Central Balticum Entrepreneurship Interaction (CB Entreint) Project

Entrepreneurship Education Best Practices from the Netherlands and the United Kingdom Insights from the CB Entreint project study trips

Kozlinska, I., Mets, T., Sauka, A., Goba, I. and the CB Entreint project team



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Foreword

The role of education in promoting more entrepreneurial attitudes and behaviour is now widely recognised in the EU, but in the Central Baltic countries the theme is not enough utilised. Competences of educators in promoting entrepreneurship are different in the region. In addition totally new platforms for company-university interaction in promoting innovations and entrepreneurial behaviour are emerging. These new platforms are required to be applied quickly into universities and other higher education institutions (HEIs) in the Central Baltic region.

The Central Balticum Entrepreneurship Interaction (CB ENTREINT) project contributes to the Central Baltic regional development and competitiveness through the:

- analysis of the training needs for entrepreneurship teachers in the region and in different education levels when promoting entrepreneurship;
- analysis of the company-university latest and modern business platforms;
- cross-border network development between Central Baltic novel company-university platforms,
 HEIs and development organisations;
- development and piloting of the CB Professional Diploma Programme in Entrepreneurship Pedagogy.

This report presents insights from the CB ENTREINT project study trips to the Netherlands and the United Kingdom for benchmarking the entrepreneurship education best practices. The project was financed by the Central Baltic Interreg IV A Program 2007-2013 (European Regional Development Fund) with national cofinancing from the Regional Council of Southwest Finland. The lead partner of the project was Aalto University School of Business Small Business Center (Finland) and the project partners: Tallinn University of Technology (Estonia), University of Tartu (Estonia), Stockholm School of Economics in Riga (Latvia), Latvian Technological Center (Latvia). The purpose of the project was to contribute methodologically, via knowledge creation and transfer of latest innovative tools in entrepreneurship education to the Central Baltic regional development. Teachers and lecturers at all the educational levels will promote entrepreneurship more effectively and will interact more intensively with novel business platforms in the HEIs, entrepreneurship support organisations, and NGOs.

The project partners responsible for this report were the University of Tartu, Centre for Entrepreneurship, represented by Inna Kozlinska and Tõnis Mets and Stockholm School of Economics in Riga represented by Arnis Sauka and Ieva Goba. The following individuals from the partner organisations contributed to the report: Anne Gustafsson-Pesonen and Natalia Narits at the Aalto School of Business Small Business Center; Inna Kozlinska, Tõnis Mets, Liina Joller, Kalev Kaarna, Leeni Uba, Mervi Raudsaar, Uuno Puus and Triin Kask at the University of Tartu; Urve Venesaar, Sirje Ustav, Anett Linno and Triin Ploompuu at the Tallinn University of Technology; Arnis Sauka, Anders Paalzow, and Ieva Goba at the Stockholm School of Economics in Riga; Ints Viksna at the Latvian Technological Center.

I thank the research team for its good work.

Helsinki, November 15th , 2013 Pentti Mustalampi, Director Aalto University School of Business Small Business Center

Table of Contents

Introduction	3
1. Entrepreneurial universities of the Netherlands	3
1.1 University of Twente in Enschede	3
1.2 Eindhoven University of Technology	8
1.3 RDM Campus in Rotterdam	12
1.4 Utrecht University	13
2. Entrepreneurial universities of the United Kingdom	15
2.1 University of East Anglia, Norwich Business School	15
2.2 Anglia Ruskin University, Centre for Enterprise Development and Research	17
2.3 University of Cambridge, Centre for Entrepreneurial Learning	18
2.4 University of Hertfordshire, Business School	19
References	21

Introduction

Since 1990s, when the notion of entrepreneurial university started to evolve (Wasser, 1990; Clark, 1998) and conceptualise (Etzkowitz, 2004; Etzkowitz, 2008; Gibb et al., 2009), the European academia witnesses first fruits of "the second academic revolution" (Etzkowitz, 2008:30), or transition from standard research and knowledge transmission functions towards economic and social development missions of the 3rd generation universities that inevitably benefit the business community. Although this transition is a challenge in itself for traditional and in some cases conservative government-funded universities, the ones that 20-30 years ago refocused their strategic vision to become 3G universities, obtained the first mover advantage, on the one hand, and nowadays serve as the good practice examples, on the other. Some of these bright examples of the entrepreneurial universities are located in the North-West of Europe – the Netherlands and the United Kingdom.

As part of the Central Balticum Entrepreneurship Interaction (CB ENTREINT) project networks development initiative, representatives of three partner countries – Finland, Estonia and Latvia – took part in consecutive study tours to the Netherlands and the UK in February and May 2013. Information about entrepreneurship development infrastructures, educational practices and initiatives in the renowned entrepreneurial universities of the European North-West is shared on these pages.

1. Entrepreneurial universities of the Netherlands

The Netherlands is the 17th largest economy in the world (by the nominal GDP), the 5th in the eurozone, with over 16 million people inhabiting the modest area of 41,543 km² (UN, 2011). The area houses 12 research universities, which are all in the top 200 of the world. Referring to Aard Groen, professor of Innovative Entrepreneurship at the University of Twente, the visionary and director of the Netherlands Institute for Knowledge Intensive Entrepreneurship (NIKOS), most of the European traditional research universities are very good, but the translation of academic activities output from universities to business and society, valorisation is the weak part.

Around 30 years ago, at a time when the situation in the region was "life threatening" (Blenker et al., 2008:54) (deterioration of the textile industry, very high unemployment, etc.), the University of Twente was the first to change its strategy and refocus on innovation and entrepreneurship, establishing closer contacts with business. Since then the Netherlands has started to develop 3G universities, where academic excellence and entrepreneurial spirit find the best fit. University of Twente, Eindhoven University of Technology, Utrecht University, and RDM Campus as a joint project of various Dutch higher education institutions (HEIs) are now considered the best practice examples to other European universities experiencing the current transition.

1.1 University of Twente

Founded in 1961, the University of Twente used to be a classical technology-engineering university, the youngest of 3 Dutch technical universities. It is located in Enschede, the north-eastern part of the Netherlands, historically rich industrial city. At present, the university employs over 3000 researchers and professionals and teaches over 9000 students. Since the early 1980s, when

entrepreneurship "started to take shape in the region of Twente" (van der Sijde & Ridder, 2008:53), the cumulative number of successful spin-offs of the university has exceeded 700 featuring 75% survival rate with over 7000 jobs created (NIKOS, 2011) (see Figure 1).

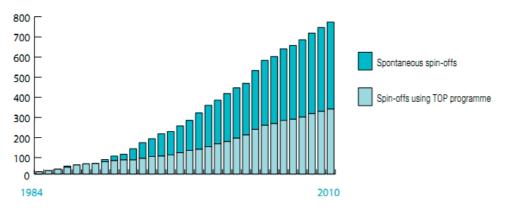


Figure 1. Number of spin-offs in the University of Twente

Source: NIKOS (2011:16)

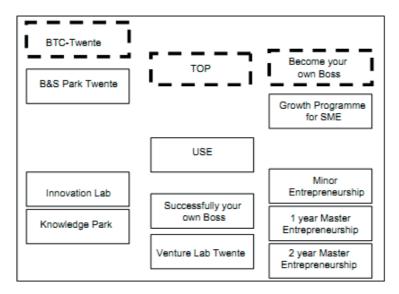
The university's entrepreneurship-focused policy allowed cross-fertilising the well-established scientific base with innovation and practice; hence most of the companies' business concepts are knowledge- and/or technology-intensive. Twente has 5 major research institutes successfully commercialising results: Nano- and Biomedical Technology, Centre for Telematics and IT, Innovation and Governance, and Behavioural Research. This policy focus is not the only condition of becoming an entrepreneurial university, however, it was a significant impetus for developing infrastructure, new modes of teaching and research, as well as corporate culture that supported entrepreneurship and innovation.

The development of Twente's structure *for* entrepreneurship started with the BTC incubator (Business and Technology Centre), the start-up programme TOP (Temporary Entrepreneurial Positions), and the elective training course "Become your own Boss" (figure 2).

The BTC incubator was created for young companies originated from the university providing flexible office and production space. Over time, it was transformed into the 40 ha Business & Science Park (B&SP) and the Kennispark ("Knowledge Park") Twente with the ultimate aim to build and maintain an interaction place with industry (public-private partnership) to foster commercialisation and develop entrepreneurial ecosystem. The space is also equipped with special facilities for high-tech companies (Innovation Lab). Nowadays Kennispark connects regional and local authorities, intermediaries as associations of companies, regional development associations, regional industry consortia, university start-ups. Still it is largely connected to the university, provides all start-up support, including entrepreneurial training, communication networks, hosting promotional events, arranging meetings of students and CEOs; does all the technology and knowledge transfer work. Thus, Kennispark acts as a joint venture for all the stakeholders, while

Twente contributes to the entrepreneurial region and ecosystem development, where all the parties together make the system work.

Figure 2. The Twente structure for entrepreneurship



Source: van der Sijde & Ridder (2008:3)

The start-up programme TOP was established to enable graduates to start a company with the university support consisting of an interest free loan, office space, access to the university's networks and training for 1 year. In the 1990s, University Student Enterprises (USE) was formed to support students via training, networks and office facilities. Another TOP project – "Successfully your own Boss" – was aimed at assisting prospective entrepreneurs with the business idea development, and has recently transformed into the Venture Lab Twente (VLT) project for high-tech and high-potentials run by the NIKOS centre (see below in more detail).

The elective course "Become your own Boss" was developed at the same time with BTC to teach students how to write and present a business plan. The course was primarily developed for owner-managers of companies as the Growth Programme, but later students were involved to do the "leg work" — finding information, writing sections of a business plan thus getting an insight into operations of SMEs. The programme also provides options of proceeding into MA courses, for instance, Minor in Entrepreneurship and Innovation, developed by NIKOS.

The NIKOS centre was established in 2002 with an objective to combine scientific and practical regional economic development for knowledge intensive entrepreneurship (NIKOS, 2011). At present, the central question of its operations is "how (scientific) knowledge can be made to serve economic and social purposes at an accelerated rate, and how the gap between interesting academic knowledge and (technical) applications can be bridged" (ibid, 2011:9). Activities at NIKOS

comprise 4 major groups: research, teaching, training and consultancy, and business development support.

All these activities have a set of underlying theoretical rationales: the concept of "engaged scholarship" (Van der Ven, 2007), the entrepreneurship in networks and process model (NIKOS, 2011), and effectuation (Sarasvathy, 2008).

- 1) <u>Engaged scholarship</u> a participative form of research involving all possible groups of stakeholders, including practitioners, clients, scholars, etc., to obtain multiple perspective and leverage different kinds of knowledge in order to better describe, explain, predict and improve entrepreneurship processes (NIKOS, 2011).
- 2) Entrepreneurship a 3-stage process of recognising or creating an opportunity, converting this opportunity into a working concept, and creating a value, or capitalising the opportunity. Entrepreneurship in Networks (EiN) suggests that on every stage of this process four types of human capital are exchanged, corresponding to behaviour of relevant actors, e.g. strategic capital CEO, cultural CMO, economic CFO, and social COO/CTO¹ (see Figure 3) (ibid, 2011)
- 3) <u>Effectuation</u> a set of decision-making principles for entrepreneurs, e.g. "bird in the hand" (start taking actions having realised available competences and resources), "affordable loss" (invest what you are ready loose") (Sarasvathy, 2008).

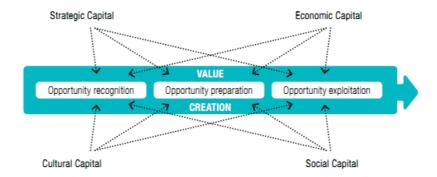


Figure 3. EiN/the 4C model, and VLT concept

Source: NIKOS (2011:22); van der Sijde & Ridder (2008:57)

Entrepreneurship education follows competence-based learning approach and aims to develop academic knowledge, entrepreneurial attitude and skills, perfectly combining research, teaching and practical experimentation.

2 big projects within the NIKOS' activities are minor programmes in entrepreneurship and the VLT.

¹ CEO – Chief Executive Officer, CMO – Chief Marketing Officer, CFO – Chief Financial Officer, COO – Chief Operations Officer, CTO – Chief Technology Officer.

- The minor programmes in entrepreneurship are a part of most Bachelor studies open for all faculties. A minor can be whether an introduction to Bachelor studies, an individual minor composed by a student him-/herself, a theme minor about a certain topic (e.g. "Innovation & Entrepreneurship"), where one of the project courses is based on student start-ups. In terms of the composition of modules, courses in high-tech, market-oriented entrepreneurship and innovation management are coupled with courses in financial management, legal aspects of SMEs, and IP. The assignment is a course completion upon a student's choice from "Become your own boss" (business planning), "Managing SME" (working with an established entrepreneur), "Organising Innovation" (in large existing firms), and "Technology Dynamics" (strategic analysis of technology-related innovation processes). The students are entitled to graduate in subjects related to innovative entrepreneurship, e.g. "selection of partners in the West for Russian high-tech companies", "business development opportunities for Siemens Medical Systems in Dutch companies" (NIKOS, 2011:34).
- The VLT welcomes national and international applicants or existing businesses with strong technology focus, but whose disciplinary background varies from engineering to financial accounting. Every training group usually consists of 25 participants. Pursuing the process approach to entrepreneurship, the first rule is to act on the initial stage opportunity recognition and to focus a prospective start-up on high-tech business. Secondly, the good balance between knowledge and experience are required to form efficient and effective teams. The rest is based on a team's training, competences and performance in multidisciplinary settings as per the 4C model (see also Figure 4).

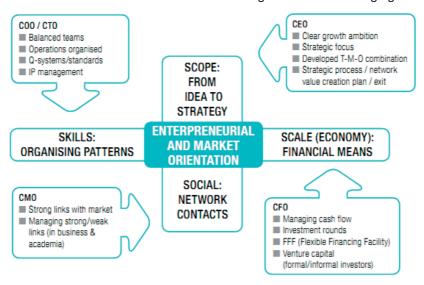


Figure 4. Features of high-growth start-ups

Source: NIKOS (2011:32)

The VLT programme consists of intensive coaching and training, placing into relevant networks and facilitating the team creation over a period of 12 months: "forty hours of personal coaching, weekly training, easy access to experts, labs, technologies, a variety of networks which in turn offer access

to potential clients or finance, and free use of office space and equipment. During the first few weeks/months the process is mainly aimed at assessing the competencies of the participants, recognising business opportunities and providing instruction and training. The participants train their capabilities in recognising opportunities and constructing business concepts, and their entrepreneurial skills are being developed and put to the test" (NIKOS, 2011:32).

A distinctive feature of the Twente structure for entrepreneurship is that all supporting activities that used to be extra-curricular when first emerged became curricular programmes or projects. For instance, students can study at and even graduate from the VLT.

	The University of Twente			
•	The 1 st entrepreneurial university in the Netherlands.			
•	"Engaged scholarship" concept in operation.			
•	"Entrepreneurship in networks" model.			
•	Focus on high-tech innovative start-ups.			
	The Netherlands Institute for Knowledge Intensive Entrepreneurship (NIKOS).			
,	Venture Lab Twente, University Student Enterprises, "Become Your Own Boss" and other educational initiatives for entrepreneurship.			
•	Minor programmes in entrepreneurship for all faculties.			
	Modular curriculum at the BA "International Business Administration" programme.			
•	Engineering and technology, social and behavioural sciences.			
• ;	3300 scientists and professionals, over 9000 students.			

Development of industrial networks, training expertise and profound research base as it is the case in the University of Twente certainly requires time, commitment of top management, governmental support, and entrepreneurial attitude across faculties of a higher education institution.

1.2 Eindhoven University of Technology

The Eindhoven University of Technology was established in 1956. It is a research university specialising in engineering science & technology and combining excellent education, advanced quality research and knowledge valorisation. According to the QS World University Rankings (2011), the university takes the 146th place internationally and the 61st for Engineering & IT. According to the University-Industry Research Cooperation (UIRC) Scoreboard (2011), the Eindhoven University is one of the world's top 10 in the university-industry research cooperation measured by the proportion of research publications as a result of partnerships with industry. It positions itself as a place, where innovation starts and "the mind brings matter into motion".

The university educates 4750 Bachelor and 2950 Master students, 1200 PhD students and 250 post-docs in Technological Design; employs 3200 people, 2000 of whom are academic staff. It produces over 3500 scientific publications (around 1300 – in the Web of Science), awards over 100 PhD degrees annually (TUE, 2009).

Historically, the Eindhoven University has had a close cooperation with Philips and was established to address the company's needs in education and training of personnel in physics, chemistry, electronics and computer science. Gerard Kleisterlee, an ex-CEO of Philips, is one of the former students. Owing to its location in the technologically advanced region of the Netherlands, the university has become a major player in the local economy, having attracted other big companies for close cooperation, such as ASML, Royal Dutch Shell, DAF Trucks, DSM and NXP. At present, these companies are doing research and even maintain part of production on-campus (with main manufacturing processes based in China).

Apart from 9 faculties (Applied Physics, Chemical Engineering and Chemistry, Electrical Engineering, Industrial Engineering and Innovation Sciences, etc.), top multidisciplinary institutes were founded: The Eindhoven Energy Institute, Institute for Complex Molecular Systems, Intelligent Lighting Institute. As key strategic areas of research the university sets health, energy and smart mobility. Researchers are equipped with technologically sophisticated laboratories, state-of-the-art high-tech equipment (e.g. Cyclotron, MRI scanners, electron microscopes), very good computer facilities, etc. Thanks to support of the Brainport Development (see below), the university offers a unique incubator of technological innovation, science and education, where students and researchers work in close cooperation with entrepreneurs. The university campus is gradually transforming into a living lab for the students to live, study and do business.

Along with development of the research commercialisation (Eindhoven is the European region with the highest number of patents), dedicated structural divisions have been created to manage the knowledge and technology transfer agreements, creation of spin-offs, etc. For example, a limited company TU/e Holding B.V. specialises in commercial exploitation of scientific knowledge and operates since 1997. *The Innovation Lab* is in charge of generating and maintaining knowledge valorisation and innovation. It has 3 major directions of operations: entrepreneurship (idea generation and start-up initiation with an emphasis on high-tech), business development (coaching and mentoring) and research support (grant applications for researchers). The lab provides industry, small businesses and academic entrepreneurs (incl. start-ups originating at the university) with a range of services, such as:

- large industry and corporate relations (with technology-driven companies, both regional, national and international);
- contract research and contract education;
- joint research and development projects within the university research fields, graduate traineeships;
- design assignments such as a 12-month practical assignment for postgraduate students.

The Innovation Lab is also one of 3 buildings, where start-ups are located physically.

Entrepreneurship education in the university is governed by the Brabant Centre for Entrepreneurship (BCE). The centre is a joint initiative of the Eindhoven University and Tilburg University; its mission is twofold: to fuel entrepreneurial thinking and acting among students, to facilitate development and establish start-up companies.

The BCE in Eindhoven runs a range of study programmes from a Minor in Entrepreneurship and Innovation on the Bachelor level to a Master Certificate Programme and workshops for PhD and post-doctoral students.

The Bachelor programme for all students consists of 3 parts: major, be it industrial engineering or applied physics; a set of basic modules for all faculties, e.g. maths, and elective modules from other faculties to broaden own knowledge and experience. The Minor in Entrepreneurship and Innovation run by the Faculty of Industrial Engineering and Innovation Sciences falls into the latter part. It features a strong focus on technology entrepreneurship and consists of a sequence of subjects, which start with Knowledge Entrepreneurship. This module teaches how to generate and develop lucrative ideas, which would create unique value for customers. In addition, students learn how to evaluate business opportunities by performing feasibility analysis. After that 2 specialised courses follow: Open Innovation and Organising Entrepreneurship. During the first course, students set up alliances with companies to get knowledge and experience from the outside of the university. Large established ventures often try to diminish internal R&D capacity and use as many new ideas as possible from this cooperation. The second course is devoted to corporate venturing inside companies and large corporations, how to grow with champions, etc. The project "Entrepreneurship an Edge" finalises the programme and is designed for the students to apply acquired knowledge by developing own business concept, usually technology-oriented; as part of the business model development, feasibility study is one of requirements.

The Master Certificate Programme in Technology Entrepreneurship also pursues the process approach and teaches opportunity discovery, exploitation and evaluation – on the knowledge level providing with theory and on the skills level making students engage into entrepreneurship. The programme commences with the basic entrepreneurship and business-related courses necessary to through the venture creation process (strategy, business modeling, research, marketing, finance). This theoretical part also contains guest lectures, testimonials of experienced or young entrepreneurs, intrapreneurs and other practitioners. The courses are offered to all the faculties and combine students with technological and business backgrounds. The next stage is the skills training session to develop creativity, decision-making, time management, negotiation and selling, personal leadership and other skills. These sessions are recommended for every student based on prior self-assessment. Finally, students have to work out a business plan based on own or a corporate idea from contractual companies, the Innovation Lab, or SMEs in the region that want to grow and develop products for different markets. For example, in 2012 Philips Venturing provided the programme with 22 ideas, all being technology push type of ideas. The project starts with idea generation session followed by master classes of experienced entrepreneurs and intrapreneurs. Team-building process is dependent on students, which favours preservation of IP; however there is a limitation of 3 students per team to spread the workload evenly. During this project, the students can develop own business network, get subsidies, legal assistance, housing and other support from the university. They are assigned a professional coach, who works with a team for 3-4 months as long as the project lasts. Once the team is ready and committed, at the very end they do an elevator pitch for a panel of experts (venture capitalists, serial, experienced entrepreneurs).

Extra-curricular development activities include bootcamps, summer schools, Global Entrepreneurship Week kick-offs, start-up weekends, debate and business clubs, social networking events.

The underlying principle in the entrepreneurship curricula design in the Eindhoven University is to combine theory, practice and research in a balanced way. Business planning is part of the studies at all levels since it allows measuring results on every stage of the entrepreneurship process as compared to effectuation which is less tangible to measure.

A significant influence on the growing number of start-ups in the region in recent years can be also attributed the new-style company Brainport Development, working with representatives from industry, universities and the government to strengthen the Brainport top technology region. Currently, Southern Denmark, i.e. the Brainport region, houses over 1300 international companies. (Exxon, Siemens, IBM, Sony, Panasonic, Citigroup, etc.). This knowledge-intensive industrial region is the European top layer for investments in R&D: 8% of the GDP given the European minimum of 3%.

With regards to the universities, the Brainport Development supports on-campus business incubators and accelerators. In the Eindhoven University, these are the High-Tech Campus Eindhoven (international) and the Science Park (on campus). The incubators and accelerators are equipped with high-end facilities, offer offices, meeting rooms and laboratories as well as provide company advisory services (solving start-up problems, business administration, development and feasibility analysis), business finance (support in securing funds, own seed and pre-seed funds), entrepreneurship networks (experts, service providers, contacts). As a result, around 1000 companies have been streamed out; 200 are currently incubated; over 5000 direct jobs provided, 7500 indirect jobs; 500 successful innovations achieved.

The Eindhoven University				
	of the world's top 10 in the university-industry research peration.			
	e cooperation contacts with Philips, ASML, Royal Dutch I, etc.			
	ts leading Dutch R&D institutes and is the European region the highest number of patents.			
• The	Innovation Lab in charge of valorisation.			
	Brabant Centre for Entrepreneurship responsible for cation in entrepreneurship.			
tead	ortunity recognition and feasibility analysis focus in hing. Good combination of theory, practice and research. ness modeling and planning as final assessment.			
	D Bachelor and 2950 Master students, 1200 PhD students, D people staff employed.			
	r 3500 scientific articles published, over 100 PhD degrees rded annually.			
• Part	of the Brainport region, the Science Park as the living lab.			

1.3 RDM Campus in Rotterdam

The RDM Campus is a cooperative educational venture between Albeda College, Rotterdam University, and the Port of Rotterdam Authority aimed for companies and students. The campus is located in the territory of an old shipyard of the RDM Dry Dock Company, which after serving as one of the largest in Europe in the beginning of the XX century went bankrupt in 1983. Major renovation of the area took place from 2007 until 2009, first initiated by the educational institutions and supported by the port as it was highly interested in educating technology people, hence invested substantially into redevelopment of the area. The European Regional Development Fund co-financed the endeavor. The port remains the owner of the land and buildings. The abbreviation "RDM" now stands for "Research, Design, and Manufacturing".

The campus area encloses the Innovation Dock, an industrial hall with as a surface area of approx. 23 000 sq.m. for education and business (the former machinery hall of the shipyard); the Droogdok (Dry Dock) housing a congress centre, offices, educational facilities and studios (the former head office of the RDM); and the Dokhaven (the Dock).

The campus ID is now an open environment, where students and companies come together to collaborate. The aim is not only to educate people in real-life projects, but also to create innovative spin-offs. The applied educational concept is called "Innovation Teams", whereas educators and students from different disciplines (civil engineering, marketing, finance, etc.) work together on topics that companies initiate (the focus is on applied high-tech), thus creating and learning in communities of practice (CoP). New knowledge generated and information about products prototyped within these projects is stored and shared online. The RDM Campus strives to work with sustainable technical innovations in the fields of building, mobility, energy, maintenance, design and architecture.

Innovation Teams first started in 2010 as part of curricula. There are around 50 teams per semester totaling to 400 students. The students can work with a variety of companies; however they are not always enough to meet the full demand. At the same time, the network gradually expands and big international companies come into play. For students this educational concept brings into opportunities to progress from vocational to higher academic levels, get hands-on experience within companies. Although interdisciplinary settings are often challenging, in the collaboration process technically advanced ideas must be coupled with commercialisation. For starting and existing companies it is an opportunity to get access to a pool of talents, to do projects with the students that will be implemented in a core business, to be a part of this pool and develop own commitment, to rent a plot on a flexible basis. In other words, CoP is a pre-condition for cross-pollination of education and practice.

From the viewpoint of existing companies however, it is sometimes difficult to understand how education works, how to fit practice into curriculum, and they are usually aiming for qualitative, but fast, solutions and results. All research that is performed in the RDM Campus is applied, but matchmaking between the 2 parties requires time.

One of the major projects implemented together with the Delft University of Technology and Erasmus University is the solar-powered floating pavilion — a fully relocatable complex for living and recreating on water. It consists of three floating hemispheres, 12 metres high structure with a total floor area the size of four tennis courts. A further plan is to create a community of floating

structures and homes with this futuristic, innovative, sustainable and flexible pavilion serving as the first prototype and catalyst for climate change-proof architecture.

Another project in process is the "Concept House Village" (CHV), which envisions functioning as a living lab to test sustainable living concepts in 10-20 different kinds of innovative models for the Dutch housing market in the area nearby the RDM Campus. CHV expects to develop into a building and knowledge community in 4-8 years and become a showcase of sustainable city development based on building research for the latest technological applications in sustainable energy, water, sanitation and home automation.

The RDM Campus is also the place of location of the DNAMO incubator and accelerator founded in 2009 by Enviu, YES!Delft, TU Delft, Hogeschool Rotterdam, Havenbedrijf Rotterdam and Rabobank Rotterdam. In 2011 Dnamo supported 27 entrepreneurs with ideas ranging from cradle-to-cradle plates to healthy snacks for children and navigation techniques. Focusing on sustainable innovations, Dnamo has a mission to inspire young and talented entrepreneurs. One of its objectives is to scout innovative ideas and facilitate these starting entrepreneurs at the RDM Campus.

	The PDM Campus				
	The RDM Campus				
•	Intermediate and higher vocational education, with plenty of space for experiment and practical research.				
•	Accommodation for the innovative and creative manufacturing industry.				
•	Place for meetings and conferences.				
•	"Innovation Teams" educational concept, CoP.				
•	"Dnamo", the Incubator and Accelerator.				

1.4 Utrecht University

The Utrecht University is one of the oldest in the Netherlands – founded in 1936. The University is home to 30344 students and 7500 staff. Over 2000 foreign students and researchers come to live, work and study in Utrecht. It offers 52 Bachelor's and 178 Master's degree programmes in Humanities; Law, Economics and Governance; Geosciences; Social and Behavioural Sciences; Medicine (UU, 2012). As opposed to Eindhoven and Twente, Utrecht is not a technology or engineering focused, neither has it had strong business school traditions. Over time, the university has evolved into a modern and leading institution with growing international reputation. It ranks No.1 in the country, No.12 in Europe and No.53 worldwide according to the Shanghai Ranking.

With 12 Nobel Prize winners and (1995 - 2010) 13 Spinoza Laureates, Utrecht has been facing the "Dutch knowledge paradox", when universities possess strong knowledge base, but it remains within the ivory tower of HEIs. Hence, it has started to complement multi-faceted innovative research with knowledge valorisation and transfer as well as educating tomorrow's leaders. Utrecht Centre for Entrepreneurship, Utrechtlnc, Utrecht Science Park, Utrecht Life Sciences and other initiatives emerged as a result of this complementation.

Established in 2011, the Utrecht Center for Entrepreneurship (UtrechtCE) aims to stimulate and develop an entrepreneurial attitude, knowledge and skills in students, lecturers, scientists, support

staff, employers and employees. The founding partners of the centre are the Utrecht University, University of Applied Sciences Utrecht and University Medical Center Utrecht.

The mission is to make students aware of entrepreneurship as a career options, but most importantly as a mode of action, which can take place in any context. The second step is to prepare students for entrepreneurship by combining knowledge and skills. Finally, to get students involved with the university after graduation as alumni. 60-70 businesses in total were established so far, but as compared to Twente, the centre pursues behavioural definition of entrepreneurship as the ability to recognise, evaluate and pursue opportunities for new value creation rather than establishment of new legal entities for own risk and reward. This approach is especially relevant for the Netherlands, where corporate entrepreneurs are as important as independent entrepreneurial activities.

Recently, the centre has received EUR 15 million financing from the European Commission for implementing the 6-year valorisation programme, whereas 4 years are funded and the remaining 2 have to be maintained by the consortium of local HEIs, the Netherlands government and local businesses and government. The programme has 3 pillars: 1. knowledge transfer (with Utrecht Holdings and Valorisation Centre), 2. start-up support (with Utrechtlnc), 3. education and training (by the Centre for Entrepreneurship). For developing the first pillar, 16 business developers and knowledge brokers are employed to build external network and look for applications of knowledge in the faculties. The second pillar is based on incubation services comprising provision of office space, legal and IP support, business coaching, networks, financing (through Rabobank, UtrechtVC or individual venture capitalists), etc. UtrechtVC is an adjacent company investing into start-ups and usually owning a minority share. The third pillar is aimed at developing and accelerating entrepreneurship education programmes, increasing the number of entrepreneurship students, hosting competitions, events, bridging alumni and local entrepreneurs with the university to get extra support, find internships for current students, among other activities. From 2010 to 2012 participation in new entrepreneurship courses increased from 600 to 1200 students.

The Utrecht University

- Utrecht Centre for Entrepreneurship dealing with knowledge transfer, start-up support, education and training.
- Utrecht Holdings, Utrechtlnc, UtrechtVC.
- 12 Nobel Prize winners in physics, chemistry, economics and medicine.
- No.1 in the country, No.12 in Europe and No.53 worldwide according to the Shanghai Ranking.
- 1200 entrepreneurship students.

On top of that, Utrecht Science Park provides an innovative climate for "open science" and value creation, it is a space for education, research and knowledge-intensive companies to work together on two basic themes — sustainability and life sciences to improve the quality of life. Utrecht Life Sciences is an open innovation network, a partnership between Utrecht University, the University Medical Center Utrecht, government and business aimed at enabling innovation in medicine.

If 10 years ago, the Utrecht University was classified as a traditional high-class research university with no hint of innovation or entrepreneurship, in recent years it has changed considerably and nowadays continue changing by reinforcing entrepreneurial spirit across the faculties through education and training, start-up support, and knowledge valorisation.

2. Entrepreneurial Universities of the United Kingdom

2.1 University of East Anglia, Norwich Business School

University of East Anglia (UEA) was established in 1960 and offers study programmes in the four faculties — Art&Humanities, Medicine&Health Science, Science and Social Science, where programmes are provided by 25 different schools. In the UK higher education landscape UEA is a part of the so-called 1994 group of research-intensive universities along with Birkbeck College, University of Essex, Goldsmiths College University of London, Royal Holloway University of London, Lancaster University, University of Leicester, Loughborough University, School of Oriental and African Studies, University of Surrey and University of Sussex. The UEA is also a leading institutions of the Norwich Research Park, which includes the UEA, the Norfolk and Norwich University Hospital, four independent research institutes - John Innes Centre, Institute of Food Research and The Genome Analysis Centre and The Sainsbury Laboratory.

The UEA has approximately 15,000 students and ranked number one in the Times Higher Education Student Experience Survey in 2013 and at the university a lot of effort is put on achieving high student satisfaction. In 2013 the UEA was ranked 23rd among UK universities by The Times, 22nd by The Sunday Times, 17th by The Guardian and 20th by The Complete University Guide.

Norwich Business School (NBS) is the largest of the seven schools of the Faculty of Social Science with approximately 600 undergraduate and around 180 post-graduate students. Norwich Business School follows the UEA's motto of 'Do Different' by delivering innovative and pioneering courses in both Norwich and London. At UEA the Norwich Business School offers seven undergraduate programmes - BSc Accounting and Finance, BSc Accounting and Management, BSc Management, BSc Finance and Management, BSc Marketing and BSc Management are available to students in Norwich, while BSc International Business Management is offered at UEA London. On postgraduate level the school offers cognate masters programmes for students with business degree and conversion master programmes for graduates with no business background or international students who have not studied in Western countries. There are 2 cognate Masters programmes offered in Norwich – MSc Advanced Business Management and MSc Brand Leadership. Conversion programmes are available both in Norwich and London. There are seven programmes available in Norwich - MSc Business Management, MSc Investment and Financial Management, MSc Human Resource Management, MSc International Accounting & Financial Management, MSc Marketing, MSc Supply Chain Management, MSc Sustainable Business, while in London students can attend MSc Entrepreneurship and Strategy, MSc Management, MSc Finance & Management and MSc Marketing & Management. The NBS also offers full-time and executive MBA programmes and a possibility to study for a PhD.

In its work the NBS is trying to meet the current challenges of the HE in the UK that require universities to become more enterprising with the aim to foster an enterprising spirit and increase a number of graduate start-ups but also reducing employment. Recently the Higher Education Funding Council for England (HEFCE) has asked all higher education institutions and HEFCE- funded further education colleges to publish employability statements on the help they provide to students to improve their employability and transition into work. The universities are also required to publish key information sets (KIS) that include information about student satisfaction, learning and assessment, financial costs and support, employment outcomes and professional body recognition and are available on Unistats website. In the light of those developments more attention is paid to entrepreneurial education, which according to the UK's Quality Assurance Agency for Higher Education (QAA) aims to produce graduates with the mindset and skills to come up with original ideas in response to identified needs and shortfalls, and the ability to act on them. In short, having an idea and making it happen. In its 'Enterprise and entrepreneurship education. Guidance for UK higher education providers' the QAA points out the differences between the 'for' and 'about' courses. According to their definition the 'about' courses "are intended to help students to assimilate and reflect upon existing knowledge and resources that enhance their understanding of a topic or theme, for example, venture creation and business growth strategies", while the 'for' courses "focus on creating enterprising mindsets in graduates and help them to discover what it is to be enterprising, as well as offering insights into being an entrepreneur". The QAA also emphasizes that "practice should be underpinned by theory, so an ideal combination is to include learning both 'about' and 'for' within the curriculum". In this context the importance of learning both inside and outside the curriculum, as outlined in the Figure 5 below, shall also be emphasized.

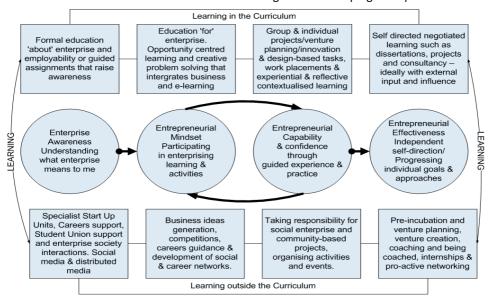


Figure 5. Developing entrepreneurial effectiveness

Source: QAA (2012:12)

This also means a shift in focus for an educator, which can be summarised as follows (QAA, 2012:25):

- from case studies to emerging situations,
- from abstract problems to innovation,
- from passive learning to active learning,
- from objective analysis to subjective experience,
- from text-heavy communication to multimedia communication,
- from neutrality to personal perspectives,
- from formal activities to authentic activities,
- from fearing failure to learning from failure,
- from dependency to self-reliance and resilience.

To operate in this new and fast-changing environment the NBS has used a number of tools like Norfolk Knowledge - a voluntary network of experienced business leaders helping/providing advice to small businesses, partnerships and single traders, voluntary organisations and local communities and students at the university, review of good practice in UK graduate enterprise incubation environments (GEIE), entrepreneurial training for UEA staff and researchers and other.

University of East Anglia, Norwich Business School					
•	 University of East Anglia and Norwich Research Park. 				
•	Norwich Business School, cognate and conversion masters programmes.				
•	'For' and 'about' courses.				
•	Key Information Sets/Unistate.				
•	Improving students employability.				

2.2 Anglia Ruskin University, Centre for Enterprise Development and Research

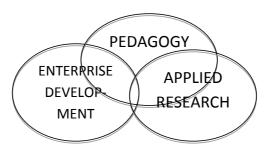
Anglia Ruskin University has its origins in the Cambridge School of Art, founded in 1858. In 1960 the school became the Cambridgeshire College of Arts and Technology but in 1989 it merged with the Essex Institute of Higher Education to form the Anglia Higher Education College. The merged college became a polytechnic 1991 was then awarded university status in 1992. The university offers undergraduate and postgraduate programmes to more than 30,000 students at its four faculties – Faculty of Arts, Law and Social Sciences, Faculty of Health & Social Care, Lord Ashcroft International Business School and Faculty Science and Technology.

Centre for Enterprise Development and Research (CEDAR) is one of the two research centres at Lord Ashcroft International Business School. In its operation CEDAR aims at blending theory and practice to create knowledge, improve understanding and challenge thinking in the area of enterprise and entrepreneurial management. CEDAR works in three overlapping areas (see Figure 6 below).

In the field of pedagogy CEDAR works with two programmes - BA in Enterprise and Entrepreneurial Management and MA in Entrepreneurial Management. CEDAR carries out research in the area research in the area of enterprise development, entrepreneurship and SME internationalization, provides opportunities for PhD research and studentships and actively works on dissemination of

results. When it comes to enterprise development CEDAR works both externally and internally. The external work includes enterprise workshops and fellowships and national and international enterprise development work, while internally it is HEIF 5 work and activities like the Big Pitch, the Little Pitch, running the StartupLab and providing mentoring.

Figure 6. Areas of work of the CEDAR



Source: CEDAR (2013)

The Enterprise Fellowship Scheme is an innovative programme for regional entrepreneurs looking to start or accelerate the development their own business. It was started in 2011 and has been allocated a total of £87,500 (donated by successful entrepreneurs) in start-up funding to eight early stage ventures. The Big Pitch is the UK's first student enterprise competition to use video pitching and interactive online voting. The competition started in 2011, it is is open exclusively to Anglia Ruskin University students and has a £30,000 prize fund every year. Both schemes offer large financial rewards for the winners to invest in their business ideas, a business mentor, free legal and financial advice, access to The StartUp Lab and title of CEDAR Fellow.

Anglia Ruskin University/CEDAR			
•	Pedagogy/Applied Research/Enterprise Development.		
-	The Big Pitch/the Little Pitch.		
•	StartUp Lab.		

2.3 University of Cambridge, Centre for Entrepreneurial Learning

The University of Cambridge is one of the world's oldest universities and leading academic centres, and in 2009 it celebrated its 800th anniversary. The University has around 18,000 students, nearly 9,000 staff, 31 Colleges and 150 departments, faculties, schools and other institutions. The University is a formed of Schools, Faculties, Departments and Colleges. The Colleges are governed by their own statutes and regulations, but are integral part of the University of Cambridge. Students live, eat and socialise in one of the University's 31 autonomous Colleges. Colleges select their own students, subject to University regulations, and most admit both undergraduate and postgraduate students. At Cambridge there are six Schools - Arts and Humanities, Biological

Sciences, Clinical Medicine, Humanities and Social Sciences, Physical Sciences, and Technology - each of which includes Faculties and other institutions. University Faculties organise teaching and research into individual subjects or groups of subjects.

The Centre for Entrepreneurial Learning is a part of the Faculty of Business and Management, Judge Business School. The Centre provides different programmes for students, graduates, researchers and new entrepreneurs in the field of entrepreneurship education. These programmes are aimed at people with different backgrounds and different level of knowledge and experience in entrepreneurship and include:

- Enterprise Tuesday series of free lecturers and networking events that are open to the University of Cambridge staff and students and students from other universities and are aimed at introducing the audience with the world of business.
- ETECH Projects is a course delivered to natural science students at the University of Cambridge aimed at accelerating their entrepreneurial skills and focused on turning novel and disruptive technologies into business ideas.
- Ignite is a one-week intensive training programme for nascent entrepreneurs and corporate innovators. During the training the participants go through training sessions, analysis of their business idea, work with mentors to turn the idea into a successful business venture.
- Enterprisers is a personal development programme aimed at building self-belief and self-confidence using entrepreneurial ways of work in your everyday life.
- Postgraduate Diploma in Entrepreneurship is a part-time, very practical programme for young entrepreneurs. During the course of 12 months the participants go through four courses and complete the related assignments.

	University of Cambridge/Centre for Entrepreneurial Learning
•	Enterprise Tuesday.
•	ETECH projects.
•	Enterprise Cambridge.

2.4 University of Hertfordshire, Hertfordshire Business School

History of the University of Hertforshire dates back to 1958 when Hatfield Technical College was established. At the time the college was built at the site donated to the Hertfordshire County Council by Alan S. Butler, Chairman of the de Havilland Aircraft Company. In 1969 the college became Hatfield Polytechnic and 1989 it was given the corporate status. In 1991 after government's announcement that polytechnics will be abolished it merged with Hertfordshire College of Art and Design and in 1992 became the University of Hertfordshire.

Today the University of Hertfordshire (UH) has 10 schools – Computer Science, Creative Arts, Education, Engineering and Technology, Health and Social Work, Hertfordshire Business School, Humanities, Law, Life and Medical Sciences, Physics, Astronomy and Mathematics. The University calls itself one of the region's largest employers with a turnover of more than 235 million GBP. It has more than 24,500 students, including international students from eighty-five countries, and employs around 2,700 staff members.

In 2010 the University was named as Times Higher Education Entrepreneurial University of the Year and it emphasizes its business orientation in all aspects of its operation.

Hertfordshire Business School (HBS), one of the UH schools offers a wide range of entrepreneurial education services to different target groups. The School has 18 undergraduate programmes in a variety of subjects from Accounting, to IT Management for Business to International Tourism Management. On the postgraduate level it offers 16 programmes including the Hertfordshire MBA. Students willing to pursue their academic career can choose one of the two doctorate programmes – DMan/MA by Research or Doctorate in Business Administration.

The HBS also actively cooperates with the business community and support new SMEs using various knowledge exchange schemes, like Innovation Vouchers, Knowledge for Businesses, Knowledge Transfer Partnerships and Graduate Consultancy Unit. The HBS research is focused around four main areas - business strategy, employment studies, creative industries and institutional economics, and all research carried out by the HBS is concentrated in one large research centre - Centre for Research on Management, Economy and Society.

Hertfordshire Business School is one of the first if not the only one that is using practical philosophy to advance entrepreneurial learning; this includes creation of authentic learning environments, letting students fail successfully during the course, understanding one's compatibility with entrepreneurial career path, and personal reflection, among other components. It has gradually started to integrate entrepreneurship courses into non-business programmes, e.g. history, alongside with preparation of teachers in charge of these programmes. Finally, the business school is implementing test projects in academic entrepreneurship, whereas selected academics are working part-time in spin-off companies; enterprising spirit is encouraged and favoured among the researchers.

	University of Hertfordshire/ Hertfordshire Business School
•	Entrepreneurial university.
•	Academic entrepreneurship and enterprising academics.
•	Practical philosophy for entrepreneurial learning.
•	Interdisciplinary enterprise education.
•	Strong connections with business community.
•	Support to SMEs.
•	Strong emphasis on research.

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