



Supporting the entrepreneurial potential of higher education

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Case Study No. 7:

Technical University of Kosice, Slovakia: Extra-curricular entrepreneurship education activities and start-up coaching within the region

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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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Abstract



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V KOŠICIACH

The Technical University of Kosice (TUKE), Slovakia, is located in Kosice, the main city in Eastern Slovakia and the European Capital of Culture 2013. TUKE is a fully-fledged university with a strong technical tradition. It offers curricular entrepreneurship education mainly through its Faculty of Economics, in particular courses in entrepreneurial management and developing entrepreneurial skills. The main emphasis of entrepreneurship education at TUKE is on extra-curricular activities. These include a training programme and a linked start-up weekend for students to develop their own business ideas and start-ups (the AZU initiative), as well as infrastructure to coach individual student start-up projects and regional entrepreneurs (in the Start-up Centre). Within these activities the university integrates regional and national co-operation partners and their knowledge resources in supporting entrepreneurial ventures. This enables a flexible integration of university members with entrepreneurial motivation (staff, students, alumni) as well as a scaling of entrepreneurship education on campus. At the same time it brings about the task of co-ordinating and sustaining single activities over time. Institutionalisation of an infrastructure for extra-curricular entrepreneurship education is currently mainly indirect. It has developed through start-up coaching and training for individual student or staff teams within general technology transfer activities in the university's start-up centre and the prospective science park.

Case study fact sheet

■ Full name of the university:	Technical University of Kosice (TUKE); Kosice, Slovakia
■ Legal status (e.g. public or private)	Public
■ Location (if applicable: branches):	Kosice Campus
■ Year of foundation:	1952
■ Number of students:	Approx. 10.600 (as per October 2014)
■ Number of employees:	Approx. 1.800 (of which 900 in teaching and 900 in research and administration)
■ Budget in most recent financial year:	Approx. 42 million Euro (2013)
■ Academic profile:	TUKE is a well-established technical university with seven technical faculties (Mining, Ecology, Process Control and Geo-technology; Metallurgy; Mechanical Engineering; Electrical Engineering and Informatics; Civil Engineering; Manufacturing Technologies; Aeronautics) and, since the 1990s, a Faculty of Economics and a Faculty of Arts
■ Entrepreneurial profile:	Entrepreneurship education offers within curricula are predominantly hosted within the Faculty of Economics; there is strong focus on extra-curricular entrepreneurship activities organised by individual university members and partners in the Kosice region
■ Activities focused in this case study:	Extra-curricular activities in entrepreneurship education in co-operation with external, in particular, regional partners (AZU Programme; Start-Up Weekend; TUKE Start-Up Centre coaching of start-ups from the region of Eastern Slovakia and to student start-up project teams
■ Case contact person(s):	Veronika Duricova, Faculty of Economics, TUKE

Information included in this case study is from end of year 2014 unless stated differently.



7.1 The university's entrepreneurial profile

7.1.1 The university's overall approach to entrepreneurship education

In Slovakia's higher education sector, entrepreneurship is still a developing and unfolding theme, which is not yet fully anchored in national higher education legislation as a standard function of universities. Slovakian university institutions are therefore in the process of building their infrastructure for supporting and teaching entrepreneurship with contributions from external stakeholders like public and private organisations, initiatives, and networks in start-up support and consulting (e.g. the SPOT; Junior Achievement; KPMG), as well as individual Slovakian entrepreneurs (see 7.3.3 and 7.5). The Technical University of Kosice (TUCE) implemented entrepreneurship in its course curricula and study programmes predominantly through the Faculty of Economics. The faculty offers entrepreneurship courses to its own bachelor students, but also to selected faculties in engineering and science (see 7.2). There are both introduction courses to entrepreneurship and a more hands-on format where students work on their own business ideas and plans culminating in student campus firms. Overall the portfolio of entrepreneurship courses is still developing and not yet fully diversified across different faculties, degree programmes and other target groups.

The strength of TUKE is in supporting and engaging individual university actors and institutions to establish, offer, and integrate extra-curricular activities to create entrepreneurial mindsets (e.g. the AZU programme), a start-up weekend, and business idea competitions (see 7.3.3). This represents a suitable strategy for the university organisation, which is still in the process of building a fully-fledged entrepreneurship curriculum. Extra-curricular foci allow TUKE to integrate partners from the Kosice region (e.g. the Kosice IT Valley or initiatives around the 2013 European Capital of Culture Kosice) and national new venture support organisations (see 7.3.3), as well as offering entrepreneurship education (EE) on an efficient internal resource base.

In addition, the university engages in EE indirectly within its technology transfer and spin-off activities via the coaching of individual student (and staff) teams and their start-up projects, as well as training workshops and business idea contests on campus for nascent university entrepreneurs. This is institutionalised through a new Start-Up Centre serving student and graduate entrepreneurship, while a projected Science Park (the Technicom) is to support entrepreneurial activities of university research staff and institutes (see 7.3.6 and 7.4.1).

7.1.2 Leadership and governance

Importance of government strategies

The role of the Slovakian government is instrumental in terms of the context in which entrepreneurship in higher education is offered and, more importantly, with regard to public policy support in building an infrastructure for entrepreneurship (education) at the university. The government also continues to support the TUKE Start-up Centre through the Slovak Business Agency. The most significant influence of government support is a project grant to support the establishment of the Science Park "Technicom" on the premises of TUKE with two regional university partners. The establishment of the park is still in a project state. It is planned to be finalised this year with funding of operations of



the science park (including the support of university start-ups and coaching entrepreneurs), which are still to be acquired (see 7.4.1).

Importance of entrepreneurship in the university's strategy

The role of the university leadership and its strategy has been considered important in bridging and communicating existing challenges and barriers. The strategy has been especially important for further implementation of entrepreneurship and EE infrastructure with regard to the Slovakian Government and its role in shaping public higher education policy. Interlocutors from university management institutions involved in entrepreneurial activities considered TUKE to currently concentrate more on technology transfer and the entrepreneurial training support and coaching implicit in this rather than on immediate (curricular) entrepreneurship education. This corresponds with the observed EE activities which predominantly take place in the extra-curricular domain (see 7.3.3).

Organisational implementation

Curricular EE is mostly anchored in TUKE's Faculty of Economics. Like private banking, entrepreneurship also used to be uncommon in Slovakia prior to its transition to a market economy. Similar to banking and managerial finance, the theme has found a home within business and economics at the university. However, unlike banking and investment, which is an institutionalised department within the faculty, entrepreneurship appears more to be an interdisciplinary topic in the process of establishment with university staff from different departments (mainly from the Department of Regional Science and Management) engaging in EE teaching and coaching activities (see 7.2 and 7.3).

7.1.3 Resources: people and financial capacity

Human resources for entrepreneurship education

Since the university's EE profile is characterised mostly by extra-curricular activities, there is only a small set of people and supporting material resources for entrepreneurship teaching (note that there is no specific entrepreneurship professor chair or tenured research and teaching position in entrepreneurship currently at TUKE). Curricular EE teaching is delivered by a small group of people from the Department of Regional Science and Management including external lecturers (both at the course level – see the course Development of Entrepreneurial Skills in section 7.2.3 – and in the context of individual course sessions or events; e.g. teaching on a specific topic of entrepreneurial management). However, people of the university (teaching and research staff; alumni; current students) are additionally involved in various extra-curricular activities discussed in 7.3 below.

7.2 Entrepreneurship in curricula and teaching

7.2.1 Overview about curricular offers

At TUKE entrepreneurship has been considered as an attractive path for the further development of the curricular profile of degree programmes in the Faculty of Economics. This is particularly the case in the faculty's Department of Regional Sciences and Management, however entrepreneurship is also offered to other bachelor-level students



in other departments such as the Departments of Finance and Banking and Investment. Centrally, there is fundamental introductory course “Enterprise and Entrepreneurship” which is compulsory for bachelor students in the Faculty of Economics. In addition, two consecutive courses are offered as an elective – Development of Entrepreneurial skills I and II (for an overview of degree programmes and courses see Faculty of Economics, 2013). Further details of these courses and the Enterprise and Entrepreneurship course are described in 7.2.3 below.

Exhibit 1: Overview about curricular EE offers at the Technical University of Kosice (TUKE)

No.	Name	Objectives	Target group	No. of participants in 2013
1	Enterprise and Entrepreneurship	Familiarise students with the basic concepts of entrepreneurship	Bachelor students of Faculty of Economics and Faculty of Electrical Engineering and Informatics	Approx. 300
2	Development of entrepreneurial skills I	Acquaint students with business plans as a tool for start-up planning; students write their own business plan for a start-up	Bachelor students of Faculty of Economics	Approx. 25
3	Development of entrepreneurial skills II	Students implement their business plan (from part I of the course) and set up a student company (in cooperation with Junior Achievement Slovakia)	Bachelor students of Faculty of Economics	Approx. 25

7.2.2 Target groups

Curricular EE offers at the university address initial education at the early stage of bachelor studies to introduce students to entrepreneurial thinking and concepts (in the course “Enterprise and Entrepreneurship”).¹ EE is offered at the Faculty of Economics in the three bachelor study tracks in “Finance, Banking, and Investment”, “Public Administration and Regional Development”, and “Business Informatics”. The latter programme is offered in cooperation with the Faculty of Electrical Engineering and Informatics where it is one of a number of different undergraduate degree programmes. However, for students from other faculties, no immediate access to curricular EE has been co-ordinated and institutionalised to date. The focus of the university organisation is currently more on establishing and fostering (extra-curricular) support and coaching of students or student teams in individual projects related to the development of business ideas and the establishment of start-up firms (see 7.3.3. and 7.3.6).

7.2.3 Designing lectures and courses – basic curricular decisions

Intentions

In terms of organisational intentions or objectives of curricular EE, the approach of TUKE is fairly straightforward. It aims to open student minds toward entrepreneurial thinking and the role of entrepreneurship in introductory offers, and to develop students’

¹ There seems only to be a further accredited educational course in “Entrepreneurial Competences” within the context of further professional education (Faculty of Economics, 2013, p. 35).



entrepreneurial skills by founding campus companies and supporting formative and reflective business planning for student companies. Yet the envisioned aims are so far limited mostly to entrepreneurship as a theme in business studies and economics (see 7.2.1 and 7.2.2 above), which is why a further differentiation of EE intentions across different disciplines and degrees still has to unfold over time. In terms of supposed direct outcomes of EE (e.g. start-up ambitions in teaching for entrepreneurship), the expectations regarding the “Enterprise and Entrepreneurship” course are fairly low since this is an introductory offer for young first-year bachelor students; however, this offer familiarises students with entrepreneurship early on in their studies. In contrast, the two-semester entrepreneurial skills course, while not exclusively tailored to teach entrepreneurship, has the expected outcome of founding student start-up firms which may be continued after the course (see the next section on details of these offers). Beyond the aims of individual courses, the overall objectives of entrepreneurship for the university organisation as a whole are more implicit in supporting selected extra-curricular activities and individual campus start-up projects in co-operation with regional partners (see 7.3 and 7.5).

Contents

In this section, the course **Development of Entrepreneurial Skills** will be presented as an example of EE at the Technical University of Kosice. The course is divided in *two parts (I and II)* running one semester each (see 7.2.4). The central aim in the first semester is for students to create their own business ideas in teams of around five people and develop a business plan proposal. In the second semester, the ideas and the associated business plans will be presented, and the group, together with the instructor, will select one of the business ideas to be pursued further in a guided student start-up firm to be founded as a campus company. The course is offered by the university to third-year bachelor students from the Faculty of Economics in close co-operation with external lecturers from business entrepreneurship and the Junior Achievement Slovakia Organisation (<http://www.amcham.sk>).

The course itself is instructed and co-ordinated by an external lecturer who works in an SME in the commodity industry and has been a former employee with TUKE's Faculty of Economics. Seven of the thirteen sessions on business idea creation and business plan development in the *first part* are taught by the instructor while a further six are taught by external lecturers on specific areas of entrepreneurial management such as finance, HR, and marketing. These external lecturers are from businesses in the Kosice region and commonly have an owner or management position in the functional area they teach. The business ideas developed by students provide the basis for class discussion and support of individual start-up projects grounded on these ideas (e.g. in terms of costing and pricing strategies, sources of funding or marketing planning). The business ideas themselves are developed in student teams of around five members with different managerial roles.

During the second part of the course, which is continued in the second semester, all ideas will be presented. A group of students will then select one idea to be pursued and turned into a student start-up company. This company will be created in the context of an entrepreneurship programme established and run by the Junior Achievement Slovakia Initiative in co-operation with the National Bank of Slovakia and the Slovakian Ministry of Economics. Within the programme, student companies are set-up in a simulated setting (e.g. in terms of registration with tax authorities and administrative filings). In the second semester, the business plans will have to be frequently refined and thoroughly planned,



especially when it comes to actually bringing a product or service to the market, and establishing the company as an organisation. For example, the business idea put into practice in the course in the latest academic year was a card game for travellers which was produced and sold by the students. Commonly, within the entrepreneurship programme of Junior Achievement Slovakia, the student companies will be concluded at the end of the programme; however, TUKE students may continue the business on their own at the end of the course.

Methods

In terms of teaching methods, the *entrepreneurial skills course* (within the Junior Achievement programme) is centred on learning through entrepreneurship, particularly in the second term. Simulated student companies are used to support students' development of specific skills and knowledge on how to establish a start-up in practice within the Slovakian institutional environment and market economy. Practically, the process of business idea generation, evaluation (based on business planning), and implementation (in student companies) is facilitated by team work and presentation sessions.

Since *Enterprise and Entrepreneurship* is a compulsory course for first-year bachelor students in the different bachelor degree programmes at the Faculty of Economics (see 7.2.2), it has a quite large audience of approximately 150 students and is mostly taught in a lecture-style format (the course is offered both in Slovak and English). However, other methods are also employed. In the course, student teams have to pick a start-up or young company (ideally in the industrial sector; i.e. a product company) alongside which they analyse and solve typical entrepreneurial management problems and use tools, e.g. from strategic management or financial planning. Application of managerial concepts and tools to the setting of the above entrepreneurial example companies is central. Therefore, theoretical sections are kept relatively concise by the instructor with more room for discussing the implementation of concepts and tools e.g. in case studies, class exercises, or discussion of example video material (e.g. of pitch presentations of business ideas).

Informal evaluation of learning outcomes and feedback for students

In the *entrepreneurial skills course*, the above-mentioned process of refining and further developing the business plans is coached by the instructor of the course. Students receive feedback on their work in moderated team discussions and meetings concerning further preparation of business plan elements and student presentations. Scope for informal feedback is limited in the *Enterprise and Entrepreneurship course* due to the large class size with a more pronounced focus on formal evaluation instruments (see 7.2.4 below).

7.2.4 Setting of entrepreneurship teaching

Timing

Even though the focal *Entrepreneurial Skills course* follows a structured programme (of Junior Achievement Slovakia), the local structure of the offer at TUKE is specific. From the instructor's point of view, it is advisable to run the course in a two-semester format with two consecutive parts. This is because the learning process of developing substantial business ideas, understanding and applying business plans as an evaluation and management tool, and setting up a student company in practice is complex, with a



distal outcome at the end of the course. In particular, students will need time for preparing, deepening, and reflecting their work in class and between the sessions, which is why the course has an extended format for contact time over a two-semester period. Contact time is two hours per week with thirteen sessions in the first semester and eleven sessions in the second semester. Reportedly, the first semester is needed to introduce the business plan tool and discuss specific managerial aspects. The second semester is required for students to work out and refine the many details of their student company based on their initial plans.

Formal evaluation of learning outcomes

The formal evaluation within the course *Development of Entrepreneurial Skills* is based on a mix of aspects. Namely, this is the quality of the business plans submitted by the student teams, students' contributions to and the overall success of the established student company, and a small written examination covering students' understanding of business idea development and business plans. Overall, students receive three credits for the entire course.

In *Enterprise and Entrepreneurship*, students are evaluated on different assignments throughout the course: a) short tests related to concepts of entrepreneurial management, b) course work during the semester (e.g. submission of managerial analysis of students' example companies), and centrally, c) a written end-of-course exam.

7.2.5 Instructors: teachers and mentors

Professors, other employees and external lecturers of the university

Internal and external EE personnel are predominantly employed or contracted by TUKE's Faculty of Economics. In addition, university staff from science and engineering (e.g. within the Faculty of Electrical Engineering and Informatics) are also involved. However, the latter appears to relate mostly to the intersection between technology and business management in general, and only to some extent represents true education in the context of entrepreneurship. With the Economics Faculty, the most important aspect with regard to teaching personnel is that there is no specific tenured chair for entrepreneurship. Nevertheless, there are mid-level and junior faculty members delivering entrepreneurship education together with external lecturers – mainly in courses and additional seminars within the faculty's bachelor study tracks. As reported by the Dean for Education Affairs, the focus of the Faculty of Economics is more on supporting and offering extra-curricular activities in entrepreneurship where members of the faculty engage in coaching students interested in entrepreneurship (e.g. from banking and regional studies; see 7.3.5 and 7.3.6).

“Real entrepreneurs” as teachers

In addition to frequent guest lectures by well-known Slovakian entrepreneurs, e.g. Thomas Bel – the founder of EXIsport and one of Slovakia's *Entrepreneur of the Year* laureates, entrepreneurs and business professionals are integrated continuously in the *entrepreneurial skills course* discussed in 7.2.3 above. Depending on the topics to be discussed in class, either founders of start-ups, entrepreneurial leaders of young enterprises, or business managers teach sessions in a team, along with the co-ordinator of the course. The topics, for example, can range from financing and management accounting or entrepreneurial marketing and advertising. Entrepreneurial management



themes like this are centre-stage in the first part of the course, while in the second part, students get coached by the entrepreneurs and the instructor of the course in preparing business plans for their student start-ups.

7.3 Extra-curricular activities related to entrepreneurship education

7.3.1 Overview about extra-curricular entrepreneurship activities

In particular, TUKE offers a range of informal extra-curricular activities in entrepreneurship education. These activities are organised and supported within the university through:

- Individual groups of people like university lecturers, alumni, and students as well as professionals from the university region; e.g. *AZU activities* (an organisation delivering EE to students building their own business ideas and start-ups; www.azu.sk), the *start-up weekend* (<http://kosice.startupweekend.org/>), *Eastcubator* (an incubator for start-ups from Kosice and the region of Eastern Slovakia initiated by TUKE staff members and alumni together with entrepreneurs; <http://www.eastcubator.sk>)
- Particular TUKE institutions and funding programmes such as the university's Start-up Centre and the Technicom project to establish a science park, which includes resources for academic start-up coaching and support (see 7.3.6 and 7.4.1); e.g. there is a business idea competition called *Present Your Idea* for start-up entrepreneurs from East Slovakia. This is a unique competition of innovative ideas, projects and solutions from various fields of science that have the potential for creating a future start-up (or those that have developed within existing start-ups). The purpose of the competition is to support innovative business ideas, which may result in new high-tech companies and create new job opportunities. The competition is also part of the objectives of the University Science Park Technicom and features around 30 ideas collected in two rounds in spring and autumn across its latest edition.
- Single curricular courses which integrate additional extra-curricular entrepreneurship-related activities like business idea competitions (e.g. (<http://www.podnikatelskynapadroka.sk>; <http://www.nadaciatatrabanky.sk/grantovy-program-business-idea>) and entrepreneurial challenges (<http://www.jasr.sk/showdoc.do?docid=3147>; <http://www.jasr.sk/showdoc.do?docid=3385>).

In this case, the activities of *AZU* (including the related *start-up weekend*) will be presented in detail (see 7.3.3). Start-up coaching for university members within the newly opened TUKE *Start-up Centre* and *Eastcubator* incubator will be addressed below in 7.3.6. For an overview of extra-curricular activities related to entrepreneurship education see also the exhibit below.

**Exhibit 2: Overview about extra-curricular EE activities at the University of Kosice**

No.	Name	Objectives	Target group	No. of participants in 2013
1	AZU entrepreneurial training programme	Provide training in entrepreneurial self development as well as business idea generation, evaluation, and exploitation in start-up projects	TUKE students from all faculties	NA
2	Start-up Weekend	Prepare real start-ups from students business ideas by student teams; coached by mentors and evaluated by a panel of judges	TUKE students from all faculties	46
3	Eastcubator	East-Slovakian incubator organisation associated with university staff; provide a networking and coaching platform for nascent entrepreneurs	Regional entrepreneurs in East-Slovakia including TUKE students and staff	NA
4	TUKE Start-Up Centre (start-up coaching; training workshops, campus business idea contests; incubation activities)	The Start-up Centre is to collect students' business ideas, compose start-up project teams, and support and accelerate the start-up process through its coaching and training activities	TUKE students from all, in particular, technical faculties as well as staff and regional entrepreneurs with business ideas	30 to date
5	Various business idea competitions and entrepreneurial challenges	Complementary element of business management and entrepreneurship courses; offering students the opportunity to practice business idea generation and working on entrepreneurial management tasks	TUKE students from all faculties, in particular Faculty of Economics	

7.3.2 Target groups of extra-curricular activities

As noted in 7.3.1 above, extra-curricular activities at TUKE are offered in different contexts by different, yet sometimes overlapping (e.g. AZU and Eastcubator) groups of people. Because of this, there are different target groups addressed by these activities. For example, some of those activities integrated into curricular EE offers (e.g. the business idea competitions) are brought to and supported specifically for bachelor students from the Faculty of Economics. However, most extra-curricular activities are open to all TUKE students and staff. The coaching offers by TUKE Start-up Centre are open to potential participants from the East-Slovakian region: "It [the TUKE Start-up Centre] is an activity, whose aim is to provide support to innovative and creative people in transforming their ideas into products and services. Technical University of Kosice has the ambition to support participants of the Start-up Centre by offering them the quality professional advice, as well as infrastructure in the form of technical equipment" (UCITT, 2014; www.ucitt.tuke.sk). Some activities are also offered to externals (e.g. nascent entrepreneurs from the Kosice region within the Start-up Centre and Eastcubator coaching services).



7.3.3 Designing extra-curricular activities

Intentions

Similar to the different target groups of extra-curricular activities in 7.3.2 above, the intentions related to these activities appear to differ in detail. Activities within the Start-up Centre or Eastcubator strive to provide know-how for and guide student (or generally participant) action with regard to a specific start-up project. The AZU course activities (see the contents section below) aim to build and improve students' general soft and hard entrepreneurial skills (e.g. to master business presentations and financial venture planning). However, throughout the course programme offered by AZU, the focus also turns to generating individual business ideas and developing them further towards founding a venture (in connection with the start-up weekend event).

Essentially, most extra-curricular offers within the TUKE organisation seem to share the intent to motivate and activate students with regard to opportunities to create specific outputs such as business ideas, business plans or steps to establish a venture. This need and corresponding intention to motivate students to get active through elements of entrepreneurship has been articulated in several interviews (with AZU representatives, the dean for educational affairs as well as with teaching staff from the Faculty of Economics).

Contents

In this section the AZU education programme for TUKE students is presented in detail. The section will also include a brief overview of the Start-up Weekend activity since it is related to the AZU course programme and participating students.

The *AZU education programme* is offered by the AZU organisation (www.azu.sk). It is a student and university alumni-led initiative (together with entrepreneurs) operating at eight Slovakian Universities, including in particular the Technical University of Kosice. AZU Kosice co-operates with TUKE while AZU is funded partly by the Slovakian government and sponsors (e.g. businesses providing resources and sponsoring in kind like coaching budgets or training packages). TUKE provides rooms and technical equipment (the programme and its events are located on campus). Most importantly, university members contribute to running the AZU programmes and serve as instructors and coaches in the training and coaching events of the programme.

The term "AZU" means "activity increases success" ("aktivita zvyšuje uspech"; AZU 2014), which also relates to the particular education course programme offered to TUKE students from all departments (the focus of AZU is predominantly on student education, however, the programme may also be followed by university staff). The prime objective of the programme is to support students in their self-development and creativity with particular regard to activities in entrepreneurship. Generally, as stated by the AZU interviewee, the goal in the context of students' overall university education is to "bring practice to study", which is considered a challenge for higher education in Slovakia. At the level of student learning and action throughout the course, the aims of the AZU programme are for students to create and pursue their own business ideas in a process of problem-based creation of business ideas. An example from the programme at TUKE is Galileo. The start-up rooted from TUKE's Faculty of Electrical Engineering and Informatics and is now located at the TUKE Start-up Centre (UCITT, 2014). Galileo developed a hardware system for audio and video processing for the music and event industry. However, before actually arriving at promising start-ups from university, AZU



sees the need to provide an educational programme when working with students on entrepreneurship (see below). Considering that it is impossible to teach people how to build a new business in five or ten weeks, according to TUKE, “what we do is to show students how to solve some of the problems faced by entrepreneurs”. These entrepreneurial problems or challenges are addressed in a two-part education programme with ten individual sessions. Typically, the sessions have an input or reflection part in the beginning with a practice and discussion element to follow.

The first series of sessions is on improving hands-on practical and soft skills of students in situations relevant to establishing a venture. For example, students learn about and practice:

- Communicating business ideas in pitch presentations and negotiations;
- Gathering information for start-up planning and self-management;
- Setting and attaining entrepreneurial targets and personal goals;
- Managing their time in entrepreneurial projects and overall in their studies;
- Developing their leadership competences.

The second part of the programme is centred on typical tasks and challenges for starting one’s own business, in particular:

- Creation of a business idea based on an envisioned need or problem to be solved through entrepreneurship;
- Market analysis;
- Finance;
- Business planning;
- Entrepreneurial marketing.

In this part, students will develop business ideas between the first and second sessions in teams. In the four sessions to follow, the teams will work on and refine these business ideas to tackle the above-mentioned typical challenges when establishing a start-up venture. Commonly, AZU cooperates with external partners and sponsors, in particular with the Slovakian Union of Young Entrepreneurs but also with consulting firms like KPMG and start-up enterprises who serve as mentors for student teams and as external lecturers in the above sessions. For example, in the session on finance in the programme’s recent edition, students discussed potential crowd-funding sources for their business ideas and developed a profile on the Kickstarter platform. Overall, the entrepreneurial challenges addressed in the second part of the programme are designed to reflect the life cycle of a start-up that has to be established. This also includes the practical goal articulated by AZU to build a bridge for students to the Start-up Weekend at Kosice so as to actually build a business on the basis of their business ideas.

At the Kosice *Start-up Weekend* (<http://kosice.startupweekend.org>), more intensive individual mentoring and planning for actual new business formation takes place, e.g. in generating business models with students, assembling entrepreneurial teams, and taking steps to establish businesses. The Start-up Weekend format itself is an existing non-profit organisation present in more than one-hundred countries in the world. Local organisers from AZU and TUKE set-up a weekend event in 2014 (after a two year intermission) with a number of Slovak national and international partners and sponsors like The SPOT, a Slovakian start-up initiative (www.thespot.sk/), Slovak Telecom, EXISport, and the City of



Kosice. Representatives of these partners, including the rector of TUKE, serve as judges during the Kosice Start-up Weekend. The line-up of student mentors consists mostly of young entrepreneurs and people involved in start-up support in Slovakia. In the current event, 54 students participated in the Kosice Start-up Weekend presenting 47 ideas of which twelve ideas moved to the final to be pitched to the panel of judges who selected three winners (e.g. of a resident place in the TUKE Start-up Centre sponsored by the university and a consulting budget sponsored by KPMG). The next Start-up Weekend will be in 2015 and will be organised jointly by AZU, the Start-Up Centre and the Eastcubator.

Informal assessment of learning outcomes and feedback for students

In the main AZU programme, outcomes for students have been assessed during the team work and presentation phases during the course. This has been done in particular by communicating with students with regard to further improvement on personal entrepreneurial skills in the first part, and intensively during the start-up weekend. The latter has not only been in the structured form of business presentations to an audience of judges, but also during the coaching phase when the business ideas of students have been improved together with the mentors present at the start-up weekend. Vice versa, student feedback from running the AZU programme is used to further adapt the education programme itself, for example towards a stronger focus on assisting students to develop their personal communication and leadership skills.

7.3.4 Setting of extra-curricular activities

Locations

Extra-curricular EE activities take place in different locations, both inside and outside the university. For the AZU activities, the organisation arranges rooms with the university to host events (e.g. in the new lecture theatre in the university library). The coaching activities in the context of individual and student team start-up projects is done in seminar rooms and individual offices within the Start-up Centre or within the co-working space at the Eastcubator.

Timing

The focal AZU programme runs over two terms with ten sessions of around 90 minutes each. This time frame seems to be preferred over a shorter runtime of the programme since students: a) are first supported in improving their personal skills, which are also needed for the second part (e.g. in terms of presenting business ideas and work on business planning in teams) and, b) require time to build and further develop their initial business ideas in the second part. The Start-up Weekend which follows the programme is offered in a compact three-day format allowing working with motivated groups of students on putting their pre-developed business ideas into practice together with mentors and judges all in one place at the same time (which would likely be more difficult to organise in a format where meetings with mentors and judges are stretched over a longer period of time).

7.3.5 Persons involved in extra-curricular activities

In view of the different organisers of extra-curricular activities, there are a range of diverse persons involved in these activities. Within TUKE, staff members (e.g. assistant



professors) from economics and also from science and engineering, participate in extra-curricular EE; for example, Viliam Vajda, Assistant Professor from the Department of Banking and Investment co-manages the Eastcubator incubator, teaches entrepreneurial finance in the AZU education programme and – together with Peter Dzurka from the Regional Sciences and Management (and others) – coaches university start-up teams within the TUKE Start-up Centre. In addition, there are current students and alumni active in the AZU organisation taking on parts of the teaching in the programme in Entrepreneurial Management. In terms of external persons, particularly business professionals and entrepreneurs are involved in different contexts. Most importantly, the AZU education programme integrates entrepreneurs from the Slovakian Union of Young Entrepreneurs who act as mentors providing support to student start-up teams in the programme. AZU considers the access to internationally successful Slovakian entrepreneurs as an important motivating factor for students to get actively involved in entrepreneurship themselves. In addition, there are other persons engaged in more specific individual activities, such as acting as co-ordinators of external events like business idea competitions, or acting as judges in entrepreneurship-related contests. These individual activities include, however, only minor teaching roles but are important in terms of providing feedback for the business ideas and start-up plans of students.

7.3.6 Management of extra-curricular activities

This section presents activities of the TUKE Start-up Centre (and, briefly, the Eastcubator incubator organisation) in serving potential student entrepreneurs or entrepreneurial teams from TUKE and their venture projects (managing student support).

Managing student support

The central institution on campus that supports business ideas and potential venture projects of TUKE students (and partly also alumni and staff) is the *TUKE Start-up Centre* (Startup Centrum; <http://startupcentrum.tuke.sk>). The centre is domiciled within the building of the university's Centre of Technological Innovation and integrated into the management and administration of the UCITT (TUKE's University Centre for Innovation, Technology Transfer, and Intellectual Property Protection). The Start-up Centre has been established since spring 2014 as a part of the Technicom project. The project was pursued by the university to build a science park that would serve technology transfer and technological entrepreneurship rooting from TUKE institutes and laboratories (see 7.4.1 below).

In contrast, the Start-Up Centre itself has been established with the idea of a one-stop shop to support start-up projects from TUKE students and entrepreneurs from the Kosice region with the general aim "to provide support to innovative and creative people in transforming their ideas into products and services" (UCITT, 2014). The university has set up a process of collecting and screening potential start-up projects in a prospective bi-annual business idea contest. Start-up entrepreneurs and their teams can stay at the centre for an initial period of six months (as agreed by the university) after which a business plan has to be presented as a prerequisite for a continued residence at the centre. In addition to office, ICT, and laboratory infrastructure, the centre offers individual (business) coaching and education workshops for resident entrepreneurs and student start-up teams to take part in the initiated business idea contests. Currently, there is a group of core coaches and educators in the centre (Branislav Bonk, Peter Dzurka, Frantisek Jakab, Marek Lavcak, Viliam Vajda, and Peter Vrabel) who are also involved in



other entrepreneurship education activities at TUKE. In addition, entrepreneurs receive further legal and technological advice and support from TUKE faculties depending on the nature of their business idea (this further support is organised by UCITT). Externally, the Start-up Centre co-operates with the Kosice IT Valley, IT Association of Slovakia, KPMG and other consulting companies and is expected to be supported by the new Slovak Business Agency as a public funding organisation for start-up activities in Slovakia.

In addition, there is a new incubator institution – the Eastcubator (www.eastcubator.sk) – established by entrepreneurship enthusiasts from the university (Marek Lavcak, Viliam Vajda and Peter Vrabel) and external entrepreneurs from the Kosice region. The Eastcubator has been set up as an incubator for nascent venturing projects functioning as a close co-operation partner to the Start-up Centre and the Technicom inside the university. It offers a second opportunity for co-operation partners to engage with start-up projects from TUKE and the Kosice respectively East-Slovakian region. The Eastcubator is located between the university and the city-centre of Kosice offering a co-working space for start-ups and acting as a bridge to potential start-up partners like investors or technology providers. Also, an educational programme in the form of workshops is planned (the Eastcubator has just opened in October 2014). This is based on the business model canvas as a framework instrument to facilitate the development of business plans for the venture projects that may then be pitched to potential investors. The Eastcubator is to partner with TUKE and the Kosice IT Valley, the SPOT, and KPMG to support start-ups concerning their coaching and networking needs (similar to the AZU education concept).

Internal and external network management

Co-operation across the different actors involved in extra-curricular EE at TUKE flows mostly ad-hoc between the persons engaging in and leading these extra-curricular activities. This is accompanied by institutional co-operation which will be further developed in the future since some of the institutions, e.g. the TUKE Start-up Centre and the Eastcubator, have only been established recently in 2014. Personal co-operation particularly stems from the fact that the same people are dedicated to central EE activities – for example, teaching on the AZU programme, coaching start-up teams in the Start-Up Centre and managing the establishment of the Eastcubator. Also, the institutions have initiated co-operation, e.g. in organising joint workshops for start-up teams or providing consulting offers in technology venturing projects where expertise in engineering and science from TUKE is needed.

7.4 Institutional aspects of entrepreneurship education

7.4.1 Organisational set-up and change

Measures for coordinating and integrating EE across the university

As is fairly typical for university organisations in general, and also at TUKE, co-operation and integration between faculties, respectively departments, seems to be a challenge at times. This is anchored at least to some extent in Slovakian higher education law and corresponding formal structures of university organisations. Essentially, university faculties used to be (and still are) independent bodies. In particular with regard to entrepreneurship and entrepreneurship education, formally the faculties hold



accreditations for study programmes (in terms of education content) as well as the resource infrastructure incorporated in entrepreneurship chairs, centres, and departmental research institutes. Also, entrepreneurship, its education, and general technology transfer as distinct activities of HEIs have traditionally not been on the policy agenda of TUKE, which has for a long time been more focused on education and selected fields of research with only occasional industry collaboration as a platform for entrepreneurship and technology transfer.

However, this is considered to be slowly changing by most interviewees², and there are today notable elements of bottom-up emergence and top-down implementation and support of entrepreneurship and entrepreneurship education. Asked for the drivers of this, interviewees expressed four potential catalysts, in particular for the future diffusion of entrepreneurship at the Technical University of Kosice:

- The bottom-up engagement of individual university members who initiate and support activities like the AZU education programme, the Eastcubator, or the start-up coaching activities in the Start-up Centre;
- The attractiveness of entrepreneurship as an element of student education with departments willing to take entrepreneurship on board, in particular in engineering and science faculties where the entrepreneurship theme contributes to attracting students to study programmes in competition with other HEIs in Slovakia;
- The top-down impulse from university-wide third-party funded projects, in particular the EU and the Slovakian Government, e.g. the infrastructure for the TUKE Start-Up Centre (see 7.3.6) and the Science Park “Technicom” project (see below) and;
- The demand-pull from external stakeholders, like industry, to establish platforms for collaboration, such as a science park or business accelerator.

The university’s overall support of bottom-up activities like AZU is mostly in terms of infrastructure (e.g. in the form of rooms, office space, IT equipment), partial funding, and ad-hoc participation in events (like the Start-up Weekend). However, the management of the university also initiated entrepreneurship activities top-down, mainly in the context of technology transfer, most notably the Start-Up Centre and the science park.

The *Science Park Technicom* (www.technicom.tuke.sk) is in project stage with results to be expected soon. The infrastructure for the science park is currently being built, and the opening is planned around July 2015. In establishing the science park, which is structured as a pre-incubator and high-tech incubator, the university cooperates with Pavol Jozef Safarik University (Kosice) and the University of Presov (UCITT, 2014a). At TUKE, the Technicom is established under the roof of UCITT, the central University Centre for Innovation, Technology Transfer and Intellectual Property Protection. The Technicom concept is created around the following scientific areas (UVP Technicom, 2014, 1):

- Information and communication technologies;
- Electrical engineering, automation and control systems;
- Mechanical engineering;
- Civil engineering;

² In interviews where the issue of organisational change towards entrepreneurship and co-operation across faculties has been discussed.



- Environmental engineering (mining, metallurgy, water management systems) where the R&D solutions also take into account the corresponding social and human dimensions.

In these areas, currently there are more than thirty applied research and innovation pilot projects in the pipeline which provide the basis for product development and potential ventures when the park commences its operations. The core idea is to use the strengths of TUKE research and support individual scientific entrepreneurs or entrepreneurial teams. Support activities have two elements, administrative and legal support (e.g. patent protection) as well as infrastructure and coaching support (e.g. lab space, start-up coaching). Corresponding to the Technicom, UCITT has set up the Start-up Centre not only to support technology transfer and venturing at the level of university departments and employed university scientists, but also to encourage student and graduate entrepreneurship from science as well as regional entrepreneurship.

Overall, the university's campus-wide activities in EE appear to be mainly indirectly on an extra-curricular basis. I.e., while not setting up entrepreneurship courses or programmes immediately (this belongs to the individual faculties and departments), the management of TUKE will increasingly encourage individual start-up coaching and mentoring through organisational units like the Technicom and Start-up Centre. However, the depth and (financial) sustainability of these initiatives still appears to be challenging (as reported by the interviewees from UCITT; see next section on managing resource acquisition).

Managing the acquisition of resources

As is often the case with novel activities in supporting entrepreneurship and entrepreneurship education outside the established curriculum, such initiatives are kicked-off on a project-basis with an initially fixed time horizon of funding. This also holds for the university's main Technicom project and partially, also for the Start-up Centre. The university has contributed to the establishment of both (in particular, terms of co-funding) and the units are planned to be established and respectively continued, for the long-term. The Technicom project is funded by the Slovakian Government and the European Regional Development Fund ("University Science Park TECHNICOM for innovative applications supported by knowledge technologies"; USP TECHNICOM). Funding, including the co-funding provided by the universities involved, totals around 40 million Euro (UVP Technicom, 2014). Funding is provided until the first half of 2015 covering the initial infrastructure establishment of the science park. Running operations thereafter still have to be financed. The long-term idea is to fund the Park from revenues from the Park itself and governmental support for a platform for transferring technologies and innovation. However, according to UCITT, this will take time. This also implies that long-term sustainability will still be an issue for the extra-curricular EE activities in terms of individual and group start-up coaching to be provided within the Technicom. For other extra-curricular activities, albeit at a smaller scale, this is also important since individual activities like the Start-Up Weekend or the AZU programme depend on external sponsors, typically for individual elements of education formats, like free mentors for student teams, presentation events or business competitions and additional government grants.

7.4.2 Laws, statutes and codes

In terms of incentives for university faculty to engage in EE within TUKE's institutional environment, teaching staff involved in EE has a substantial teaching load also outside



EE courses themselves, e.g. in terms of teaching general management and economics modules across various programmes (exceeding ten hours per week at the assistant professor level). As such, offering additional EE (e.g. coaching student teams in entrepreneurship contexts or offering additional practical courses) has substantial opportunity costs in terms of other lecturing duties and research obligations. Working on extra-curricular activities initiated by individual actors within the university (namely the AZU programme and the Eastcubator) is currently still on a small salary, essentially on a “pro bono” basis. However, the university, in particular the Faculty of Economics, considers the work of faculty staff to teach and coach student entrepreneurs as important and permits such additional consulting work beyond regular job duties.

7.4.3 Mindsets and attitudes

Raising awareness for the importance of entrepreneurship

Entrepreneurship at TUKE may not yet benefit from a long-term tradition and publicity within Slovakian institutions of higher education. However, actors within the university organisation cooperate with Slovak national institutions which promote entrepreneurship in Slovakia like The Spot, Junior Achievement Slovakia, and others (see 7.2.3, 7.3.3). Within TUKE itself, the need to raise awareness for entrepreneurship in general and the EE offers existing on campus in particular, has been recognised. For example, within the Start-up Centre, the bi-annual campus-wide (and regional) business idea contest has been established instead of a passive “wait-and-see strategy”. The business idea contest aims to actively develop business ideas with student teams and regional start-up entrepreneurs. The AZU programme deliberately starts with a series of events which focus on students’ self development and personal management (see 7.3.3) and then a bridge to the entrepreneurial development of business ideas is built. This seems to be a useful strategy to market the EE programme of AZU since the development of personal communication, negotiation, and leadership competences is highly relevant to the target group and it attracts students to join the course. The adjacent Start-up Weekend, to which some of the students of the AZU programme move on to continue, is deliberately also open to all TUKE students who have not participated in the AZU course so as to make the Start-up Weekend an event for the whole university.

Encouraging entrepreneurial behaviour

While compulsory curricular EE follows the aim to first familiarise first-year bachelor students with entrepreneurship, there are further courses and extra-curricular activities directly related to supporting entrepreneurial behaviour amongst students. The key objective of the AZU programme is to provide opportunities for students to create their own business and have a practical programme (including the Start-up Weekend) supporting the process of preparing a business start-up on the basis of these business ideas. Also, individual and group coaching activities within the TUKE Start-up Centre are directed at building and supporting student start-up projects (e.g. in workshops where student teams meet to further develop their business ideas, guided by TUKE teaching staff (see 7.3.6). While the Start-up Centre targets mainly student entrepreneurs, the infrastructure of the Technicom Science Park will also serve university staff involved in entrepreneurship teaching.

Within the curricular entrepreneurial skills course discussed in section 7.2.3 above, the participants of the course may continue their student firm projects. However, the course



coordinator considers financing the business activity to be the most significant challenge for student entrepreneurs and the university, of which the latter is not yet in the position to provide outright funding for start-up projects because of legal restrictions. There are also other *barriers* towards student entrepreneurship which have been put forth in the interviews. Traditionally, in higher education in Slovakia there seems to be a prevailing preference towards top-down teaching of knowledge rather than encouraging student activities. Interviewees also expressed the view that, correspondingly, there is occasionally also a lack of motivation within the body of students to engage in (demanding) entrepreneurship activities.

7.5 External relationships related to entrepreneurship education

7.5.1 Types of relationships with external stakeholders

TUKE co-operates with a range of stakeholders involved in its entrepreneurship education activities (see the exhibit below).

Exhibit 3: Overview about major external stakeholders involved in EE at TUKE

No.	Stakeholder	Type of involvement in EE
1	Junior Achievement Slovakia	Organises student firm concept within the course “Development of Entrepreneurial Skills” at TUKE; provides lecturing support and platform for business idea competition as a component of the course
2	Slovakian Union of Young Entrepreneurs	Representatives, in particular entrepreneurs, lecturing in the AZU programme on Entrepreneurial Management; acting as mentors for student start-up teams
3	KPMG	Sponsors consulting budgets for student start-ups; acts as coach for start-up projects (AZU programme and start-up weekend)
4	The SPOT	Representatives of the start-up support initiative act as mentors in start-up weekend
5	EXISport; Thomas Bel (founder)	Guest lecturer in entrepreneurship; judge in Start-up Weekend
6	Various regional technology and banking companies; Kosice IT Valley Organisation	Organisers of business idea/ plan competitions integrated in entrepreneurship education at TUKE; partners in ad-hoc support of start-up projects in the TUKE Start-up Centre and Eastcubator

7.5.2 External stakeholders involved in entrepreneurship education

Role of external stakeholders in entrepreneurship teaching activities

The involvement of external stakeholders occurs in different ways, such as interacting with the university and its members on different frequencies yet on an ongoing basis in terms of engagement in teaching entrepreneurship, coaching student start-up teams and providing platforms and conceptual support for different events. For the university, these partners are essential for enabling to offer (extra-) curricular entrepreneurship activities



for students in general, and for offering paths to practical entrepreneurship and business in particular (e.g. with young entrepreneurs as role models, practical insights by business and entrepreneurship professionals in events and coaching activities). National Slovakian institutions which support new venture creation also seem to be important, given that they provide a country-wide support network and central knowledge hub for entrepreneurship which is still a comparatively new topic within Slovakian higher education.

Influence of external stakeholders in the entrepreneurship education

The involvement of external stakeholders as sponsors (in particular sponsoring like consulting budgets as in AZU or mentoring/ judging in business idea competitions) also indirectly shapes the delivery of (extra-curricular) EE to some extent. In addition, the demands of external stakeholders have occasionally also contributed to university initiatives (e.g. the idea of a science park has to some extent come about on demands from industry). However, such pull effects from industry sectors around a technical university like TUKE appear to affect mainly the university's policies towards technology transfer (e.g. efforts to attract certain multinational enterprises to take part in the Technicom Science Park to accumulate foreign direct investment for the Kosice region) rather than entrepreneurship education in particular.

7.6 Impact and lessons learned

7.6.1 Evaluating impacts of the entrepreneurship education approach

Beyond standard forms of evaluating the learning outcomes of students (such as exams or reports), additional informal feedback evaluation instruments are employed in different EE activities at TUKE. In the "Development of Entrepreneurial Skills" course the quality of students' start-up projects and corresponding business planning efforts are evaluated both in the course by the instructor and externally when participating in the business plan competition within the format provided by the Junior Achievement Slovakia programme. A panel of external judges also evaluates the work of student start-up teams in the Start-up Weekend activity.

The Start-up Centre collects and monitors existing business ideas on campus in its bi-annual "Present Your Idea" competition. However, since the initiative is still fairly new, further instruments related to evaluating the impact of university start-up formation will have to be developed in the future.

7.6.2 Lessons learned

Summary of lessons learned from this case

The characteristic of entrepreneurship and entrepreneurship education at the Technical University of Kosice which sticks out is the more significant emphasis on extra-curricular EE activities in co-operation with external stakeholders. This may have two interesting implications – in terms of both advantages and disadvantages or challenges to be learned from:

- Initiation, flexibility and experimentation in crafting and showcasing EE offers for future expansion of EE at the university;



- Co-ordination and sustainability of the set of education activities and long-term institutionalisation of EE within the university organisation.

In the case of the first point, TUKE started to engage in entrepreneurship with a comparatively small base of resources (in terms of staff) specifically dedicated to internal, especially curricular, EE activities focussing on students' hands-on learning of business idea development and entrepreneurial management skills (see, e.g., the *Development of Entrepreneurial Skills* course in 7.2). At the same time, a range of different extra-curricular EE activities have emerged within the university (see 7.3). These activities frequently involve partnering with external stakeholders like entrepreneurs from the Kosice region, companies, initiatives (e.g. within the European Capital of Culture Kosice movement) and organisations who coach and support start-ups in Slovakia (see 7.5). Often these activities have been initiated at the outset or have later been supported by individual university members, for example the *AZU programme* including the *Start-up Weekend*, the novel *Eastcubator*, or the *TUKE Start-up Centre*. Firstly, this enables TUKE to establish entrepreneurship activities within its organisation with engaged and motivated individual university members (university staff; alumni; students) backing these education activities. Secondly, operating EE on such a bottom-up or grass-roots basis allows the university to experiment with single activities or instruments of entrepreneurship education and to find out what works and what does not. For example, in terms of attractiveness for the target group of TUKE students or regarding a suitable organisational set-up of entrepreneurship institutions like the TUKE Start-up Centre, the Eastcubator or the *Technicom Science Park*. This has been considered important by case interviewees in particular in terms of providing a neutral platform for entrepreneurship outside individual university faculties or even outside campus (in case of the Eastcubator).

This trial path of flexibly identifying feasible structures for and instruments of EE within the organisation may in turn allow the formation of showcases of successful forms of entrepreneurship education and raise additional resources to expand these activities. Such resources may root from state support of entrepreneurship and new business creation, external stakeholders from society (e.g. in public-private partnerships), or from the university's management itself. Here, the focus on extra-curricular EE providing students and other university members with opportunities to create business ideas and concrete start-up projects as actual entrepreneurial outputs may be an advantage in a process of initial showcasing and further expansion in building the EE infrastructure of TUKE.

Regarding the second point, such a flexible grass-roots type build-up of EE within a university organisation is obviously a double-edged approach, which also brings about challenges in ensuring co-ordination and organisational sustainability. Since EE activities are operated by different individual entities and with external co-operation partners, there is a requirement to have an overarching umbrella strategy for entrepreneurship education rather than a patchwork set of different, unrelated or competing activities, which may even undermine the organisational acceptance of EE. At TUKE itself, co-ordination and communication currently flows across the key people involved in the different activities facilitating shared resource use, collective events, and knowledge exchange.

Personal trust and communication is an effective means of intra-organisational co-operation between the EE activities backed by a group of key actors inside and outside the university organisation. However, while banking on a set of key people to get EE established, it is also essential to keep an eye on overall organisational sustainability over



time. With regard to this, fostering further institutionalisation by the university and its management as a whole may well be instrumental towards a long-term establishment of a differentiated EE infrastructure. This EE infrastructure should not depend on whether a set of individual university members commit to engaging in entrepreneurship or not. Such institutionalisation may come in the form of tenured research and teaching positions in entrepreneurship, the establishment of an entrepreneurship centre, or the founding of formal partnering institutions with the region (e.g. with industry).

Transferability to other universities

The case of the Technical University of Kosice entails a path for transferability particularly for those universities and higher education organisations which are in their initial stage of development of an entrepreneurship education infrastructure. The route to initiate and grow activities in entrepreneurship education outside an accredited curriculum offers a chance for a rapid and individual set-up of activities, such as entrepreneurship training modules, start-up camps or weekends and local incubators offering individual start-up coaching to campus entrepreneurs. Activities may be offered based on the initiative of organisation members (e.g. teaching staff or groups of students) who are interested in entrepreneurship and are motivated to take action without much resource support by the university itself. University management will need to cultivate such initiatives taken by university members and be open for co-operation with external stakeholders, which the Technical University of Kosice already does. Often such activities may be established taking on board the know-how and experience of external partners to bring established formats of entrepreneurship activities and supportive elements to one's own campus.

However, such an "emergent strategy" of individual initiative paired with contributions of external partners needs to be managed carefully for it to be a part of the long-term establishment of entrepreneurship at a university. In the end, the task boils down to navigating the development of an EE infrastructure alongside the two sides of the coin of *institutionalisation*. On one hand, higher education institutes concentrating on extra-curricular entrepreneurship activities can start with small, straightforward resource and human capital bases. These should be based around a group of motivated internal people keen to engage in entrepreneurship by integrating established EE formats already offered by others (e.g. organisers of start-up weekends and business idea or plan competitions, national start-up coaching initiatives, or networks of young entrepreneurs). Such a flexible path to build entrepreneurship education generates benefits because it does not involve substantial institutionalisation (e.g. setting up a centralised entrepreneurship unit or putting individual entrepreneurship activities into a format of accredited modules of study run by faculty staff). On the other hand, higher education institutes will need to supplement the grass-root emergence of individual entrepreneurship education activities with external partners by further institutionalisation. This will ensure long-term sustainability, consistence, and independence of the core parts of an infrastructure of entrepreneurship education from single organisation members and external partnerships.



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