Supporting the entrepreneurial potential of higher education

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Case Study No. 6:

Kaunas University of Technology, Lithuania:

Developing entrepreneurship education with international expert networks

May 2015

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About the sepHE Study

The study "Supporting the entrepreneurial potential of higher education" was based on a contract between the European Commission, Directorate General Education and Culture (DG EAC), and empirica Gesellschaft für Kommunikations- und Technologieforschung mbH (co-ordinator – Bonn, Germany) as well as the University of Wuppertal, UNESCO Chair of Entrepreneurship and Intercultural Management (Wuppertal, Germany).

The study's main purpose was collecting 20 case studies about insightful practice in entrepreneurship education at European universities. This is one

of them. The findings from a cross-case analysis are included in the Final Report which is available at the study's homepage and at DG EAC's website.

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Overview of contents

Abstract

Kaunas University of Technology (KTU), Lithuania, is one of the leading universities in the country. Initiatives to develop entrepreneurship education (EE) at KTU began in 2011. They were driven by the Vice-Rector for Research, professors from the School of Economics and Business, the Innovation and Entrepreneurship Centre, and a business leader. KTU offers two regular EE courses: Technology Entrepreneurship, an elective course for undergraduate students, and Technology Venturing for graduate students. Both target students from KTU's engineering schools. There are also recurrent extra-curricular activities like an accelerator programme named "Start-up Space". KTU also supports students in participating in a business plan competition at San José State University (SJU), US. KTU seeks to extend EE offers, curricular as well as extra-curricular. A barrier to extend EE offers at KTU appears to be that it is not considered as a "hard science" by some in the engineering schools. Furthermore, there is competition about credit-bearing courses and about resources. A striking characteristic is that KTU develops EE with comprehensive and targeted support from experts from abroad. Main supporters include Aalto University, Finland, and the US universities of Berkeley and Stanford. KTU considers these universities as world-leading examples of EE at engineering schools. There was also notable support from the US Market Access Centre. Limitations of involving external experts in developing EE were found to be related to funds, time, a necessity to have own experience in entrepreneurship, and a need for adapting foreign approaches to local socio-economic conditions. KTU's approach may be insightful particularly for other technical universities.

Case study fact sheet

■ *Full name of the university, location:*	*Kaunas University of Technology, Kaunas, Lithuania*
■ *Legal status:*	*Public*
■ *Campuses:*	*Kaunas*
■ *Year of foundation:*	*1922*
■ *Number of students:*	*Approximately 11,000 (http://ktu.edu/en/content/facts-and-figures)*
■ *Number of employees:*	*Approximately 1,000 academic employees (http://ktu.edu/en/content/facts-and-figures)*
■ *Budget in most recent financial year:*	*Not available*
■ *Academic profile:*	*Nine faculties: Chemical Technology, Electrical and Electronics Engineering, Informatics, Mathematics and Natural Sciences, Mechanical Engineering and Design, Social Sciences, Arts and Humanities, Civil Engineering and Architecture, School of Economics and Business, and Panevėžys Faculty of Technologies and Business. Nine research institutes.*
■ *Entrepreneurship education (EE) profile:*	*Recent introduction of entrepreneurship education (first course in 2013) and ambitions to broaden and deepen EE, supported by the recently founded Innovation and Entrepreneurship Centre.*
■ *Activities focused in this case study:*	*Developing EE with support from renowned international experts*
■ *Case gatekeeper:*	*Violeta Kaunelienė, Head of Intellectual Property Management Group, National Innovation and Entrepreneurship Centre, Kaunas University of Technology*

The status of information provided in this case study is February 2015 unless stated differently.

6.1 The university's entrepreneurial profile

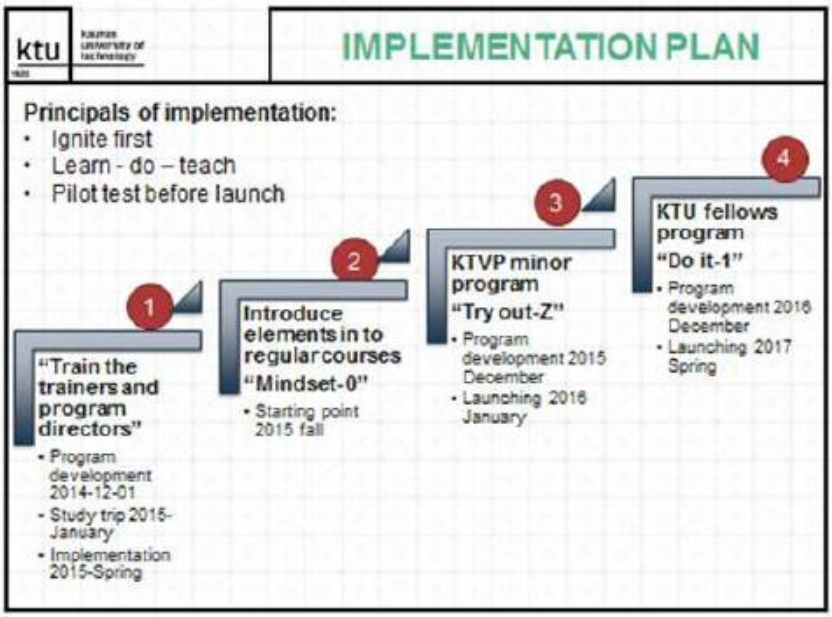
6.1.1 The university's overall approach to entrepreneurship education

Kaunas University of Technology (KTU), located in the second-largest city of Lithuania, is one of the leading universities in the country. Entrepreneurship education (EE) is a fairly recent item on KTU's agenda. Initiatives to develop EE began in 2011. Since early 2015, there are two regular EE courses: Technology Entrepreneurship and Technology Venturing. KTU seeks to extend EE offers and the number of students involved in these offers.

KTU did not start EE from zero – there was some entrepreneurial understanding among teachers and management. It was also a favourable precondition that KTU has a Business School and that this Business School had been working with the engineering faculties. The missing factor was networks, and in particular international networks. KTU has been developing EE with considerable support from renowned international experts. Experts are mainly from Aalto University (Finland), Stanford University and University of California, Berkeley (US), as well as the US Market Access Centre (US MAC). This support is a main theme on which this case study focuses. This case study seeks to describe and analyse EE courses and the international support with which they are developed, deriving lessons from which other universities may learn when trying to go a similar road.

KTU has an implementation plan for EE that foresees four steps, as depicted in Exhibit 5-1: First, to train the trainers and programme directors by spring 2015; second, to introduce entrepreneurship elements into regular courses starting in autumn 2015; third, launching a programme of the Kaunas Technology Venture Programme minor in January 2016; and fourth, implementing a KTU fellow programme in spring 2017.

Exhibit 6-1: EE implementation plan at Kaunas University of Technology



Source: KTU

Developing EE is part of an overall ambition to create an entrepreneurial environment at KTU. This also includes an appreciation of intrapreneurship.

6.1.2 Leadership and governance

Importance of governmental activities for developing EE

At the time of writing this case study and in the years before, there were no specific governmental strategies and programmes supporting the development of EE in Lithuania. There were only more general policies for supporting start-ups. However, according to interviews for this case study, launching entrepreneurship education and related organisations at KTU was also fostered by the Lithuanian Government. A key promoter was found to be Alex Sozonoff[1], who was Vice-President and Senior Adviser to the CEO of the Hewlett Packard Company (HP) for many years and who worked with HP Lithuania and Lithuanian Government departments. He is member of the Lithuanian Investment Advisory Council. In order to further develop the Lithuanian economy, his recommendation to the Lithuanian Minister for the Economy was to establish an academic programme around entrepreneurship and innovation. In the end, KTU was selected for such a programme because it appeared to be the most dynamic university in the country and had already initiatives in place for introducing entrepreneurship.

Importance of entrepreneurship in the University's strategy

The KTU's strategy paper from 2012 (KTU 2012) does not directly mention entrepreneurship or even entrepreneurship education. However, the paper targets better links with businesses – more co-operation, more joint R&D – and it mentions knowledge transfer several times. These factors point indirectly to the importance which the university attributes to entrepreneurship. The same applies to the University's strategic plan for 2014 – 2016 (KTU 2014b), which in addition specifies the commercialisation of intellectual property as an objective.

Extent of top management commitment to implementing entrepreneurship

KTU began developing EE in 2011 when the new Rectorate came into office. Besides the initiative taken by businessman and entrepreneur Alex Sozonoff and the Lithuanian Ministry for the Economy, there was apparently no specific driver behind the idea to foster EE at KTU. It was just believed to be the right thing to do.

Four promoters were found to be particularly important for driving the development of entrepreneurship education at KTU: the Vice Rector for Research (Asta Pundzienė), the Dean of the Faculty of Economics and Business (Prof. Dr. Edita Gimžauskienė), the then Head of the Intellectual Property Management Group of the National Innovation and Entrepreneurship Centre (NIEC) (Dr. Violeta Kaunelienė), and the Head of the Department of Strategic Management, School of Economics and Business (Prof. Dr. Monika Petraitė). Hence, KTU is also an example of women driving entrepreneurship education.

Students were not found to be demanding or promoting EE, except some specifically interested individuals. On the contrary, it may take five to ten years to make the bulk of students know what entrepreneurship is about, as Asta Pundzienė said.

[1] See http://en.ktu.lt/content/news/alex-sozonoff-young-people-today-leaders-tomorrow-are-facing-continuously-changing-worlfor further information about Alex Sozonoff.

The case study also identified **barriers to developing EE**, including issues related to organisational culture, decreasing number of students, budgeting incentives, and administrative requirements:

- Two interviewees stated that the "organisational culture" is an impediment: There are people who are sceptical about EE, particularly in engineering schools, arguing that KTU should rather concentrate on "hard matters" and that EE is "not serious", only providing "soft skills" like finance and marketing. One of the interviewees said there is some, but not necessarily strong, resistance.
- A further barrier to developing EE at KTU was found to be that the number of students is decreasing for demographical reasons. One of the interviewees elaborated that when the number of students decreases, there is also pressure to reduce the number of staff. In such a situation it is difficult to introduce new courses because it implies discontinuing other courses and possibly dismissing employees.
- Another issue may be that a Faculty's budget depends on the number of modules offered; hence it is not attractive for an engineering faculty to take over an EE module from the Business School. (See also section 6.4.2 about laws, statutes and codes.)
- One of the external advisors said that KTU, as a public university, needs to incorporate "a lot of red tape" for administration and fulfil governmental requirements, for example with regard to taking a certain number of students into classes.

Level of Schools' and departments' autonomy to act

While KTU's faculties can, in principle, introduce as many courses as they want, proposed new courses need to fit with existing programmes and the overall budget. Study programme committees need to approve new courses. This may not necessarily be in the interest of the faculties concerned. In the case of the Technology Venturing course described further below, the programme committee did not include it in the study programme as a compulsory course. Engineering faculties were required to replace an engineering course with the Technology Venturing course, which they did not want.

Organisational implementation

At the time of writing this case study, Violeta Kauneliene from the National Innovation and Entrepreneurship Centre (NIEC), which also acts as the KTU's technology transfer office, was the overall co-ordinator of EE-related activities. She believed that more people needed to be involved in EE so these offers could be extended. It should be noted that while Violeta Kaunelienė was working for the NIEC and delivered lectures about intellectual property management to participants of the EE courses, the NIEC was involved in EE only in terms of co-ordination and organisation, and not in terms of content. The EE courses and their contents were co-ordinated by Monika Petraitė from the Business School's Department of Strategic Management.

University's importance for driving entrepreneurship in its environment

KTU is an important actor in driving entrepreneurship in the Kaunas region and also in Lithuania at large. The University pays strong attention to "synergy with business, entrepreneurship, and practical skills", as mentioned in the University's profile overview for 2014 (KTU 2014). The profile mentions five items in this respect:

(1) KTU's "Start-up Space", an NIEC unit that fosters young businesses.

(2) KTU's contribution "to solving real problems" through carrying out 70% of all research and development (R&D) which Lithuanian universities provide for private businesses.

(3) Two integrated "science, study, and business valleys", Santaka and Nemunas, founded by KTU to provide open-access laboratory space for collaboration among students, researchers, and business representatives to create innovations.

(4) Technology transfer facilitated by the National Innovation and Entrepreneurship Centre, a "single window" for communication between research, business, and industry.

(5) A specialised Technology Entrepreneurship module in the KTU's curricula.

6.1.3 Resources: people and financial capacity

Human resources for entrepreneurship education

The teachers running KTU's EE courses are employees of the University. External guest speakers, for example entrepreneurs or international visiting lecturers are invited regularly to present on specific issues. One of the interviewees said that there is as yet, no sufficiently large pool of supporters and teachers who can instruct and train about entrepreneurship on campus, which is an impediment to developing EE further. Those who drive EE are working on this issue.

Financial resources for entrepreneurship education

EE funding was found to be not particularly strong and persistent. EE and its development are funded through the University and through European projects. The University teachers involved in EE are employees of the University and thus paid by the University. KTU also has a budget for hiring external lecturers for specific purposes. Furthermore, KTU has been running European projects related to entrepreneurship and technology transfer, for example, a project for building technology transfer capacity and a project for mentoring founders and supporting start-ups. Such funding also indirectly helps to develop EE.

6.2 Entrepreneurship in curricula and teaching

6.2.1 Overview about curricular offers

There are two curricular offers in entrepreneurship education at KTU: one course in "Technology Entrepreneurship" and the other in "Technology Venturing". Both are elective, not compulsory; "Technology Entrepreneurship" is for undergraduates (Bachelor level) while "Technology Venturing" is for graduate (Master level) students in engineering.

KTU's principal aim at the time of writing this case study is maintaining these two courses. There are also plans to introduce a course for advanced students as well as a programme at the PhD level. Furthermore, the Business School would like to expand the entrepreneurship subject into existing courses about innovation, as well as to introduce more specific entrepreneurship courses, for example, on entrepreneurial marketing and finance.

Exhibit 6-2: Overview of curricular EE offers at Kaunas University of Technology

No.	Name	Objectives	Target group	Offered since [year]	No. of participants in [year]
1	Technology Entrepreneurship	"Provide basic entrepreneurial skills, based on the interaction of technology and knowledge transfer as well as entrepreneurial skills for start-up development." (Course description)	Elective course for Bachelor-level students	2013	65 (2014)
2	Technology Venturing	"Provide business and venturing competences for transferring technology concept into the business model, venture capital attraction and shape entrepreneurial behaviour as a professional feature." (Course description)	Elective course for Master-level engineering students	Spring 2014	40 (2014)

Technology Entrepreneurship

KTU offered the course "Technology Entrepreneurship" for the first time in September 2013. The course targets engineering students and is intended to teach the basic elements of entrepreneurship, involving as many practitioners as possible. According to the course summary, "the course aims to introduce fundamentals of technology and R&D driven entrepreneurship, and provide basic knowledge on the processes used by technology entrepreneurs to start companies. It develops basic skills of taking a technological idea and finding a high-potential commercial opportunity, gathering resources such as talent and capital, figuring out how to sell and market the idea, and managing rapid growth of an enterprise." For engineering students, it is an elective course.

Source: KTU. See Annex 1 for a detailed description.

Technology Venturing

The course "Technology Venturing" was run at KTU for the first time in spring 2014. According to the description, the course provides "business and venturing competences for transferring technology concept[s]" into a viable business model, for attracting venture capital and shaping entrepreneurial behaviour. Attendees learn about early-stage entrepreneurship including, for example, technology business opportunity assessment, business and product development, and entrepreneurial marketing.

Source: KTU. See Annex 2 for a detailed description.

6.2.2 Target groups

Main target groups of entrepreneurship education

Before implanting the two courses there were already elements of EE included in Bachelor education at KTU's School of Economics and Business. KTU's new approach was to implement an EE concept in engineering education. At first, only a small amount of business students – up to one sixth of the group – was allowed to attend the courses. In 2014, there were no such limitations any more. The Technology Entrepreneurship course can be attended by a maximum of 200 students; Technology Venturing is limited to 40 students. Engineering students attending the courses came from six of KTU's nine faculties: Mechanical Engineering and Design, Informatics, Electrical and Electronics Engineering, Civil Engineering and Architecture, Chemical Technology, and Social Sciences, Arts and Humanities. According to KTU, this composition of faculties was also reflected in the student teams within the courses – which is what the KTU aimed at. In 2014, spaces in the courses were allocated on a first come – first serve basis, but the university sought to establish some kind of competition.

Students in the Technology Entrepreneurship course were reported to have different levels of excitement regarding entrepreneurship. Monika Petraitė said that 75% of the participants in the Technology Entrepreneurship course would choose it again; for the other 25%, the course was too challenging. The aim was to confront first-year students with the idea of entrepreneurship, however, for some "freshmen" it may have been too demanding. One of the students interviewed for this case study said "it was the best course I had".

Continuous education

At the time of authoring this case study, KTU did not offer continuous education in entrepreneurship.

Bridges to secondary education

In early 2015, KTU introduced a new scheme bridging secondary and tertiary education in the field of entrepreneurship: High school students could attend a competitive course from which the most successful students were offered a space in the Technological Entrepreneurship course for autumn 2015.

6.2.3 Designing lectures and courses – basic curricular decisions

Objectives

The objective of the two EE courses at KTU is to confront students very practically with entrepreneurial activity and attitude. The overall objective of the **Technology Entrepreneurship** course is, as one of the KTU representatives said, "To plant a seed, to show that there is a different career path".

The **Technology Venturing** course is, according to the syllabus, "an experiential course that aims to 'throw student teams into the deep end' of entrepreneurship" (p. 1).

Contents

The **Technology Entrepreneurship** course has three main themes: (1) "inspiration", including issues such as "the essence of technology driven entrepreneurship", "entrepreneurial leadership in technology venturing", and business models; (2) "creativity sources and improvisation in technology business", including "creativity and creativity methods in technology venturing" as well as "entrepreneurial team formation and teamwork"; and (3) "technology business design", including the lean start-up methodology, business model design, validation of the business model, sources for financing of technological business, intellectual property issues in technology entrepreneurship, and business model pitch for stakeholders.

The sessions in the **Technology Venturing** course are organised around nine building blocks of a business model, related to the business model canvas concept:[2] key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structure, and revenue streams.

Methods

Technology Entrepreneurship

The Technology Entrepreneurship course is a series of lectures – formal ones and guest lectures – plus interactive methods such as discussions, role plays, reflective journals, and case lectures. As noted in an academic article about KTU's EE approach, "teachers try to create interactive emotional experience based lectures, thought-provoking sessions where students are engaged into the experiential learning and learning-by-doing and feel motivated for learning on their own".[3] One of the KTU representatives said that some students find it difficult to accept the non-traditional methods applied, noting that "the methods originated in the US entrepreneurial ecosystem, and we are trying to make them more compatible with the mindsets of our – Eastern European – students".

Technology Venturing

The Technology Venturing course rests upon the "**lean launchpad**" approach from Stanford University. The lean launchpad implies "a heavily hands-on programme that immerses teams in developing, testing, and iterating their business model hypotheses outside the classroom" (p. 1). It prefers interaction between students, as well as the teaching and coaching team, over traditional lectures. The approach adopts the "**flipped classroom**" concept, meaning that traditional lecture content is assigned as homework and class time is spent interacting with professionals and practitioners.

The lean launchpad syllabus describes the courses' methods as follows: "During each class, all teams present their 'lessons learned' from their customer discovery efforts outside the classroom and explain how their business model has iterated or pivoted as a result. All teams are expected to be fully autonomous in conducting assignments, customer discovery efforts outside the classroom, and adequately preparing for and delivering presentations at each session. (...) This is an advanced class in entrepreneurship, so the teaching team and coaches will be highly demanding."

At KTU, Aalto advisors introduced concepts that were meant to be adapted to the Lithuanian environment. For example, the original lean launchpad approach from

[2] See http://businessmodelgeneration.com/canvas/bmc.

[3] Bakanovė/ Petraitė/Urbonė.

Stanford University provides for a ten-week bootcamp where students are pushed beyond their limits by making them believe their efforts are insufficient, until they are told in the final debriefing that they are fantastic. Instead, Aalto proposed a motivational, inspirational approach.

In order to ensure that course time is effectively used for practical work, students are required to read or view all material before coming to class. All material is provided electronically in advance of the sessions.[4]

For searching information about the students' targeted market and companies within it, as well as customers, students' are required to access numerous **databases** such as Edgar (US Securities Exchange Commission)[5], Library online resources[6], Orbis[7], Hoover's Lexis Nexis[8], Financial Times[9] and others.

Preparing students for taking part in the San José State University business competition in the US is part of the course.

Media

The two entrepreneurship courses make intensive use of online media. Study books and other material are available online, teachers communicate with students via a Moodle[10] learning platform, and there is a related Facebook site.

The **Technology Entrepreneurship** course uses a "Reflective Journal" as a means of triggering students' self-reflection with online media. The Reflective Journal is an online blog where every student of the course has to enter his or her experiences in the course into a log site for each session. The entries can be in text format but also pictures or videos. Teachers read the entries and may react upon what is written there. Second, students have to group into teams and each team needs to comment regularly in a student blog.[11]

The "lean launchpad" approach of the **Technology Venturing** course uses, beside normal textbooks and articles, two specific online media: Udacity.com, a for-profit education service provider offering an "online university", and Lean Launch Lab[12], offering an online workspace that is essential to collect material from students participating in the course.

Informal evaluation of learning outcomes and feedback for students

All evaluation of the courses is based on students' experience because the course itself is experience-based. Students have to present their business ideas and receive feedback for their pitches from course staff, mentors and guest speakers; and the student teams also evaluate themselves. This is an unusual way of evaluation, which may be challenging for students because they cannot escape the experiential approach.

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4 Lean launchpad syllabus, p. 1.

5 See http://www.sec.gov/edgar/searchedgar/webusers.htm.

6 See http://lib.hse.fi/EN/ecampus.

7 See https://orbis.bvdinfo.com.

8 See http://www.lexisnexis.com/hottopics/lnacademic.

9 See http://www.ft.com/home/europe.

10 Moodle is an open source learning platform, see http://moodle.org.

11 See http://www.goodidea-ktu.blogspot.com.

12 See http://www.leanlaunchlab.com.

Formal evaluation of learning outcomes

The **Technology Entrepreneurship** course has a brief final exam in which students have to reflect on what they learned and how the course could be improved. Students receive their marks for outputs such as their blog entries and teamwork.

In the **Technology Venturing** course, students receive feedback from mentors and coaches on the presentations they deliver. Course staff evaluates what students learned about the tools and methods, for example, who the customers are. There is no evaluation of the success of the business idea. According to the "lean launchpad" syllabus, "there are no numerical grades assigned for any of the assignments or presentations. All assignments and presentations are evaluated as either passed or failed. The overall class is graded as Pass/Fail."

6.2.4 Setting of entrepreneurship teaching

Locations

The lectures of the EE courses take place in conventional lecture halls. For the practical parts there is a large, flat room in the same building where teams can go to corners and staff can walk around and discuss with them. The first edition of the Technology Entrepreneurship course took place in KTU's E-Learning Centre in order to record the lectures.

Timing

Technological Entrepreneurship runs throughout a semester, comprising 160 teaching hours. Theoretical classes take place every week in three-hour blocks; practical classes every other week for one and a half hour.

Technological Entrepreneurship is a four-day block course offered in spring and autumn. One of the annual courses is in English, the other in Lithuanian. Originally it was a six-week course, using the "lean launchpad" approach applied at Aalto University.

6.2.5 Instructors: teachers and mentors

Professors, other employees and external lecturers of the university

The **Technology Entrepreneurship** course is organised exclusively by KTU staff, but there are also guest lectures from entrepreneurs and other business professionals as well as international visiting lecturers. The following KTU staff members are involved as teachers and mentors:

- Prof. Monika Petraitė (course leader), Head of the Department of Strategic Management, School of Economics and Business.
- Prof. Eduardas Bareiša, Dean of the Faculty of Informatics.
- Prof. Algimantas Valinevičius, Dean of the Faculty of Electrical and Electronics Engineering.
- Dr. Andrius Vilkauskas, Dean of the Faculty of Mechanical Engineering and Design.
- Prof. Rytis Krušinskas, Head of Department of Finance, School of Economics and Business.

- Assoc. Prof. Dainius Martuzevičius, Vice Dean for Research, Faculty of Chemical Technology.

The larger number of people involved indicates that Technology Entrepreneurship is a staff-intensive course.

The course **Technology Venturing** is organised by the following experts, also including experts from abroad:

- Prof. Dr. Monika Petraitė: co-ordinator, start-up mentor, STVP faculty fellow, Entrepreneurship lecturer at KTU, EU and Lithuanian expert of innovation politics and practice.
- Dr. Fabian Sepulveda: start-up mentor, Lean Launchpad trainer, Entrepreneurship lecturer at Aalto University and a co-founder and CEO of EyEscubed.
- Dr. Renata Urbonė: start-up mentor, Lean Launchpad Fellow, Entrepreneurship lecturer at KTU, project management practitioner.
- Dr. Agnė Bakanovė: start-up mentor, STVP faculty fellow, lecturer and Technology Venturing course coordinator at KTU, manager of the entrepreneurship project "Inostartas".

Business professionals, often top managers from well-established companies, also regularly give lectures to KTU students. They speak about specific subjects, such as entrepreneurial finance. They normally do not extensively present and elaborate on business cases.

"Real entrepreneurs" as teachers

Some of the teachers are "real" entrepreneurs. For example, Dr. Fabian Sepulveda, co-organiser of the "Technology Venturing" course, is a co-founder and CEO of the EyEscubed company (http://eyescubed.com/).

Mentors

The KTU staff members running the course Technology Entrepreneurship also act as mentors for students. Students can ask any mentor for advice, depending on the issue that needs to be clarified.

In the Technology Venturing course, each start-up team in the entrepreneurship courses is assigned a mentor. According to the lean launchpad syllabus, "mentors are external volunteers who are entrepreneurs, venture capitalists, business angels, etc. (...). Please be respectful of their time and use it wisely. You will also have access to alternating coaches during each of the sessions." The organisers of the Technology Venturing course also act as start-up mentors. Mentoring takes place on a volunteer basis.

6.2.6 Management of entrepreneurship education

Management of EE teachers

There are as yet no specific facilities for managing and developing EE teachers and trainers at KTU. "Teaching the teachers" takes place by way of being consulted by foreign experts (see section 6.5 for details). Four people in charge of EE attended a two-week seminar of the Stanford Technology Ventures Programme (SVTP) in August 2014.

Managing student support

Support to students interested in a start-up company or actually starting a company was found to be managed by the National Innovation and Entrepreneurship Centre, Start-up Space, at KTU.

Internal and external network management

Management of internal and external networks for entrepreneurship education is mainly done by Vice Rector Asta Pundziene and by Monika Petraitė from the Department of Strategic Management.

Management of curricular integration and attracting students

The EE course teachers and the EE co-ordinator at the NIEC have been working closely with the Deans of the engineering faculties in order to "market" the courses, make Deans support the offers, and attract students.

Evaluation of courses

The EE courses undergo regular KTU evaluation procedures. KTU is in a process of discussing the courses on offer and developing them further, involving teachers, deans, top management and external experts. Thus, there is intense evaluation of the EE courses.

Managing entrepreneurship education finance

Funding the entrepreneurship courses is an issue because they are faculty-intensive. Moreover, taking students to the San José State University's business plan competition, which is part of the Technology Venturing course, is very costly. "Entrepreneurship education is quite expensive", said Vice-Rector Asta Pundziene. Programme leaders, invited guest speakers, and mentors need to be paid. KTU has 13 to 14 people working on the EE programme.

6.3 Extra-curricular activities related to entrepreneurship education

There are several extra-curricular activities in entrepreneurship education at KTU. The major activities so far have been carried out in support with Aalto University. KTU representatives reported the following activities:

- In 2013 and 2014, students from KTU took part in the **Silicon Valley Business Plan Challenge** at San José State University. The KTU raised funds to allow students to participate physically. In 2013, the team of students won a prize.
- KTU Start-up Space hosts different events. "**Start-up Sauna**" is one of them. A "Start-up Sauna", originating from Aalto University, was hosted for the first time at KTU in 2013. The sauna events take place twice a year in spring and autumn. They address students and graduates from KTU and other Lithuanian universities. (See a more detailed description in the box-text.)

- There are **start-up weekends** organised or co-organised by the Start-up Space taking place twice a year, in spring and autumn. These weekends are national events in order to attract a larger number of interested students.
- The **Aalto venture programme** delivered lectures on entrepreneurship, dealing with various aspects of business development. The audience was mainly entrepreneurs from KTU start-ups. There was a lecture series from 12 – 15 November 2012 and 7 – 11 January 2013.[13]
- Within EU projects there have been opportunities for training entrepreneurs and mentoring start-ups from the KTU.

The Start-up Space at KTU is dealing with entrepreneurship in extra-curricular activities.

Start-up Sauna

Start-up Sauna is an accelerator programme originating from Aalto University. The programme's owes its name to its Finnish origin and the fact that running through the programme will very likely make founders sweat strongly: "Start-up Sauna connects the most promising start-ups from Nordic countries, Eastern Europe and Russia, with experienced serial entrepreneurs, investors and other industry experts (...). We focus heavily on business development (...). The best teams are brought to Silicon Valley after the accelerator program to get an understanding of the US market, that is, to meet investors, media, customers and potential partners. Once accepted to Start-up Sauna, a company also gets access to Slush, the leading start-up event in Europe." (http://startupsauna.com/accelerator)

While the Start-up Sauna in Aalto is open to everyone, participation in the local Start-up Sauna events at KTU are subject to application and selection. The local team described the procedure for a Start-up Sauna in September 2014 as follows: "The Start-up Sauna team and coaches review the applications and select the most relevant start-ups from amongst the applications. We concentrate on start-ups with a superb team that can deliver (..) an idea with potential to scale globally, and a finished product or prototype. The start-ups we select for the event are also those we think we can provide the most value to the event." (http://ktu.edu/ivc/turinys/startup-sauna-kaunas.)

While the Aalto Start-up Sauna is a one-month programme, the Start-up Sauna events at KTU last only one day. According to the programme's self-description, local start-ups attending the event receive the following benefits: "Honest feedback on their business potential and pitch"; "coaching from serial entrepreneurs, investors and other professionals"; "a great network of start-ups and global connections through the coaches"; "update[s] about future Start-up Sauna and Slush events"; as well as opportunities "to be selected to the Start-up Sauna accelerator and Slush", "to access the Start-up Sauna trip to Silicon Valley", and "to get 40 000 euros of funding".

Extra-curricular activities in entrepreneurship education at KTU were co-ordinated by the KTU's National Innovation and Entrepreneurship Centre, Start-up Space.

Extra-curricular EE activities have been funded by dedicated KTU funds and EU projects. There is no regular budget for such activities so that the issue of sustaining them depends on fundraising activities. However, KTU is very active in fundraising for EE.

[13] See http://www.15min.lt/naujiena/svietimas/karstos-zinios/ktu-studentus-verslumo-mokys-stanfordo-ir-aalto-universitetu-profesoriai-234-277259.

6.4 Institutional aspects of entrepreneurship education

6.4.1 Organisational set-up and change

Co-ordinating and integrating entrepreneurship education across the University

In 2012, the **National Innovation and Entrepreneurship Centre** (NIEC) including Start-up Space was established at KTU. This was a major move towards strengthening entrepreneurial activity and EE, not only at KTU but also in Lithuania at large. According to its strategy statement, the NIEC's objectives are the following, in the order provided by NIEC:[14]

- Development and transfer of technology.
- Establishment and development of companies as well as creating innovative products.
- Intellectual property management and protection.
- Education and spread of entrepreneurship and innovation culture.
- Development of a control system of an open access centre.

Thus, the NIEC has an explicit role in promoting EE but not a primary one. The NIEC has a Start-up Space for supporting KTU students or graduates who seek starting a business.

Influence of external stakeholders in the entrepreneurship education programmes

External experts were intensely involved in developing EE at the KTU. (See section 5.5 for further details.)

6.4.2 Laws, statutes and codes

Incentives for staff to engage in or support entrepreneurship education

Teaching entrepreneurship is part of the lecturers' normal teaching workload. The EE co-ordinators enjoy benefits of collaborating with foreign experts and taking part in related events, for example, the Stanford Technology Ventures Programme.[15]

A faculty's budget depends on the number of modules offered. If a module from a different faculty is included, the own faculty's budget decreases. Hence, "reservations" against EE on the part of deans and professors may rather be "calculations". If, for example, the number of start-ups per faculty was rewarded with additional funds, deans and professors would assumingly be quite receptive.

Incentives for other stakeholders contributing to entrepreneurship education

Business people and entrepreneurs were found to normally present their lecturers about entrepreneurship issues pro bono. Their motivation may be "applause from students" and perhaps receiving access to possible new employees, as one interviewee said.

[14] See http://nivc.ktu.edu/en-about_us-15.htm#mm50, last accessed 2/4/2015.

[15] See http://stvp.stanford.edu.

6.4.3 Mindsets and attitudes

Raising awareness for the importance of entrepreneurship

After a training visit to the Stanford Technology Ventures Programme in July 2013, the four KTU experts who participated in the programme concluded that they should give priority to change the mindsets at KTU towards being more entrepreneurship-friendly. In order to fulfil this objective, they considered it an important factor to introduce elements of entrepreneurship in all courses. Building upon this, they found that there should be specific courses offering training for those students who are keen on starting a business. In addition, there should be start-up campaigns, mentoring and coaching offers in the future.

Encouraging entrepreneurial behaviour

Establishing the two EE courses was also meant to encourage entrepreneurial behaviour among KTU students.

6.5 Outreach activities related to entrepreneurship education

6.5.1 Building an international network of advisors and peers

Three key organisations consulting KTU

KTU has been developing intense relationships with external stakeholders and supporters. In particular, a network of experts from foreign countries has been built for supporting the development of EE course content and other entrepreneurship offers. There are also contacts with local and national business professionals.

KTU made use of mainly three sources for developing EE: Aalto University, Helsinki, Finland; universities in the San Francisco Bay Area, US ("Silicon Valley"), and US Market Access Centre (US MAC) that helps foreign companies understand the US market. Three foreign experts – one from Aalto, one from University of California, Berkeley, and one from US MAC – actively developed the two EE courses running at KTU in 2014. They acted as the core reference points, inspirational sources, and provided guest speakers.

KTU and **Aalto University** concluded a co-operation agreement for developing entrepreneurship and entrepreneurship education at KTU. This agreement "had a price", as one interviewee said. The Technology Venturing course was mainly developed with support from experts from Aalto University in Helsinki, Finland. According to Will Cardwell from Aalto, Aalto University went a long way in a short period of time with regard to entrepreneurship and EE. So Aalto can show "how to jump-start such a system", as Cardwell said. Starting around 2009, the university spent considerable resources on developing an entrepreneurial ecosystem, connecting researchers with entrepreneurs, and developing numerous training courses. The activities were largely driven by students. As a result it spun off many new companies, among them a number of success stories. Aalto however, benefitted because of its history in entrepreneurship and EE.

KTU has strong liaisons with universities in the San Francisco Bay Area (**Silicon Valley)** in the US. There is no formal agreement with a Silicon Valley university, just informal

agreements and consultation. First of all, Ken Singer, a professor from the University of California in Berkeley, helped develop contacts and also consulted and mentored start-ups from KTU. The Berkeley Method of Entrepreneurship, developed at the University's Centre for Entrepreneurship and Technology, is a "pedagogy that is offered in three interconnected layers of theory, entrepreneurial mindset, and new venture networks".[16] The main focus of this approach is on cultural and psychological issues of entrepreneurship. Second, in summer 2013 and 2014, eight experts driving EE at KTU attended a two-week course of the Stanford Technology Ventures Programme (STVP), a programme operated by Stanford University's School of Engineering.[17] Third, KTU has also contacts to San José State University (US), mainly through the University's business plan competition.

US MAC provided expertise to KTU from late 2013 to early 2014. US MAC Co-CEO Chris Burry provided mentoring to start-ups from KTU based in Lithuania as well as advice on teaching entrepreneurship. One of the main messages was that one needs to bring real world experience into EE. The "Lean Launchpad" and "Business Model Canvas" approaches are valuable methods but the key problem is to bring them to life in a certain university's context. Since US MAC is a spin-off from San José State University (SJSU), it was a natural suggestion from US MAC to KTU to let students participate in SJSU's business plan competition.

Co-operation with foreign advisers is planned to last at least until 2016.

KTU considers the EE programmes at Aalto, Berkeley, Stanford and also Cambridge as leaders in the area of teaching entrepreneurship to engineers and thus good examples for KTU.[18]

How KTU's network developed

KTU developed its EE network step by step. As a basic decision, KTU sought support from abroad to learn from others. Connections to Aalto University already existed before developing EE, so it was a natural step for KTU to first approach entrepreneurship experts at Aalto due to the latter's reputation in this field. Initially, around twelve representatives from KTU's top management visited Aalto in order to learn about Aalto's approach and how it could possibly be applied at KTU as well. On this visit, KTU representatives were also introduced to experts from the US who co-operated with Aalto. Thus, in a next step, the KTU also targeted experts from the US because start-ups were being given high attention there.

At the time of writing this case study in early 2015, KTU had entered a new phase in collaboration for EE and was searching for new external links to the entrepreneurship education community. Contacts to Aalto, Stanford University and US MAC were, however, sought to be maintained.

Limitations of involving advisors from other countries

Many experts interviewed for this case study mentioned limitations of involving external experts for developing EE. These limitations are related to funds, time, a necessity of own

[16] See http://cet.berkeley.edu/curriculum/.

[17] See http://stvp.stanford.edu/about/.

[18] See Bakanovė/Petraitė/Urbonė.

experience, economic and cultural conditions, a need for adaption, as well as the suitability of advisors:

Funding may be a barrier for several reasons. Above all, experts from foreign countries may not necessarily provide services pro-bono. One of the external experts said that "affordability of outside assistance is a real challenge". Furthermore, while there are also EU funds that can be used for developing EE, one of the external advisors stated that the way EU funds are allocated and awarded is quite difficult. It may also be an obstacle to involve experts outside the EU because EU funding normally has to be spent within the EU. However, the case study also found that some expert services were apparently provided below international market prices. Experts did not necessarily demand market prices because KTU representatives, including top management, were really serious about developing entrepreneurship, and were open-minded and likable to communicate with. Hence, KTU also provided a kind of immaterial reward by indicating that support services would likely have tangible impact in a country that could benefit considerably from it.

Time may also be a barrier to involving experts from foreign countries. As one interviewee from KTU put it, "involving external experts takes time and money and needs to be planned very precisely". This shortage of time may lead to trying to do things too quickly, as one of the external advisors mentioned: "I had the impression they were too rushed. They wanted to do things they had not well thought through." Furthermore, one of the interviewees stated that KTU had already planned an EE curriculum when he became involved – the impact of his advice could have been stronger if he had been involved earlier.

Several interviewees pointed to the **necessity of own experience** for introducing, teaching and developing EE. Educators may educate well, but those who are educated still need to explore on their own. One of the interviewees from KTU used a metaphor for explaining the importance of tacit knowledge: "If you ask a leading surgeon how he does it, he can explain, but you still cannot do it yourself, unless you are a good surgeon as well." Most of the time international experts have practical experience as they might be entrepreneurs themselves. However, they may lack experience of training the trainers as well as professional materials that would support the training. An interviewee from the US said that the leaders of the successful EE programmes at US universities come from industry, and it would be a challenge all over Europe that professors lack real-world experience.

There is a need to have a local **matured entrepreneurship ecosystem**. One interviewee from KTU said that it would of course be better to have such a developed entrepreneurship ecosystem. However, Lithuania does not offer a sufficient amount of venture capital and does not have the presence of a matured entrepreneurial community. The involvement of foreign experts could be even more fruitful if there was a more matured entrepreneurial ecosystem in Lithuania. Several interviewees from KTU and from other countries mentioned a rather underdeveloped investment sector in Lithuania as an impediment to entrepreneurship in the country. Moreover, collaboration between business and the University was found to be limited. One of the reasons may be that Lithuania does not have too many companies with a research and development department so that there are few natural counterparts for university researchers.

Local socio-economic conditions may require a **need for adaptation**: Approaches from other countries may not work if they are tried to be transferred one-to-one.[19] The adopting university may need to adjust approaches to its specific situation, i.e. to human and financial resources available as well as to the culture, traditions and support infrastructure at the university and in the environment. KTU was found to seek adapting approaches from other universities to KTU's specific preconditions. For example, Vice Rector Asta Pundziene pointed out that KTU perceives EE to be much broader than just education on how to establish new ventures – EE, first of all, should serve as a "playground" for students to safely test their entrepreneurship capabilities and learn how to transfer their knowledge to practical use. EE has a mission to "inoculate" an entrepreneurship culture into the university as well as to make students aware of different career opportunities.

Last but not least, as regards **suitability of advisors**, even universities with a very high reputation in entrepreneurship may not necessarily be the most suitable ones for advising certain other universities. For example, one interviewee said that "the problem with Stanford University is that they are much different from other universities", which may limit transferability of their ways of doing things, and they may have some degree of "success blindness".

Peer-to-peer consultation

As a consequence of limitations of involving external experts, one interviewee suggested more "co-development", i.e. co-operating with other universities that are on a similar level of EE development. KTU actually has, for example, contacts to the Monterey Technology Enterprise Team from Mexico who were part of the SVTP team seminar in summer 2014. Since they were in 2013 on a fairly similar level as KTU, they provided some kind of "peer coaching".

6.5.2 Further external stakeholders

Enterprises

Most external stakeholders who are involved in EE at KTU are business people, mainly from technology-based firms – SMEs because there are no large technology-based firms located in the Kaunas region. Companies are represented in the University's advisory council. Many companies support entrepreneurship-related events such as the start-up weekends.

Incubators, accelerators, science parks and technology parks

In November 2014, a new Science, Technology and Business Centre opened on the KTU campus.[20] It is part of the recently established "Santaka Valley", a large science, education and business centre.[21] The main purpose of Santaka Valley is confluence of public and private research and the provision of knowledge-intensive services. The

[19] There are incidences that such one-to-one copying is sought. One of the foreign experts stated that a Chinese university actually copied (or tried to copy) a university's EE approach.

[20] See http://ktu.edu/en/lmip/newitem/santaka-valley-ktu-science-technology-and-business-centre-architectural-vision-synergy.

[21] See http://www.santakosslenis.lt/en.

centre's technological focus is on sustainable chemistry and bio-pharmacy, future energy, mechatronics, information and communication technologies.[22]

6.6 Impact and lessons learned

6.6.1 Evaluating impacts of entrepreneurship education

Evaluating students' learning progress

The most important means for evaluating EE impacts at KTU is a two-tier survey of students' entrepreneurial knowledge, abilities and skills at the beginning and the end of the courses. KTU Business School developed a specific method for their surveys. Students have to fill in a structured, virtual questionnaire with basically the same questions in the first and the second tier. The questionnaire uses a five-point Likert Scale with 1 = bad, 2 = satisfactory, 3 = average, 4 = good, and 5 = perfect. The results provide a self-assessment of what the students learned. Indicators include the following:

- **Entrepreneurial knowledge**: conceptual understanding of entrepreneurship; conceptual understanding of entrepreneur; familiarity with the concept of creativity and creativity techniques; knowledge in the field of team building and teamwork; awareness of the lean start-up methodology; conceptual understanding of business model; awareness of the funding resources for a start-up; familiarity with the aspects of intellectual property protection.
- **Entrepreneurial abilities**: ability to be creative, ability to build a multidisciplinary team, ability to work in a multidisciplinary team, ability to validate a business idea, ability to commercialise one's competencies.
- **Entrepreneurial skills**: public speaking skills; skills for expressing oneself in writing; skills for boosting creativity in others; interviewing skills; business model designing skills.

A survey of 26 students in 2014 found that students improved in all indicators.[23] The strongest increases were found for "awareness of the lean start-up methodology" (from a mean of 1.92 before the course to 4.35 after), awareness for the funding resources for a start-up (from 2.54 to 4.42) and for "business model designing skills" (from 2.46 to 4.15).

Numbers and examples of start-ups from KTU

KTU seeks keeping track of start-ups from the University. The number of young companies supported at the Start-up Space indicates an increasing trend. Since 2012, when the Start-up Space was founded, the facility hosted 36 companies. In a few of these companies, the participating students were ones who had attended an entrepreneurship course at KTU. Some of these companies already allow the founders to earn a living.

Examples of companies started by KTU students and hosted by Start-up Space include the following:

- alovita[24], a company that developed a multifunctional care bed;

[22] See http://www.santakosslenis.lt/en/the_santaka_valley.

[23] See Bakanovė/Petraitė/Urbonė.

[24] See http://www.alovita.eu.

- BLIU BLIU[25], a platform to learn languages;
- sneakyBox[26], an augmented reality and computer games developer;
- InLoga[27], an electronic devices design and development company;

As well as the seoHelis service company[28], Power of Eye, and EVJ Lighting[29].

Outlook to possible future impacts of entrepreneurship education at KTU

While at the time of writing the case study it may have been be too early to assess the impacts of entrepreneurship education at KTU, one can assess the existing base from which future impacts may emerge. One of the interviewees said that the ground is fertile: Engineering students are very competent in their subjects, some are highly interested in starting a new business, and KTU already counts several successful start-ups. However, it was also stated that business understanding was still fairly basic. Nota bene, KTU does not consider an increase in the number of start-ups as a primary objective. Rather, entrepreneurship education is supposed to "help students make up their minds what they are: entrepreneurs, employees, inventors, ...?", as Vice Rector Asta Pundziene said.

In order to successfully develop entrepreneurship and EE at a university, one interviewee said it would be most important to "get the most influential faculty members excited about it first". Other faculty members may then follow. However, it was also stated that it is "not easy to make hard scientists believe in entrepreneurship". It was said that KTU already completed the first steps in this respect.

6.6.2 Lessons learned

Summary of lessons learned from this case

The KTU case provides several lessons for other universities seeking to establish and develop an entrepreneurship education programme. The case may in particular provide lessons for other universities seeking foreign advice in establishing EE, especially technical universities.

- **University leadership commitment**: The KTU case suggests that a university starting the journey of EE should have strong commitment and support from the university's leadership as well as a clear vision of EE objectives. In the case of KTU, the University's leadership was found to have such a clear vision as well as the strategic aim to establish an entrepreneurship culture within the University and to foster the development of knowledge intensive start-ups. The University's strategy towards entrepreneurship development helped to select appropriate measures and international experts as well as to expand the international networks.
- **Helpfulness of external expertise**: Intense consultation with external experts from other countries was found to be fruitful at KTU for developing EE. Such consultation may thus be a road to follow for other universities. It may be advisable to involve

[25] See https://bliubliu.com/en.

[26] See http://sneakybox-studios.com.

[27] See http://inloga.eu/?lang=en.

[28] See http://www.seohelis.lt.

[29] See http://carcamsonline.com/video/9kSAbOic7CE/3-different-EVJ-LIGHTING-prototypes.html for a prototype.

external experts right from the beginning of planning EE, in order to maximise their impact on EE endeavours.

- **Limitations of external expertise**: There are limitations of involving external experts for developing EE. Firstly, consultations from external experts may be costly and funds are always limited. Second, involving external experts takes time for thorough planning and for carrying out consultation visits. Third, EE may be most beneficial when the experts from the consulted university have their own experience in entrepreneurship and teaching the teachers, which is not necessarily the case. Third, there may be unfavourable economic and cultural conditions in the country or region, for example a lack of appreciation for entrepreneurship and a lack of contact between universities and businesses. Fourth, there is a need for adaption of foreign approaches to local conditions. Fifth, there is a need to select advisors thoroughly because not all may be suitable for the specific EE targets aimed at by the university. Hence it may be advisable to plan the involvement of external experts thoroughly.
- **Starting from established contacts**: KTU built its international network connections for developing EE initially through established contacts. KTU then expanded the network to partners that were found to be particularly suitable and at the top end of worldwide experience. In the case of KTU, this was an existing connection to Aalto University in Finland, which led further to co-operation partners in the Silicon Valley, US. Using such established contacts may ensure a necessary level of trust.
- **Seeking additional peer coaching**: Beyond foreign advisors, who may normally be paid, it may also be helpful to interact with peers, i.e. with universities at a similar point in developing EE.
- **Overcoming internal barriers**: The KTU case also shows that proponents of EE may have to overcome barriers to implement EE within the university. Such barriers may be related to reservations against entrepreneurship as a “soft science” as well as competition among faculties about scarce resources for courses. Foreign advisors may help convince sceptics through their knowledge and experience, but foreign advisors may not be able to simply wipe out such barriers.

Transferability to other universities

The KTU case may be insightful for any other European university that starts from scratch to introduce entrepreneurship education. Universities from Eastern Europe and also technical universities may find the case particularly relevant.

References

Research for this case study was conducted by Dr. Stefan Lilischkis, Senior Consultant at empirica GmbH, Bonn, on behalf of the study for supporting the entrepreneurial potential of higher education (sepHE). Sources and references used include desk research plus the following:

Interviews

- Violeta Kaunelienė, Head of Intellectual Property Management Group, National Innovation and Entrepreneurship Centre, Kaunas University of Technology, 7 August 2014 (phone) and 26 February 2015 at KTU.
- Monika Petraitė, Head of Department of Strategic Management, School of Economics and Business, KTU, 22 September 2014 (phone).
- Will Cardwell, Senior Lecturer and Advisor, Aalto Executive Education, Aalto Ventures Programme, 24 September 2014 (phone).
- Alex Sozonoff, CEO, FlyVictor; member of the Investment Advisory Council of the Lithuanian Ministry of Economy, 2 December 2014 (phone).
- Ken Singer, Managing Director, Center for Entrepreneurship and Technology, University of California at Berkeley, US, 5 December 2014 (phone).
- Chris Burry, Co-CEO, US MAC, 17 Decemer 2014 (phone).
- Asta Pundziene, Vice Rector for Research, KTU, 6 January 2015 (phone), and 26 February 2015 at KTU.
- Sarunas Mancius, 1st year student, KTU, 25 February 2015.
- Laima Masalevičiute, 4th year student, KTU, 25 February 2015.
- Assoc. Prof. Dainius Martuzevičius, Vice Dean for Research, Faculty of Chemical Technology, KTU, 25 February 2015.
- Fabian Sepulveda, Partner at Courage Ventures, Aalto University Executive Education, Aalto Ventures Programme, interview at KTU on 26 February 2015.

Participations

- Tour through KTU Startup Space together with representatives of the Aalto Ventures Programme, guided by Liutauras Palaitis, Head of Start-up Space at KTU, 25 February 2015.
- Observation of a mentoring session for a new business at KTU's Startup Space, mentoring by Fabian Sepulveda, 26 February 2015.
- Guided tour through the Santaka Valley R&D Centre together with representatives from the Aalto Ventures Programme, 26 February 2015.

Literature

Bakanovė, Agne; Petraitė, Monika; Urbonė, Renata: Curriculum Development for Technology Based Entrepreneurship Education: Cross Disciplinary and Cross Cultural Approach. (Forthcoming.)

KTU, Kaunas University of Technology (2014a): Profile. (Available at http://ktu.edu/en/sites/ktu.edu.en/files/viesuju_rysiu_skyrius/ktu_profile_en_2014_web.pdf, last accessed 4/9/2014)

KTU, Kaunas University of Technology (2014b): Kauno Technologijos Universiteto, 2014–2016 Metų Strateginis Veiklos Planas (Strategy Plan 2014 – 2016). (Available at http://ktu.edu/lt/system/files/2014-2016_m._strateginis_veiklos_planas.pdf, last accessed 10/5/2015)

KTU, Kaunas University of Technology (2012): Kauno Technologijos Universiteto Strategija (Strategy of Kaunas University of Technology). (Available at http://ktu.edu/sites/default/files/bylos/Dokumentai/ktu_strategija.pdf, last accessed 16/9/2014).

Websites

Berkeley Method of Entrepreneurship: http://cet.berkeley.edu/curriculum/, last accessed 8/4/2015.

KTU to Establish Innovation and Entrepreneurship Centre, KTU News, announce date 8/2/2012: http://en.ktu.lt/content/news/ktu-establish-innovation-and-entrepreneurship-centre (last accessed 18/9/2014 - the news is in fact about the co-operation agreement between KTU and Aalto, not about the IEC).

National Innovation and Entrepreneurship Centre: http://ktu.edu/ivc/en/ (last accessed 16/9/2014).

EyeEscubed: http://eyescubed.com (last accessed 16/9/2014.)

Panevezys Science and Technology Park: http://en.ktu.lt/content/structure/panevezys-science-and-technology-park (last accessed 16/9/2014).

Stanford Technology Ventures Programme: http://stvp.stanford.edu/ (last accessed 17/9/2014).

Annex

Annex 1: Study module programme "Technology Entrepreneurship"

KAUNAS UNIVERSITY OF TECHNOLOGY

STUDY MODULE PROGRAMME (SMP)

Module Code	S	000	B	177	Accredited until	2016	09	01	Renewal date		
	Branch of Science		Progr.	Registr. №.							

Entitlement

Technology Entrepreneurship

Prerequisites

n.a.

Main aim

To provide the basic entrepreneurial skills, based on the interaction of technology knowledge transfer and entrepreneurial skills for start up development.

Course (module) Learning Outcomes

№.	Learning Outcomes	Teaching / Learning Methods	Assessment Methods
1		Discussion, Formal lecture, Guests lectures, Reflective journal	Oral presentation, Self-assessment, Student blog
2		Formal lecture, Guests lectures, Role play	Oral presentation, Self-assessment, Student blog
3		Case analysis (Case study), Discussion, Formal lecture, Guests lectures	Group (team) project, Reflection on action, Self-assessment, Student blog

Summary

The course aims to introduce fundamentals of technology and R&D driven entrepreneurship, and provide the basic knowledge on the processes used by technology entrepreneurs to start companies. It develops basic skills of taking a technology idea and finding a high-potential commercial opportunity, gathering resources such as talent and capital, figuring out how to sell and market the idea, and managing rapid growth of an enterprise.

Level of module

Level of programme		Subject group
Cycle	Type	
First	Bachelor	Core Subjects of the Study Field

Syllabus

№.	Sections and themes
1.	Inspiration: entrepreneurship, creativity and technologies
1.1	The essence of technology driven entrepreneurship
1.2	Entrepreneurial leadership in technology venturing
1.3	Business model for an individual entrepreneur
2.	Creativity sources and improvisation in technology business
2.1	Creativity and creativity methods in technology venturing
2.2	Entrepreneurial team formation and teamwork
3.	Technology business design
3.1	Lean start-up methodology
3.2	Business model design
3.3	Validation of the business model
3.4	Sources for financing of technological business
3.5	Intellectual property issues in technology entrepreneurship
3.6	Business model pitch for stakeholders

Evaluation procedure of knowledge and abilities:
Ten grade and gathered evaluation system is applied. The semester's individual work tasks are evaluated by grades; the final grade is given during the examination session while multiplying particular grades by the lever coefficient and summing the products.

References

№.	Title	Edition in KTU library		In KTU bookstore	Number of ex. in the methodical cabinet of the depart.
		Pressmark	Number of exemplars		
1.	Ragauskas A., Kriaučionienė M. 2008 . Inovacijų vadyba. Mokomoji knyga			No	20
	Comment:avialable via KTU e-books				
2.	Ostaševičius V., Kriaučionienė M., Kaunelienė V. 2007. Inovacijų valdymas. Vadovėlis.		20	No	10
3.	Jucevičius, G.; Kriaučionienė, M.; Ragauskas, A. Inovatika ir globali žinių ekonomika: vadovėlis / Kauno technologijos universitetas. Kaunas, 2008. 191 p. ISBN 9786098007053		20	Yes	
4.	Jucevičius R., Urbonė R. Intelektuali antreprenerystė: fenomenas, kontekstas, perspektyvos. Mokomoji knyga. 2008. ISBN 978-609-02-0474-0			Yes	
5.	Cooper, Brant, Vlaskovits, Patrick. Lean Entrepreneur : How Visionaries Create Products, Innovate with New Ventures, and Disrupt Markets. Wiley, 2013. eISBN: 9781118334089.			No	
	Comment:Electronic resource available via Ebrary database.				

Additional literature

№.	Title
1.	Bessant, J.Tidd, J. 2007 Innovation and entrepreneurship. John Wiley & Sons, 2011, ISBN 978-0470711446
2.	Tidd, J., Bessant, J., Pavitt, K. (2008). Managing innovation. Integrating technological, market and organizational change. John Wiley and sons. ISBN 978-0-470-99810-6
3.	Steve Blank, Bob Dorf. The Startup Owner's Manual: The Step-By-Step Guide for Building a Great Company. K&S Ranch, 2012. ISBN 978-0984999309
4.	Vyakarnam, S., Hartman, N. Unlocking The Enterpriser Inside! A Book Of Why, What And How! World Scientific Publishing Company, 2011. ISBN 978-9812818744
5.	Thomas Lockwood. Design Thinking: Integrating Innovation, Customer Experience, and Brand Value. Allworth Press, 2009. ISBN 978-1581156683
6.	Tina Seelig. inGenius: A Crash Course on Creativity. HarperOne, 2012. ISBN 978-0062020703
7.	Stefan Lindegaard, Guy Kawasaki. The Open Innovation Revolution: Essentials, Roadblocks, and Leadership Skills. Wiley, 2010. ISBN: 978-0-470-60439-7
8.	Lee, Charles T. Good Idea. Now What? : How to Move Ideas to Execution. Wiley, 2011. eISBN: 9781118226179
9.	Feld, Brad; Batchelor, Amy. Startup Life : Surviving and Thriving in a Relationship with an Entrepreneur. Wiley, 2013. eISBN: 9781118516867
10.	Caldicott, Sarah Miller. Midnight Lunch : The 4 Phases of Team Collaboration Success from Thomas Edison's Lab. Wiley, 2012. eISBN: 9781118421963
11.	Lankow, Jason Crooks, Ross Ritchie, Josh. The Power of Visual Storytelling. Wiley, 2012. eISBN: 9781118420065
12.	Cases in technological entrepreneurship : converting ideas into value / edited by Claudio Petti ; preface by Aldo Romano. Cheltenham : Edward Elgar, 2009. ISBN: 9781848441866

Coordinating lecturer

Position	Name, surname	Schedule №.
Professor	Eduardas BAREIŠA	0902
Professor	Algimantas VALINEVIČIUS	4648
Professor	Monika PETRAITĖ	9445
Senior Research Assistant	Andrius VILKAUSKAS	9924
Professor	Rytis KRUŠINSKAS	2672
Assoc. professor	Dainius MARTUZEVIČIUS	2692

Subdivision

Entitlement	Code	Contribution, %
Department of Environmental Engineering	0208	5
Faculty of Informatics	14	5
Faculty of Mechanical Engineering and Design	11	5
Faculty of Electrical and Electronic Engineering	03	5
Finansų katedra	0601	5
Strateginio valdymo katedra	0605	75

Study module teaching form №. 1

Semester		Mode of studies	Structure				Total hours	Credits
			Lectures	Pract.	Lab.	Ind. work		
A	S	D	36	28	0	96	160	6

Languages of instruction:

Lithuanian	L	English	E	Russian	R	French	F	German	G	Other	Oth.

Plan of in-class hours

№. of Themes	Academic hours			№. of Themes	Academic hours		
	Lectures	P	L		Lectures	P	L
1.1	3	2	0	3.2	12	8	0
1.2	2	2	0	3.3	2	2	0
1.3	3	2	0	3.4	2	2	0
2.1	2	2	0	3.5	2	2	0
2.2	2	2	0	3.6	3	2	0
3.1	3	2	0				
				Total:	36	28	0

Schedule of individual work tasks and their influence on final grade

	№. of syllabus	Total hours	Influence on grade, %	Week of presentment of task (*) and reporting (o)															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17-20
Oral presentation	1-3	23	15	*							0									
Peer-assessment	1-3	4	10	*															0	
Student blog	1-3	16	20	*															0	
Reflection on action	1-3	8	20	*																0
Group (team) project	1-3	45	35			*													0	
Total:	-	96	100																	

Annex 2: Study module programme "Technology Venturing"

ktu kaunas university of technology 1922

Aalto University School of Business

TECHNOLOGY VENTURING

Technology venturing course is particularly dedicated for those that feel excited about starting a new venture or for those that already have started their business. The attendees have the opportunity to learn and practice the fundamental skills required to assess a business concept or product in the framework of a business opportunity, to get a lot of experience while working in teams and finally to give a space for personal grow as an entrepreneur. The course focuses on products and services with an innovative and engineering based advantage that will provide sustainable differentiation. We will explore the opportunity to build a business around a realistic and actionable concept.

Technology venturing course will provide business and venturing competences for transferring technology concept into the business model, venture capital attraction and shape entrepreneurial behaviour as a professional feature. During the Technology Venturing course the attendees will learn about the early-stage entrepreneurship including: technology business opportunity assessment, business and product development, entrepreneurial marketing and etc. (see table 1).

Table 1. Time table for Technology Venturing course

Dates	***Topics to be covered in the class***	***Instructors***
	Teaching in class	
31/03/2014	***Morning session: Introductory lecture on market research and idea development & Business opportunity validation*** *This session will provide with the knowledge on what market research is and why it is necessary for reshaping current business idea.* *Methods and tools for opportunity validation is going to be introduced.* ***Lunch Break*** ***Afternoon session: BMC workshop*** *During the workshop you will get to know the essence of business model and how to design it.* *The instrument of business model canvas will be introduced so that you are free to design the business model for your idea.* ***Assignment no. 1:*** *Small scale market research*	***Dr. Fabian Sepulveda****, Aalto University;* ***Prof. Dr. Monika Petraitė, Dr. Renata Urbonė, Dr. Agnė Bakanovė,*** *Kaunas University of Technology*
01/04/2014	***Morning session:*** ***Discussion on the assignment no 1*** *Interactive session for short presentations and feed backing in class.* ***Entrepreneurial marketing. Go-to-market strategy*** *Content session (lecture) on how to plan a good marketing campaign and choose the proper way for entering the market with the value proposition.* ***Assignment no. 2:*** *Desktop research* ***Lunch Break*** ***Afternoon session: Desktop research in the class*** *You will implement the assignment no 2, present the results in front of the audience and get the feedback.* ***Q&A session****. Time for your questions and coaching*	
02/04/2014	***Morning session:*** ***Discussion on the assignment no 2,*** *Pivoting based session for short presentations and feed backing in class.*	

	Lean product development *Content session for knowledge building around agile and customer development.* ***Lunch Break*** ***Afternoon session: Entrepreneurial finance*** *Content session during which you will be introduced with the basics of finances for startups.* ***Assignment no 3****: To calculate the estimate financials* ***Q&A session****. Time for your questions and coaching*	
03/04/2014	***Morning session:*** ***Discussion on the assignment no 3 and coaching on financial calculations*** *From the live example you will learn on how to finance the idea and the most important core stones have to be taken into account.* ***Capitalization and valuation & Venture capital relations*** *Content session for provision with the understanding on how to manage the shares, what should be proposed for the VCs and etc.* ***Lunch Break*** ***Afternoon session: How to estimate your financials?*** *Interactive exercise designed for learning the financial estimation.*	
04/04/2014	***Morning session:*** ***Business communication for startups.*** ***Pitching*** *Content session on how to pitch yourself and your business to VCs, potential clients, partners and other stakeholders.* ***Preparing for the pitch*** *Time for questions and coaching* ***Lunch Break*** ***Afternoon session: Pitching in practise*** *(7-10 min pitch & feed backing)* ***Course wrap-up and further steps for mowing on***	

* - there might be some minor changes in the topics during the process

The classes start at 9:30 a.m. and end at 5:30 p.m. The auditorium is 304, Food Science and Technology Center (the address is Radvilėnų pl. 19 B, Kaunas).

Dr. Fabian Sepulveda,
A start-up mentor, Lean Launchpad trainer, Entrepreneurship lecturer at Aalto University and a co-founder and CEO of *EyEscubed*

Prof. Dr. Monika Petraitė,
A start-up mentor, STVP faculty fellow, Entrepreneurship lecturer at KTU, EU and Lithuanian expert of Innovation politics and practice

Dr. Renata Urbonė,
A start-up mentor, Lean Launchpad Fellow, Entrepreneurship lecturer at KTU, project management practitioner

Dr. Agnė Bakanovė,
A start-up mentor, STVP faculty fellow, lecturer and Technology Venturing course coordinator at KTU, manager Of Entrepreneurship project Inostartas

Visit our team on Facebook and get a sense of what we do:
https://www.facebook.com/KTUTechnologyEntrepreneurshipProgramme?ref=hl

Annex 3: Programme of Start-up Sauna at KTU

Renginio vieta: Room 337, Studentų st. 48A, Kaunas

Pradžia: 2014-09-16

Renginio laikas: 10.00

Northern and Eastern Europe's top accelerator, Start-up Sauna, is coming to Kaunas Technical University on September 16th to help the most promising early-stage companies in Kaunas together with KTU StartupSpace!

What is Start-up Sauna? https://www.youtube.com/watch?v=Z6Nj0v5dc5w

IMPORTANT! The event application form is hosted this year in f6s. All the applications to the event should go there. Event application is already open and closes on 9th of September: https://www.f6s.com/startupsaunainkaunas-sep16th#/apply

The Start-up Sauna team and coaches review the applications and select the most relevant start-ups from amongst the applications. We concentrate on start-ups with a superb team that can deliver, an idea with potential to scale globally, and a finished product or prototype. The start-ups we select for the event are also those we think we can provide the most value to through the event. So please, put some efforts in filling up the registration!

Local start-ups attending the event get:

• Honest feedback on their business potential and pitch

• Coaching from serial entrepreneurs, investors and other professionals

• A great network of start-ups and global connections through the coaches

• Updated about future Start-up Sauna and Slush events

• An opportunity to be selected to the Start-up Sauna accelerator and Slush

• An opportunity to access the Start-up Sauna trip to Silicon Valley

• An opportunity to get 40 000 euros of funding (convertible note + grant)

Startup Sauna Coaches: Magnus Kumlin, Jan-Erik Nyrövaara, Saku Everi, Mindaugas Glodas, Artūras Bulota, Rokas Tamošiūnas, Darius Dulskis.

Event Day Schedule

Before the event
9.00 - 10.00 general setup, teams upload their slides, coffee served
Morning
10:00 - 10:30 Welcome by Start-up Sauna, the local partner and coaches
10:30 - 12:30 Start-ups pitching (3 minutes with slides + a short Q&A)
Lunch break
12:30 - 13:30 Lunch at the venue or nearby restaurant
13:30 Announcing the teams selected for the afternoon session
Afternoon
13:30 - 16:30 20-minute 1on1 coaching sessions
16:30 - 16:45 Coffee break (Startup Sauna, the local partner and the coaches choose a couple of top-performing start-ups)
16:45 - 17:00 General feedback and announcing the top performers
Evening
19:00 Networking and drinks together with the local start-up community
Event will be held in English!

(Source: http://ktu.edu/ivc/turinys/startup-sauna-kaunas)