrepreneur can receive is the knowledge of whom to go to in order to gain further resources to develop the business. Therefore, the existing alumni initiative at

TU Ilmenau should also include entrepreneurship support as an objective to engage (local) businesses and industry to help future start-ups coming from the university.

Reducing the focus on business planning

The focus on business plans and their use in business plan competitions should be downscaled. Even though a business plan can offer good and relevant considerations from entrepreneurs, the development of business plans seems to turn such plans into academic exercises taking the focus away from what the entrepreneur really needs, giving attention to what he or she thinks the stakeholders might like to hear. The aim of most business plans is to gain additional resources for the project, and financing is meant by resources, then the most important thing for investors is the security and certainty that their investment is secure. However, the banks' and investors' security can be secured in other ways. A business plan is (mostly, but not always) a way to predict the future and a means of ensuring that actions are being developed to meet these predictions. But to foretell is fundamentally one of the most insecure ways of protecting your investment. Focus should rather be on more tangible and action-oriented features of the start-up; i.e. the personality, drive, and engagement of the entrepreneur(s), an account of what has been done so far and what the next steps are, the identification of the entrepreneur's network and connections (the know-who factor) and how good he or she (or the team) is to establish and make use of these connections. Even though TU Ilmenau probably develops graduate entrepreneurship start-ups with well-defined (high or low tech) products and/or services, there is still a need to look more closely at the team behind the enterprise and to not focus entirely on the product and the market possibilities. Knowledge within sales, marketing, financing, law, and the like are of course relevant features to be aware of, but it is often possible to outsource these elements, hence it is important to strengthen the team's primary resources and core-competencies.

Promoting the concept of open innovation

For the technology cluster in the city and region of Ilmenau it could be beneficial to explore the "open innovation" concept for possible application by the TU Ilmenau and the TGZ. In the open innovation model, a firm seeks to commercialise not only its own ideas but also the innovations from other organisations. In this paradigm, the boundary between organisations and the surrounding environment is more porous, enabling innovation to move easily between various entities. The goal of activities to promote open innovation is to foster further collaboration of large and small companies both in the region and beyond. As knowledge and technology become more widespread and distributed across companies in many parts of the world it forces organisations to open up their innovation processes. Furthermore, as the cost of technology development rises and product life cycles shorten it makes closed models of innovation increasingly more difficult to sustain (Chesbrough, 2010).⁷ The high tech campus in Eindhoven is a good example of how an ecosystem can be developed that has a mix of small and large companies, innovative start-ups and technology institutes which have a direct link to science. On the high tech campus, companies work together in open laboratories and open research institutions. In Ilmenau, the technology centre and business incubator TGZ could foster further links with the university as the high tech campus has with TU Eindhoven. Although Ilmenau does not have a global company such as Eindhoven does in Phillips, there are still ways in which opening up can nurture closer collaboration between government, industry and knowledge institutions.

While many graduates in technology fields favour working in open, collaborative environments, "open innovation" is only one of many approaches that can be used to stimulate innovation. This model deserves consideration because it allows start-ups to leverage their resources with external

⁷ Chesbrough, H.W., (2010). Business Model Innovation: Opportunities and Barriers. *Long Range Planning*, 43(2-3), 354-363.

resources to commercial their ideas in multiple ways. This will strengthen links between industries and can attract human capital to the region.

INTERNATIONAL LEARNING MODELS

In the following section three learning models are presented. These are policy initiatives or university-based actions that seek to promote action-oriented approaches in entrepreneurship support. The emphasis of these initiatives is on the development of a university-based support infrastructure which reflects the current set-up and capacities and enhances their continuous improvement. Such an infrastructure also allows for a fruitful partnership between the university's internal and external entrepreneurship support organisations and actors.

The table below gives the reader a quick overview of which learning model provides inspiration for action and practical hints in light of the recommendations presented above.

<i>Strengthening of auftakt.</i>	<ul style="list-style-type: none"> • The “One-door-in”-approach – Copenhagen School of Entrepreneurship
<i>Using teambuilding as a way to qualify projects, knowledge, start-ups, and awareness.</i>	<ul style="list-style-type: none"> • New cross-disciplinary education at Aalborg University
<i>Improving the communication strategy.</i>	<ul style="list-style-type: none"> • The StartupWheel • The “One-door-in”-approach – Copenhagen School of Entrepreneurship
<i>Promoting a local “One-door-in” for TUI-students and graduate start-ups.</i>	<ul style="list-style-type: none"> • The “One-door-in”-approach – Copenhagen School of Entrepreneurship
<i>Engaging alumni as mentors.</i>	<ul style="list-style-type: none"> • The “One-door-in”-approach – Copenhagen School of Entrepreneurship • New cross-disciplinary education at Aalborg University
<i>Reducing the focus on business planning.</i>	<ul style="list-style-type: none"> • New cross-disciplinary education at Aalborg University • The “One-door-in”-approach – Copenhagen School of Entrepreneurship
<i>Promoting the concept of open innovation.</i>	<ul style="list-style-type: none"> • The StartupWheel • The “One-door-in”-approach – Copenhagen School of Entrepreneurship

Box 1. The StartupWheel

A Danish developed tool to organise and cultivate the progress of the start-up is the so-called StartupWheel (<http://www.startupcompany.com/>).

The inventor David Madié has started more than 25+ successful businesses and has never written a business plan, and has had long experience of working with universities and graduate start-ups. As stated above the rationale for business plans are often about control and security for investors rather than being used to support the development of the venture. That is the justification of the development of this tool; a tool for decision-making in start-up and growth companies that helps entrepreneurs and advisors get focus, set agenda, and take the next step.

The StartupWheel is being used as a platform for dialogue with start-ups as well as a concrete tool for the single start-up. It provides the start-up, investors as well as start-up support organisations with thorough insight and ability to change directions when needed. The constant changing environment for start-ups demands for the ability to rapidly change plans and/or already made actions. The focus is therefore on four categories for the start-up, namely Business Concepts, Customer Relations, Organisation, and Operations. Subcategories define the details and actions that need to be taken, so that organisations as a whole and its stakeholders are aligned in the development. Relevant resources and stakeholders involved have by using this tool an excellent indication of the development of the venture. Working with the tool needs certification and at the moment business advisors and educators in many different organisations from incubators to government agencies and universities are certified. They all customise the StartupWheel to their specific needs and the types of entrepreneurs they are working with. Today more than 50 of these kinds of organisations use the tool, including The Danish Enterprise and Construction Authority and universities all over the world.

One of the main advantages is the ability to use it as a one-to-one dialogue session tool between entrepreneur and the consultant/certified person, but also as an instrument for the “homework” (development) of the start-up and for networking. Thus the incentive and possibility to move forward is present and obvious for the entrepreneur (and the team behind it) and saves time, money and secures focus only on what is relevant. The use of the StartupWheel at universities provides the institutions with a tool that has credibility thanks to its many users worldwide. Of course, other tools and initiatives are known worldwide to put the emphasis on “action” rather than a traditional business plan that is often a descriptive exercise, and many of these tools are also good instruments, but the extension worldwide of this particular tool shows the viability and credibility as a significant lever for start-ups.

For more information, see <http://www.startupcompany.com/>. Free webinars are frequently offered for insight and as introduction to the product.

Box 2. The “One-door-in”-approach – Copenhagen School of Entrepreneurship (CSE)

An initiative that started as a bottom-up project is the Copenhagen School of Entrepreneurship (<http://cse.cbs.dk/>) at Copenhagen Business School in Copenhagen, Denmark. Different student initiatives and (university) start-up support organisations have built an initiative that especially auftakt at TU Ilmenau could use as inspiration. As a student interested in entrepreneurship (in this case entrepreneurship means all aspects, including intrapreneurship, social entrepreneurship, creativity etc.), this is where you go and get concrete knowledge, help, and inspiration.

The initiative existing originally of six different entrepreneurship-oriented organisations gained and achieved in dialogue with university management access to physical premises at the university from where the idea could develop. The rationale was to create a visible and tangible environment for building the university's platform for entrepreneurship including incubator, event, educations, and research. Each organisation kept focusing on their own speciality (e.g. dealing with business plan competitions, the development of network among educators, the development of entrepreneurship education, getting students interested in entrepreneurship and the like), but by working together and communicating the overall purpose of the unified effort rather than sub optimising the work, a coherent effort was made to change the mindset and attitudes among all the stakeholders at the university. The organisations brought to the work their own resources and objectives, so the extra resources provided by the university were not substantial, but the moral support from management meant that a long term basis for development was secured. In the beginning, the main target groups were the students at the university, but over the last couple of years the initiative is now targeting faculty and businesses too.

Today CSE is the melting pot and meeting point of most entrepreneurship interested students in the Greater Copenhagen area as it is at the time the only university offering an almost full range of services regarding graduate start-up. Events, seminars, teambuilding, access to mentors, law experts, office space etc. are included in the offering. One of the aspects of the success has been the visibility of the activities, a focused communication strategy, and the access to a critical mass of students. In the beginning it was merely students from Copenhagen Business School attending (and interestingly enough a great amount of international students – they are a very interesting resource in creating awareness on campus), but over time the rumor and greater awareness of activities attracted students from other universities. This cross-fertilisation meant even better possibilities for different backgrounds to team up in venture creations, and consequently a positive spiral effect took place. From being a bottom-up initiative, the awareness eventually spread to educators, researchers, and management and has now lead to two more highly esteemed and heavily financially supported joint ventures in the region between three universities, one being Next Generation (<http://www.nxtgen.dk/en/>), which also includes the educator and research element as well as an enhanced interaction with businesses, society, and start-up support organisations.

The challenge from the beginning was getting faculty to engage in the initiative, as entrepreneurship was (and still is in certain ways) regarded as an “add-on” to education and research rather than an integrated part of education. In that respect it has been a bottom up-initiative supported by (in the beginning) few engaged professors and educators, but as the initiative showed progress and successes, it attracted the management's attention and the “winds of change” regarding entrepreneurship at university level has become the talk of the town over the last couple of years, the formalisation and development of innovation and entrepreneurship support is now well integrated at Copenhagen Business School in close co-operation with others from the biggest universities in the Greater Copenhagen area.

This exercise is probably transferable, possibly to TU Ilmenau and FHS. The keywords are access to physical premises, engaged student organisation(s), support from top management and close interaction with the external support structures in the local area.

For more information, see <http://cse.cbs.dk/>.

Box 3. New cross-disciplinary education at Aalborg University

At Aalborg University in Denmark the tradition of creating new cross- and inter-disciplinary educations is one of the backbones of the university. The pedagogical and didactical principles of Aalborg University are the problem based and the project based way of learning, called "PBL – The Aalborg model".

The combination of new insights aimed at the ever changing world and the cooperation between faculties opens the door for new blending of technical skills. Examples of this are the educations Medialogy that combines technology and new media platforms and Technoanthropology that combines technology and the insight into human behaviour. These combinations are developed to create understanding and implementation of new knowledge and markets in the global society (www.aau.dk).

Aalborg University's tradition of having close collaboration and contact with business life and society when it comes to education and research is one of the reasons and rationales for a proactive and somewhat foresighted approach towards education in order to secure high employability among its students. The dialogue and contact with the surrounding society makes way for the creation and implementation (and accreditation) of relevant and up-to-date education that deliver candidates that are ready for the inter-disciplinary tasks and environment in today's businesses and organisations. Aalborg University strives to create cross-disciplinary education and research thus having the faculties working cross disciplines and traditional subject areas. Still maintaining the need and education for specialisation, the students are working with real life problems and projects in groups throughout their time at University. This give them both theoretical depth and understanding as well as broad competencies within for instance group dynamics, cross-disciplinarity, and an ability to relate to given challenges and task rather than theoretical exercises.

This pedagogical and didactical approach has two main results: Aalborg University's students are by far the students in the country most likely to graduate within the official duration of their study programme, and they are also the ones who get a job quickest after graduation. This calls for the different faculties within the TU Ilmenau to join forces and develop new cross-disciplinary educations. As the TU Ilmenau offers project oriented education in cooperation with business and industry, a closer look at new study combinations could be an option. Especially if the university act upon the recommendation of an enhanced look at the region's need and wishes for a development structure within new and undiscovered areas and lines of business.

For more information regarding Aalborg university's model for problem based learning (pbl), see here: <http://www.en.aau.dk/about+aalborg+university/the+aalborg+model+for+problem+based+learning+%28pbl%29/> and for a closer look at the university's cross-disciplinary education, see here: <http://www.en.aau.dk/education+%26+programmes/>

ASSESSMENT FRAMEWORK

The OECD LEED Programme has developed from previous international case study work on university entrepreneurship support and the theoretical debate of the role of universities in generating entrepreneurial motivations, intentions, and competences below presented Criteria List of good practice.

The Criteria List served as assessment framework for the here presented findings and recommendations.

At the same time the Criteria List is a 'tool', which allows universities to self-assess and re-orient their strategy in supporting entrepreneurship, their current pool of financial and human resources, the existing support infrastructure, current practices in, and evaluation of, entrepreneurship education and start-up support.

Strategy and top-management support	
A university needs a clear vision and strategy that responds to what is entrepreneurship, why does the university promote entrepreneurship, who are target groups, what does the support consists of, how it is delivered and by whom. Clear incentives and rewards are needed for professors, researchers and students to engage. The internal and external communication of a university with regard to entrepreneurship matters; information needs to be easily accessible.	
Criteria	<ul style="list-style-type: none"> • There is a clear vision and strategy behind the university provided entrepreneurship support. • Objectives of entrepreneurship education and start-up support include generating entrepreneurial attitudes, behaviour and competences, as well as enhancing growth entrepreneurship (both high-tech and low-tech). • There are clear incentives and rewards for entrepreneurship educators, professors and researchers, who actively support graduate entrepreneurship (mentoring, sharing of research results, etc.). • Recruitment and career development of academic staff takes into account entrepreneurial attitudes, behaviour, prior experience as well as current entrepreneurship support activities.
Financial resources	
Public kick-off funding for entrepreneurship support infrastructure is common practice today. Yet, it is the balance between a minimum long-term financing for staff costs and overheads and the openness to private sector involvement in the financing of Entrepreneurship Chairs and incubation facilities which proves to be successful in an international comparison.	
Criteria	<ul style="list-style-type: none"> • A minimum long-term financing of staff costs and overheads for graduate entrepreneurship is agreed as part of the university's budget. • Self-sufficiency of university internal entrepreneurship support is a goal.

Human resources	
Entrepreneurship support in universities, in particular entrepreneurship education, is demanding reinforcement and development of existing human resources and employing new staff. Working with entrepreneurs, chief executives, bankers, venture capitalists and business angels is important to link theory with practice.	
Criteria	<ul style="list-style-type: none"> • Regular, relevant training for staff involved in entrepreneurship education is in place. • Regular, relevant for staff involved in start-up support is in place.
Support infrastructure	
Moving towards greater cross-faculty collaboration in entrepreneurship support and greater connection between entrepreneurship education and start-up support provision will require a co-ordination unit. Universities will need to find their place in existing start-up and entrepreneurship support systems. Networking and incentives for clear referral systems are needed to increase the effectiveness of start-up support and reduce duplication, confusion and waste of resources.	
Criteria	<ul style="list-style-type: none"> • An entrepreneurship dedicated structure within the university (chair, department, support centre) is in place, which closely collaborates, co-ordinates and integrates faculty-internal entrepreneurship support and ensures viable cross-faculty collaboration. • Facilities for business incubation either exist on the campus or assistance is offered to gain access to external facilities. • There is close co-operation and referral between university-internal and external business start-up and entrepreneurship support organisations; roles are clearly defined.
Entrepreneurship education	
Ideally all students should have access to a wide range of entrepreneurial learning opportunities inside and outside their courses of study. Increasing take-up rates will require both expanding and tailoring the offer in entrepreneurship education. The goal is to generate entrepreneurial intentions and to develop competences for entrepreneurship. Progressively the offer in entrepreneurship education should be expanded and tailored to the different interests and needs of participants. Engaging in exchange of good practices in creative teaching methods at wider regional, local and international levels will facilitate improvement and innovation.	
Criteria	<ul style="list-style-type: none"> • Entrepreneurship education is progressively integrated into curricula and the use of entrepreneurial pedagogies is advocated across faculties. • The entrepreneurship education offer is widely communicated, and measures are undertaken to increase the rate and capacity of take-up. • A suite of courses exists, which uses creative teaching methods and is tailored to the needs of undergraduate, graduate and post-graduate students. • The suite of courses has a differentiated offer that covers the pre-start-up phase, the start-up phase and the growth phase. For certain courses active recruitment is practiced. • Out-reach to Alumni, business support organisations and firms is a key component of entrepreneurship education. • Results of entrepreneurship research are integrated into entrepreneurship education.

Start-up support	
<p>Start-up support is providing a helping hand in business start-up without taking away the 'do it on your own'. It is all about making, entrepreneurship support systems accessible and attractive for future entrepreneurs, and about rectifying market and system failures in financing and premises. A key success factor lies in private sector collaboration. Universities can create a protected environment for nascent entrepreneurship. This can be an important stimulus for students and researchers to make a first step towards the creation of a venture. Yet, in order to avoid 'over protection', early exposure to market conditions is advisable.</p>	
Criteria	<ul style="list-style-type: none"> • Entrepreneurship education activities and start-up support are closely integrated. • Team building is actively facilitated by university staff. • Access to public and private financing is facilitated through networking and dedicated events. • Mentoring by professors and entrepreneurs is facilitated. • University-internal business start-up support is closely integrated into external business support partnerships and networks, and maintains close relationships with firms and Alumni.
Evaluation	
<p>Assisting the establishment of new firms is a key objective of university entrepreneurship support, but not its only one. For entrepreneurship education creating entrepreneurial mindsets that drive, for example, modernisation and innovation in existing firms, is of equal importance, yet success is much more difficult to measure. Hence, the co-existence of tangible outputs (e.g., number of assisted new ventures) and intangible outcomes, such as the spread of entrepreneurial culture and the creation of entrepreneurial mindsets, renders assessing the impact of university entrepreneurship support a challenge that requires tailored approaches and systematic, long-term evaluation efforts.</p>	
Criteria	<ul style="list-style-type: none"> • Regular stock-taking and performance checking of entrepreneurship education activities is undertaken. • Regular stock-taking and performance checking of start-up support is undertaken. • There is systematic evaluation of entrepreneurship education activities in terms of their impact on achievement of prior defined objectives. • There is systematic evaluation of start-up support provision.
<p>Source: OECD (2010), "Universities, Innovation and Entrepreneurship: Criteria and Examples of Good Practice", OECD Publishing. http://dx.doi.org/10.1787/5km7rq0pq00q-en, adapted.</p>	

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