OBSTACLES TO THE UNIVERSITY-INDUSTRY COOPERATION IN THE DOMAIN OF ENTREPRENEURSHIP

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Abstract

An imperative concerning entrepreneurship education noticeable in the European research sources is fostering cooperation between universities and companies. Coupled with a now widely accepted educational view of entrepreneurship as a practical domain, the task becomes even more relevant, but challenging to accomplish. Despite the recognised importance of cooperation between universities and businesses in our society, the present university-industry environment in Europe is "underdeveloped and highly fragmented", 40% of academics do not engage in this cooperation at all.

Several sources already attempted to identify these obstacles and provide with suggestions for overcoming them, but none of these sources attempted to look at the problem through the prism of entrepreneurial university. This paper primarily aims to apply the four pillars framework of entrepreneurial university introduced by Etzkowitz and to structure the obstacles to university-industry cooperation according to this framework thus offering a theoretical basis for further empirical research of the problem. Secondly, the paper provides corresponding solutions to overcome the identified obstacles. To achieve the aims set, general scientific research methods, including monographic and logical construction tool, were employed.

The paper suggests the main obstacles to university-industry cooperation are: conservatism and rigidness of the academic system, insufficient communication between the parties and detachment of academia from practice, closed corporate culture of businesses, differing attitude of the parties to knowledge, among others. On the other hand, it appeared that commercialisation of scientific commons endangers future progress of science, academic degrees are losing value because of "academic inflation", and companies are unwilling to cooperate within industry-based projects initiated by universities as it is unclear how created intellectual property will be divided.

Solutions that might help the universities to overcome the existing obstacles are based on good practice examples – involvement of large companies as intellectual donors, science-to-business marketing, renovation of entrepreneurship curriculum, industry-based projects, incentives for companies and others.

The paper contributes to the use of the entrepreneurial university concept, provides classification of the university-industry cooperation obstacles with a focus on entrepreneurship education, and can serve as a shortcut to exploration of the topic.

Keywords: university-industry cooperation, entrepreneurial university, entrepreneurship, education.

1. INTRODUCTION

The role of universities in a knowledge-based society we are living nowadays has changed revolutionary. Serving society and being an active actor in economic development, new type of universities known as "Entrepreneurial University" is a source of entrepreneurship and a key driver of knowledge-based economies (Etzkowitz, 2008). Entrepreneurial university, apart from knowledge transmission and research functions, acts as an incubator for professors and fellows to start-up, patent own results and transfer knowledge/technology into industry (i bid, 2008). Transition to entrepreneurial university in modern society is called "the second academic revolution", which we are witnessing at present (i bid, 2008:30).

Now the concept of entrepreneurial university "embraces universities of all types including those with a strong research tradition" (Gibb et al., 2009:3). If we think of an ultimate aim of higher education, the most

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evident and straightforward answer is preparing students for an economically viable professional life. For no doubt, entrepreneurship is a practical and inter-disciplinary domain that must be taught to students with diverse backgrounds, especially non-business, currently lacking in new member states of the European Union (EC, 2008). As far as the social constructivist paradigm is concerned, entrepreneurship education should take a form of open learning process ensuring authentic environment for students featuring uncertainty, experiencing acquired knowledge, absence of concrete "road maps" and pre-defined solutions (Lobler, 2006). Hence, cooperation between universities and companies is of an utmost importance as part of the experiential learning and teaching in entrepreneurship education.

Eurobarometer Survey No. 260 of around 15000 European students aged from 18 to 25+, all in higher education on BA level or above and various fields of study (mostly – social sciences) in the section "Cooperation of universities and businesses and entrepreneurship in higher education" showed "a large majority of 87% of surveyed respondents (strongly or rather) agreed that it was important for HEIs to foster innovation and an entrepreneurial mindset among students and staff, and that there should be a possibility to undertake work placements in private enterprises as part of a study programme" (EC, 2009:40). Three-quarters of interviewees (strongly or rather) agreed that "HEIs should provide tailor-made study programmes for enterprises to help upgrade their workforce" (76%).

Despite the recognised importance of cooperation between universities and businesses in our society, the recent study of Science-to-Business Marketing Research Centre (Davey et al., 2011) in Munich revealed that the present university-industry (henceforth – "U-I") environment in Europe is "underdeveloped and highly fragmented" (p.5). 40% of academics do not engage in this cooperation at all, 20% -- to a very low extent (ibid, 2011). It is not enough to realise the European universities have to apply experiential teaching methods in entrepreneurship programmes/courses and strive to be more entrepreneurial. When it comes to action, a number of obstacles become salient, concerned both with university-led and external factors. Several sources already attempted to identify these obstacles and provide with suggestions for overcoming them (Davey et al., 2011; Bruneel et al., 2011; Rohrbeck & Arnold, 2006). However, none of these sources attempted to analyse the obstacles to the U-I cooperation from the viewpoint of entrepreneurial university.

The concept of entrepreneurial university started to spread in the scientific literature in the 1990s (Wasser, 1990; Clark, 1998). One of the major contributors to the formation of the concept is Etzkowitz (2004), who developed a framework of the entrepreneurial university comprising four parts, or pillars: academic leadership, organisational capacity, entrepreneurial ethos, legal control over resources (Etzkowitz, 2008). The entrepreneurial university concerns a wide variety of topics: the basic philosophical idea of the social development mission, commercialisation of know-how, technology and knowledge transfer, the internationalisation and global competitive strategies of the universities, the employability and skills development of graduates and others (Gibb et al., 2011), which are, in effect, all linked to the U-I problem.

This paper primarily aims to apply the framework of Etzkowitz to structure the obstacles to cooperation of the universities and businesses into the four pillars thus offering the adapted framework for further empirical research of the cooperation problem. While the article is classified as an opinion paper, all the arguments are backed up by diverse sources ranging from purely to popular scientific; it presents alternative viewpoints to the recognised obstacles and comments on them creating a constructive discussion. The paper also offers corresponding solutions to overcome the identified obstacles in every pillar.

2. COOPERATION OBSTACLES IN FOUR PILLARS

According to Etzkowitz (2008:27), academic leadership in such in the entrepreneurial university refers to the ability to formulate and implement a strategic vision; organisational capacity – to transfer knowledge and technology through patenting, licensing, incubation; entrepreneurial ethos – entrepreneurial attitude and behaviour among administration, faculty and students; and finally legal control consists of control over physical and intellectual resources of university.

All the four pillars that serve as the current working concept from the first sight are related solely to the university's internal environment. Application of Etzkowitz's framework (2008) to the U-I cooperation problem

allows us to determine what the obstacles in every pillar essentially comprise, and broaden their meaning into external environment.

2.1 Academic leadership

Conservatism and rigidness of the academic system, resistance to changes in curriculum or existing hierarchy of subjects, especially in traditionally structured universities as well as the lack of suitable collaborative programmes are the most salient obstacles in the "Academic leadership" component.

Most universities in Europe are government-funded, which makes it difficult to integrate new approaches, although the majority of entrepreneurship education researchers admit there is a need for "complete paradigm shift in fundamentals of universities' operations" (Wilson, 2008:5; Mets, 2010). A number of institutions in Finland, UK, Germany, Netherlands and other countries are already taking active steps towards closer cooperation with business community (Aalto University, Northern Ireland Centre for Entrepreneurship, University of Twente). The lack of collaborative programmes and, insufficient funding from the Government and funding in general is another widespread problem (Bruneel et al., 2009; Davey et al., 2011).

Alternative views on the obstacles in the academic leadership pillar relate to positioning of entrepreneurship in academia and thematic focus of training programmes. Wilson (2008) argues that many entrepreneurial training programmes in Europe focus on functional management of SMEs, which are not growth-oriented. However, SMEs represent 99% of all companies in the EU. They are the biggest sector of the EU economy, with 23 million enterprises employing around 75 million people responsible for the creation of one in every two new jobs. SMEs produce considerably more than half the EU's GDP (Euractive, 2011). Therefore, on the one hand, focus on small and medium rather than large companies or "breeding gazelles" is justifiable given the market features, but on the other hand, the education system is one of the powerful influential channels that can influence the existing market structure and trigger changes; furthermore, understanding or interpretation of entrepreneurship as management only or mostly undermines the meaning and concept of entrepreneurship per se.

Etzkowitz (2008) and Wilson (2008) notice that positioning of entrepreneurship in academia is often driven by external forces, such as the European Commission, governments, but not universities themselves, as compared to universities in the US, which are self-organised. Having created a market niche for "majors" in entrepreneurship with multidisciplinary focus, academic entrepreneurship departments are meeting active demand from American students (i bid, 2008). But it is necessary to remember that entrepreneurship education in the US exists for more than 60 years, since the first graduate course in entrepreneurship was offered at Harvard University in 1947, while Europe (its Western part, including Great Britain, Scandinavian and German-speaking countries, and then its Eastern part) has started to operate in this realm in the last 20 (Katz, 2003). On the one hand, government is an influential power and, irrespective of the existing political controversies, can play crucial role in the U-I cooperation through funded programmes, being directly interested in the economic development. On the other hand, the study of Bruneel et al. (2009) showed that management of the U-I cooperation through government policies and university administration can even increase the obstacles.

2.2 Organisational capacity

The main obstacles in the "Organisational capacity" component are: detachment of academia from practice, lack of or no communication between the parties, and lack of mutual trust.

The common problem is that research in universities does not usually correspond with the industry needs. Researchers and professors are occupied with topics they are good or interested in. Hence it is hard to valorise the research (Muravyova, 2010; O'Shea et al., 2007). It is also common that researchers do not approach companies and ask what their problems are, while companies do not ask researchers how to improve performance (Gelbuda, 2011). In addition, the research of universities is usually long-term oriented, while industry requires "close-to-immediate reaction or short-term action plans" (Bruneel et al., 2009:860).

Other views for the organisational capacity component are concerned with academic publications and understanding of business operations. In the Harvard Business Review article "How Business Schools Lost Their Way" the authors W. Bennis and J. O'Toole (2005:99) state that professors are required to publish in top-tier scientific journals, although these works are less likely to influence business practices or the national

economy. Indeed, there are many "So what?" issues and the scientific model of entrepreneurship does not correspond to "randomness, ambiguity and uncertainty embedded in wider social and business concepts" (Bennis & O'Toole, 2005; Fillis & Rentschler, 2010:60). But the entrepreneurial universities deal with developing innovative economies and ventures. Thus, it is necessary to distinguish between pastry shops and software companies, for instance, and readiness of industry to come forth.

Other sources emphasise "universities do not understand how companies operate" (American Council in Higher Education, 2011:27; Rohrbeck & Arnold, 2006). It is rather questionable, whether one can generalise, because educators come into teaching with different professional backgrounds, but the study of S2B Marketing Research Centre (2011) revealed 40% of academics do not engage in the U-I cooperation at all (the sample covered around 4100 respondents) (Davey et al., 2011). Mutual trust, commitment and shared goals are the most essential drivers followed by U-I relationship; but these U-I drivers are higher for HEIs management than for educators themselves, because they do not recognise personal benefits from U-I cooperation (including those for their research) in terms of promotion (ibid, 2011). Businesses, in turn, most probably seek for purely commercial benefits.

2.3 Entrepreneurial ethos

Obstacles in the "Entrepreneurial ethos" component mainly deal with concentration on academic achievements, insufficient experience of educators in entrepreneurship and preconceived attitude of business community to the university products.

Our current system of higher education is predicated on academic achievements, as it came into being in the 19th century to meet the needs of industrialism, when the transition from the medieval university concept based on preservation and transmission of knowledge into a research institution occurred (known as "the first academic revolution") (Bennis & O'Toole, 2005; Robinson, 2006; Etzkowitz, 2008:30). Since then, it is the academic ability that is valued the most, leaving the minimum space for creativity and stigmatising mistakes, thus, being far away from real-world entrepreneurial experiences. Within this system, key winners and simultaneously a target output are traditional university professors (Robinson, 2006), while "the model of academic excellence is self-defeating for business programmes" (Bennis & O'Toole, 2005:96).

Less than 1/3 of staff teaching entrepreneurship in Europe has practical business experience (Curavic, 2011). Indeed, at many schools, including American, a path of junior scholars does not go through field work in businesses; on the contrary, they usually avoid work with practitioners and focus on their narrow field of research (Bennis & O'Toole, 2005). The majority are traditional academics, whose experience is based on long-lasting policies and practices, but naturally diverge with entrepreneurial spirit, drive and environment required to educate real entrepreneurs (Wilson, 2008). In the US, experience of educators in entrepreneurship is one of the key strength measures for programmes (Kabongo & Mc Kaskey, 2011) – so it should be in Europe.

The nature of personnel determines the prevailing approach to teaching. Hence, attitude of entrepreneurs to professoriate is somewhat preconceived: "they are just another form of life, disembodied, live in their heads"; their research is far from real life in general and business in particular (Robinson, 2006). As a result, even valuable research remains underestimated; universities lack authority and power.

To introduce an alternative viewpoint to the above mentioned in the entrepreneurial ethos component, we can refer to the famous speech of Sir Ken Robinson (2006), who stated that earlier HE degrees were associated with jobs, but now they are losing value because of "academic inflation" ("in the next 30 years more people will receive formal education than in all of human history thus far", referring to UNESCO data). However, according to OECD data ((2011) in 2009), on average from 77.8% to 88.8% of population in EU25 (depending on type of tertiary education) aged from 25 to 64 gets employed. Comparable figures three years earlier (2006) showed the interval from 79.7% to 88.9% (OECD, 2008).

The European Foundation for Entrepreneurship Research expert Karren Wilson (2008:7) noted that European universities often "lack experience, courage and incentives for proactive engagement in cooperation with external environment". At the same time, quite often industry is closed for contact itself. Universities value practical experience and empirical evidence high (including scientific publications – collaborative research is highly cited), but industry resists cooperation, especially in developing countries, where SMEs aim for survival, not change (American Council in Higher Education, 2011).

2.4 Legal control

The closeness of business is explicable with main obstacles identified in the last pillar – legal control. Usually businesses have closed corporate culture and hardly open for newcomers, tending to protect their privacy and prevent information outflow; at present, many SMEs avoid changes as sources of risk.

Attitude to knowledge differs in entrepreneurship and education environments conceptually. Industry keeps knowledge undisclosed as a corporate asset, source of competitive advantage and future profit (patenting as example of information dissemination are also used to establish leadership in a particular field). Universities, on the contrary, tend to publish results as a source of academic success (Bruneel et al., 2009; American Council in Higher Education, 2011).

From another viewpoint, companies are unwilling to cooperate within industry-based projects initiated by universities as it is unclear how created IP in such projects will be divided (Muravyova, 2010). Yet, the issue can depend on mutual agreements/interests between/of the parties.

Nelson (2003:455) puts forward a contrasting statement about knowledge/technology transfer: "commercialisation of scientific commons endangers future progress of science and technological progress". However, entrepreneurship cannot be regarded in the same way as physics or biology, it is a profession rather than science; hence commercialisation and competition are rooted in entrepreneurship (Bennis & O'Toole, 2005).

Finally, there are two opposing views on incentivising inventors. Most probably, rewards from university to faculty members positively influence spin-off/university technology transfer activities (Link et al., 2006) as the lack of incentives and personal benefits have already been mentioned. Still, Gregorio & Shane (2002) found out that a low inventor's share of royalties in universities' TLOs start-ups increase new firm formation. We can assume there are other factors that influenced the result, since the research conducted by Davey et al. (2011:11) proved "the higher the perceived benefits, the higher the extent of U-I cooperation carried out". It is in the nature of people to be rewarded, a highly significant stimulus.

Table 1 visualises all the aforementioned arguments. As the reader may notice, the discussed obstacles classified into four pillars of the entrepreneurial university are concerned primarily with internally (university)-led, but also with external (businesses- or governments-led) factors; hence the meaning of four pillars is broadened into external environment. Having identified the main obstacles to the U-I cooperation, the next section provides with a number of suggestions using the applied framework.

3. SUGGESTIONS FOR OVERCOMING SOME OF THE OBSTACLES

One of the examples of overcoming the U-I obstacles in the academic leadership component is the practice of large IT companies in Russia: IBS & Yandex. These companies act as intellectual donors for universities, having created own faculties and ensured experienced company-based lecturers are teaching courses in ongoing educational projects: IBS is currently running master and lifelong learning programmes, majoring in IT Business Consulting, while Yandex – School of Data Analysis, School of Yandex Managers, Yandex training, etc. offering specialisations of IT analysts, system administrators, IT project managers and others (Novash & Chernozatonskaya, 2012). The companies collaborate with leading Russian HEIs, such as Moscow Institute of Physics and Technology (State University), Lomonosov Moscow State University, Saint Petersburg Academic University of the Russian Academy of Sciences – to guarantee high-quality personnel will work for them in future. At present, IBS has approximately 47 educators and 50-80 students, and Yandex – over 30 educators and 130 students (i bid, 2012). Similar initiative can be governed by a pool of SMEs or clusters.

While the problem of funding is open, it is advised to maintain closer connections with alumni, especially successful ones, which could support alma maters as their business grows. This generally happens in the US, but is not practiced in Europe, according to the recent studies (EC, 2008; Wilson, 2008). Attraction of venture capitalists to innovative projects originated in universities remains an option; participation in cross-border online mentoring programmes, embarking onto new interactive platforms, such as enterprise development labs, pre-incubators, etc. (party mentioned in Bruneel et al., 2009 and Wilson, 2008).

Table 1. Obstacles to university-industry cooperation

Group/Views	***1. The author's opinion***	***2. Other views***	***3. Comments***
Academic leadership	Conservatism of the academic system (Wilson, 2008; Mets, 2010).	Focus of programmes on functional management of SMEs (Wilson, 2008).	Why not SMEs that represent 99% of all companies in the EU? (Euractive, 2011; EFER, 2010)
	Lack of suitable programmes and initiatives, insufficient funding (Bruneel et al., 2009; Davey et al., 2011).	Positioning of entrepreneurship in academia is often driven by external forces, for example, the EC (Etzkowitz, 2008).	Entrepreneurship education in the US exists for more than 60 years (Katz, 2003). Government is an influential power that can play crucial role in the U-I cooperation.
Organisational capacity	Research in universities does not usually correspond with industry needs (Muravyova, 2010; O'Shea et al., 2007).	Top-tier publications are unlikely to influence business practices (Bennis & O'Toole, 2005).	Entrepreneurial universities are concerned with developing innovative economies and ventures, where knowledge is the key.
	Lack of or no communication, lack of mutual trust (Gelbuda, 2011).	Universities do not understand how companies operate (American Council in HE, 2011; Rohrbeck & Arnold, 2006).	40% of academics do not engage in U-I cooperation, 20% experience low engagement, because they do not recognise personal benefits (Davey et al., 2011). Can we generalise?
	The research of universities is usually long-term oriented, while industry requires short-term action plans (Bruneel et al., 2009).		-
Entrepreneurial ethos	Predication on academic achievement (Bennis & O'Toole, 2005; Robinson, 2006).	"Academic inflation" (Robinson, 2006, referring to UNESCO data).	On average from 77.8% to 88.8% of population in EU25 (depending on type of tertiary education) aged from 25 to 64 gets employed (OECD, 2011).
	The minority of staff teaching entrepreneurship has practical business experience, but skills are transmitted only from a holder to holder (Curavic, 2011; Bennis & O'Toole, 2005; Wilson, 2008).		New training programmes for educators emerge, such as buzz platforms connecting HEIs and SMEs. In the US, experience of educators in entrepreneurship is one of the key strength measures for programmes (Kabongo & Mc Kaskey, 2011)
	Preconceived attitude of business community to the university products and professors (Robinson, 2006; Muravyova, 2010).	European universities lack experience, courage and incentives (Wilson, 2008).	Industry is closed for contact itself (American Council in HE, 2011). SMEs aim for survival, not change.
Legal control over resources	Businesses prevent information outflow and avoid changes as sources of risk.	It is unclear how created IP will be divided (Muravyova, 2010).	The issue depends on mutual agreements/interests between/of the parties (Mets et al., 2011).
	Attitude to knowledge differs conceptually: publish Vs keep confidential (Bruneel et al., 2009).	Commercialisation of scientific commons endangers future progress of science (Nelson, 2003).	Entrepreneurship is a profession rather than science; commercialisation and competition are rooted in it (Bennis & O'Toole, 2005).
	Rewards from university to faculty members positively influence spin-off/university technology transfer activities (Link et al., 2006).	A low inventor's share of royalties in universities' TLOs start-ups increase new firm formation (Gregorio & Shane, 2002).	"The higher the perceived benefits, the higher the extent of U-I cooperation carried out" (Davey et al., 2011:11)

Source: devised by the author, 2012

As for the organisational capacity component, if researchers expect money for an accomplishment, like research, they are in the market, and they have to use marketing models and instruments to be successful (Baaken, 2011). Establishment of own science-to-business teams, functional groups, centres or university-based companies (similar to Science|Business and S2B Marketing Research Centre) is suggested (Science|Business, 2011; S2B MRC, 2011). Universities may also explore new collaborative niches, such as consultancy. For example, there is insufficient business training consultants that could assist entrepreneurs in a proactive and rapid way, while professional advisories require long hours (not mentioning costs).

To overcome some obstacles in the entrepreneurial ethos component, the entire entrepreneurship curriculum should be renovated as well as the adjacent teaching methodology, where it has been traditional so far. At the formation stage, this path will be experimental inevitably – trying out a range of approaches so that to make curricula closer to reality: business games, company visits, creativity trainings, student consulting projects, distance learning, self-directed learning, problem-based learning, behavioural simulations, etc., lifelong learning for industry representatives (mutual exchange) (Wilson, 2008, EC, 2009).

A considerable attention should be paid to training and selecting educators, since their entrepreneurial competences determine learning outcomes of trainees/students. To improve the current situation educators who have no or little practical experience in entrepreneurship should be involved into new teachers training programmes (doctoral/professional), cross-border mobility, and testing new communication platforms connecting SMEs and HEIs (Wilson, 2008). At the same time, it is equally important to attract and prepare practitioners for teaching. This includes involvement of entrepreneurs into discussion clubs, mentoring, entrepreneurship curriculums, and creation of the university's own industry network based on informal reciprocity and information exchange (i bid, 2008).

For the sake of stimulating competitiveness, quality of entrepreneurship programmes and increasing state budget revenues, it is necessary to internationalise local higher education (Kozlinska et al., 2012).

Since the validity of incentivisation has been proved, to support the legal control component, companies can be offered tax reliefs, lump sums or similar incentives for participation in industry-based projects (the former can certainly be the government-led initiative) (Mets et al., 2011; Wilson, 2008). Universities, in turn, should introduce a reward system for cross-disciplinary collaboration and spin-offs in a faculty.

4. CONCLUSION

To sup up, this paper contributes to the use of the entrepreneurial university concept, providing classification of the U-I cooperation obstacles with a focus on entrepreneurship education, and can serve as a shortcut to exploration of the topic. The approach presented here – cooperation obstacles viewed through the prism of four pillars of entrepreneurial university – is new and cannot be found in any other sources. The broadened meaning of pillars into external environment let positioning not only education in the domain of entrepreneurship, but also entrepreneurship in the domain of education.

An evident challenge is to turn the obstacles into drivers and benefits. Not all suggestions formulated here can be implemented right away, but the proposed approach can be an input for further research. A logical continuation is an empirical study that would compare viewpoints of students, educators, company management and government officials i.e. core actors within the entrepreneurial ecosystem. Another option is to test how these initiatives can contribute to entrepreneurship programmes in particular, with subsequent managerial implications in both education and entrepreneurship domains. Finally, the U-I cooperation index can be devised and used for ranking entrepreneurial universities in future.

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