Tetřevová, Liběna; Vlčková, Vladimíra

Article

Academic entrepreneurship in the Czech Republic

Academic Entrepreneurship in the Czech Republic

*Liběna TETŘEVOVÁ – Vladimíra VLČKOVÁ**

Abstract

Other than financial and non-financial effects for universities, academic entrepreneurship also generates new thoughts and ideas and allows for transfer of knowledge, leading to creation of inventions and innovations. Thanks to this, academic entrepreneurship represents a source of economic growth and competitiveness and contributes significantly towards sustainable development. This role appears to be especially important from the point of view of post-communist economies which are still to a certain extent transforming. The objective in this study is therefore to assess the level of academic entrepreneurship in one of the post-communist countries – a small economy with a traditional role played by education – the Czech Republic. Data gained via a questionnaire survey, the respondents of which were competent managers from 76 HEIs and faculties working in the Czech Republic, was compared with the relevant international studies.

Keywords: *academic entrepreneurship, higher education institution, knowledge transfer, Czech Republic*

JEL Classification: D83, I23, I25, L14, O39

Introduction

Universities (in general any higher education institutions – HEIs), in their capacity as the top-level centres of education, have a fundamental impact on the economic, social, cultural, technical and scientific development of society. Their contribution towards sustainable development is however inconceivable without creation and application of new, non-traditional approaches, instruments and practices. A phenomenon which has already been developed and discussed for

* Liběna TETŘEVOVÁ, corresponding author – Vladimíra VLČKOVÁ, University of Pardubice, Faculty of Chemical Technology, Department of Economy and Management of Chemical and Foodstuff Industries, Studentská 95, 532 10 Pardubice, Czech Republic; e-mail: libena.tetrevova@upce.cz; vladimira.vlckova@upce.cz

decades in the USA and in developed European countries since the end of the last millennium is that of entrepreneurial universities (Etzkowitz, 2001; Rasmussen and Sørheim, 2006). The reason for this is the fact that universities, in their capacity as a knowledge-producing and disseminating institutions, play an enhanced role in innovation in increasingly knowledge-based societies (Etzkowitz et al., 2000). As stated by Shattock (2009a), entrepreneurialism in higher education „stimulates external collaboration, most notably with industry and commerce, but not exclusively so, and reinforces academic performance by attracting additional resources and widening the research agenda". Thanks to academic entrepreneurship, universities contribute towards the economic growth, competitiveness and sustainable development of the parties involved, but also of individual localities, regions and countries (Audretsch, 2014; Goldstein and Glaser, 2010). Development of academic entrepreneurship is a source of a complex system of benefits and synergies. Knowledge transfer in the direction of enterprises and organisations in other institutional sectors implemented via the academic entrepreneurship activities of academics and researchers at entrepreneurial universities supporting creation of invention and innovation can be regarded as being of fundamental importance. Academic entrepreneurship also results in knowledge transfer in the direction of universities, which creates effective conditions for formation of highly-qualified graduates entering the job market who have at their disposal up-to-date knowledge in the respective sector and who can thus become innovators. We must also not overlook the importance of knowledge transfer from the point of view of improvement of the research activity of universities.

Attention is for example drawn to the need for development of relations between universities and the sphere of practical application on the level of the EU by Communication from the Commission EUROPE 2020 – A strategy for smart, sustainable and inclusive growth or the Council Conclusions on a strategic framework for European cooperation in education and training. The topic in question is however still not included in mainstream research. The studies which have been created to date predominantly sum up qualitative data providing a general overview of the given issue. There is however no detailed study providing quantitative data for more in-depth analysis and offering the possibility of investigation from the point of view of the specifics of post-communist countries, from the point of view of which the issue of academic entrepreneurship is of crucial importance. The objective of the authors of the paper is therefore to evaluate the level of academic entrepreneurship in one of the post-communist countries – the Czech Republic – a small post-communist economy with a traditional role played by education.

1. Theoretical Framework

Academic entrepreneurship is a consequence of the second academic revolution which extended the original missions of universities consisting in teaching and basic research to include a third mission, this being economic and social development (Schmitz, Pierry Teza and de Souza, 2014; Strier and Shechter, 2015). The reality is however that these three functions are mutually intertwined and it is thus expedient to perform their activities in harmony. While implementing the third mission, universities and their subdivisions (faculties and departments) behave a little like small and medium enterprises (Shattock, 2009a). This need not however concern business in the strictly financial sense (Shattock, 2009b). In the given context, Etzkowitz (2003) talks of so-called quasi-firms.

Universities are able to perform many academic entrepreneurship activities. These are understood to mean such activities which surpass the framework of the traditionally conceived duties of academics such as teaching and personal research (Klofsten and Jones-Evans, 2000). This concerns activities which are innovative, linked to a certain degree of risk and certain benefits for academics or their institutions; these benefits may come in a directly financial form or they may exhibit themselves indirectly via an increase in reputation, prestige, influence or societal benefits (Abreu and Grinevich, 2013). Klofsten and Jones-Evans (2000) identified the following eight types of academic entrepreneurship: large scale science projects, contracted research, consulting, patenting and licensing, spin off firms, external teaching, sales and testing. Philpott et al. (2011) built of the typology of these authors, distinguishing between hard and soft entrepreneurial activities. They rank creation of a technology park, spin-off firm formation and patenting and licensing among hard activities. They regard contract research, industry training courses, consulting, grantsmanship, publishing academic results and producing highly qualified graduates as soft activities.

On the basis of the work of these authors and the findings which other authors such as Husarova (2007), Rakovska, Pavlin and Melink (2012) or Tetrevova et al. (2017) have contributed towards development of knowledge in this field, we are able to formulate a modified concept of academic entrepreneurship activities. It is at the same time necessary to consider, among other things, the fact that some of the above-mentioned activities overlap (e.g. grantsmanship and publishing academic results with contract research) and also the fact that in view of the above-mentioned definition of academic entrepreneurship activities, education of students of HEIs cannot be ranked among these activities. In our opinion, we can thus regard not only creation of, but also participation in science and technology parks or business incubators as hard activities. Hard activities may also include creation of or participation in a cluster (Prokop and Stejskal, 2017)

or spin-off firm formation (Jessop, 2017; Neves and Franco, 2018). A typical characteristic of hard activities is that they are linked with creation of separate organisational units. This may concern creation of new cross-organisational or cross-institutional entities (Etzkowitz et al., 2000). No new organisational unit is created in the case of soft entrepreneurial activities; these initiatives usually come in the form of written contracts or even verbal agreements (Tetrevova et al., 2017). We can regard contract research (Barbolla and Corredera, 2009; D'Este and Perkmann, 2011), consulting (Grimpe and Fier, 2009; Todorovic, McNaughton and Guild, 2011) and training courses for external entities (Pahurkar, 2015) as forms of these.

The initiator of academic entrepreneurship may be either the top management of HEIs and faculties, or a specialised unit on the level of the HEI or faculty, e.g. a department for cooperation with the sphere of practical application or a centre for technology transfer (Berbegal-Mirabent, García and Ribeiro-Soriano, 2015; Grimaldi et al., 2011; Muscio, 2009; Siegel and Wright, 2015). Initiation of collaboration with external entities may however also take place in a decentralised manner from the position of individual departments and academics (Grimaldi et al., 2011; Perkman et al., 2013; Muscio, 2009; Rasmussen, Mosey and Wright, 2014).

As regards the level of academic entrepreneurship in the world, the studies which have been performed show a difference between the leaders in this field, these being US universities, e.g. the Stanford University or the Massachusetts Institute of Technology and universities operating in Europe or other countries around the world. We can for example document this state of affairs on the basis of the work of Acs, Audretsch and Strom (2009), who dealt with the topic of academic entrepreneurship at American universities, but also for example at universities operating in Germany or the study by Wong (2011), who focused their attention on academic entrepreneurship in Asia. As regards the level of academic entrepreneurship in European countries, we can document this state of affairs on the basis of work by Klofsten and Jones-Evans (2000) who dealt with academic entrepreneurship in Sweden and Ireland, Husarova (2007) who examined academic entrepreneurship in the Czech Republic, Slovakia, Bulgaria and Italy or Muscio (2009) who evaluated the level of academic entrepreneurship in Italy. Some interesting findings are then provided in particular by the study performed by Rakovska, Pavlin and Melink (2012) who focused their attention on academic entrepreneurship in Bulgaria, Hungary, Poland, Slovenia, Spain and other unspecified EU countries, or Pavlin (2009) who evaluated the level of academic entrepreneurship in Hungary Lithuania, Poland, Slovenia and Turkey. It is evident from these studies that progress has been registered in EU countries in the last decade relating to hard and soft entrepreneurial activities focused

on research and technological development (Rakovska, Pavlin and Melink, 2012). At the same time, implementation of soft entrepreneurial activities is predominant in the majority of monitored European countries, this in particular being in the form of contract research (Muscio, 2009; Klofsten and Jones-Evans, 2000; Rakovska, Pavlin and Melink, 2012). Business centres dominate the field of hard entrepreneurial activities, this in particular being in Poland and Slovenia (Rakovska, Pavlin and Melink, 2012). Use is made in a minimal scope of spin-off firm formation (Muscio, 2009). It is evident from the studies performed to date that initiation of academic entrepreneurship via a specialised unit is dominant in Bulgaria, Hungary, Poland or Slovenia (Rakovska, Pavlin and Melink, 2012) as opposed for example to Italy (Muscio, 2009), where academic entrepreneurship is predominantly initiated by individual academic workers.

2. Data and Methodology

Data was obtained in the form of a questionnaire survey from competent managers of HEIs and faculties operating in the Czech Republic. As at 1 June 2016, there were 24 university and 48 non-university HEIs operating in the Czech Republic. This concerned 26 public HEIs (of which 22 were university institutions comprising 143 faculties and 4 non-university institutions), 2 state-run HEIs (both of a university type comprising 5 faculties) and 44 private HEIs of a non-university type (Ministry of Education, Youth and Sports CZ, 2016). The respondents were chosen due to the fact that in the case of HEIs of a university type, academic entrepreneurship is in fact implemented on the level of the faculties and in the case of HEIs of a non-university type, on a central level. In the case of HEIs of a university type, vice deans for external relations (or cooperation or development) were thus contacted and in the case of HEIs of a non-university type, vice rectors for external relations (or cooperation or development). Several reasons led us to define this sample of respondents. The given vice deans and vice rectors, in their capacity as the top-managers of the faculties and HEIs, have privileged access to all relevant strategic and operational materials relating to academic entrepreneurship at the centres they manage. They participate in or are informed about all negotiations relating to this issue. Last but not least, they have a significant level of knowledge of the academic environment and also experience in fulfilment of the third mission in practice.

Competent managers of all HEIs operating in the Czech Republic were contacted by e-mail with a request that they complete the questionnaire in the Lime-Survey application. A total of 76 completed questionnaires were obtained. The rate of return thus amounted to 39%.

The specialisation of HEIs and faculties operating in the Czech Republic was diverse and so in view of the low representation of individual fields, they were grouped into three groups within the framework of the study presented below. Use was at the same time made of the typology of fields of study created by Biglan (1973) and modified by Kolb (1981). Technical, natural science and medical HEIs and faculties were included in Group 1. Group 2 comprises economic and law HEIs and faculties. Group 3 comprises HEIs and faculties specialising in the humanities, the arts and pedagogy. The characteristics of the structure of the set obtained is evident from Table 1.

T a b l e 1

Structural Characteristics of the Obtained Dataset

Type of HEI from the point of view of		**Absolute and relative frequencies**	**HEIs/faculties**			**Total**
Internal subdivision	Method of financing		Group 1	Group 2	Group 3	
Divided into faculties	Public and state-run HEIs	Frequency	25	16	16	57
		% within method of financing	43.9	28.1	28.1	100
		% within the groups	100	100	100	100
		% of the total	43.9	28.1	28.1	100
Not divided into faculties	Public and state-run HEIs	Frequency	0	0	1	1
		% within method of financing	.0	.0	100	100
		% within the groups	.0	.0	16.7	5.9
		% of the total	.0	.0	5.9	5.9
	Private HEIs	Frequency	3	8	5	16
		% within method of financing	18.8	50.0	31.3	100
		% within the groups	100	100	83.3	94.1
		% of the total	17.6	47.1	29.4	94.1
	Total	Frequency	3	8	6	17
		% within method of financing	17.6	47.1	35.3	100
		% within the groups	100	100	100	100
		% of the total	17.6	47.1	35.3	100
Total	Public and state-run HEIs	Frequency	25	16	17	58
		% within method of financing	43.1	27.6	29.3	100
		% within the groups	89.3	66.7	77.3	78.4
		% of the total	33.8	21.6	23.0	78.4
	Private HEIs	Frequency	3	8	5	16
		% within method of financing	18.8	50.0	31,3	100
		% within the groups	10.7	33.3	22,7	21.6
		% of the total	4.1	10.8	6,8	21.6
	Total	Frequency	28	24	22	74
		% within method of financing	37.8	32.4	29.7	100
		% within the groups	100	100	100	100
		% of the total	37.8	32.4	29.7	100
Missing			2			2.6
Valid			74			97.4
Total			76			100

Source: Authors' calculations.

Data obtained from the questionnaire survey was processed using IBM SPSS Statistics statistical software. Procedures of descriptive and inferential statistics were in particular applied. Use was made of nonparametric tests at a significance level of 0.05. On the basis of findings obtained via literature review and practical experiences both from work in the top management of the faculties of public HEIs and also in development of collaboration with representatives of the non--academic sphere, the presented conclusions and recommendations were formulated in the article.

3. Findings

3.1. Scope of Academic Entrepreneurship

It is evident from the survey performed that all HEIs and faculties operating in the Czech Republic, the managers of which provided information, enter into relations within the framework of their academic entrepreneurship with at least one type of the evaluated six types of economic entities. The evaluated six types of entities were Czech enterprises, foreign enterprises, Czech public institutions, foreign public institutions, Czech non-profit organisations and foreign non-profit organisations. HEIs/faculties most often perform entrepreneurial activity with three entities, whereas the greatest representation is in Group 3 (50% of HEIs/ faculties). Almost a quarter of the evaluated HEIs/faculties perform entrepreneurial activity with all six entities, whereas the greatest representation is of private HEIs (Table 2).

T a b l e 2

Scope of academic entrepreneurship (in %)

Number of categories of economic entities	Frequency of HEIs/faculties	Relative number of HEIs/faculties in the group				
		Public and state-run	Private	Group 1	Group 2	Group 3
1	5.3	3.4	12.5	6.7	8.3	.0
2	9.2	10.3	6.3	3.3	16.7	9.1
3	35.5	34.5	43.8	33.3	25.0	50.0
4	13.2	17.2	.0	10.0	8.3	22.7
5	13.2	17.2	.0	16.7	16.7	4.5
6	23.7	17.2	37.5	30.0	25.0	13.6

Source: Authors' calculations.

It is also evident from the survey performed that within the framework of academic entrepreneurship, HEIs/faculties enter into relations with domestic economic entities to a greater extent: 94.7% with public institutions, 84.2% with enterprises and 72.4% with non-profit organisations. More than half of the HEIs/faculties (59.2%) perform entrepreneurial activity with all three types of

entities on a national level. A third of HEIs/faculties (32.9%) perform activity with two entities whereas a fifth of them (19.7%) do not enter into relations with non-profit organisations and to a lesser extent do not enter into relations with enterprises (11.9%) and with public institutions (1.3%).

As regards relations with foreign entities, approximately half of HEIs/faculties enter into relations with foreign enterprises (55.3%) and foreign public institutions (46.1%). HEIs/faculties enter into relations with foreign non-profit organisations somewhat less (38.2%). Just under a quarter of HEIs/faculties perform entrepreneurial activity on an international level with all three categories of entities (23.7%). 18.4% of HEIs/faculties enter into relations with two types of foreign entities and 31.6% of HEIs/faculties with one type. More than a quarter (26.3%) of HEIs/faculties do not enter into relations with any foreign entities.

3.2. Applied Soft and Hard Entrepreneurial Activities

From the point of view of soft entrepreneurial activities, we examined whether HEIs/faculties operating in the Czech Republic perform academic entrepreneurship in the form of contract research, training courses and consulting. It is evident from the survey performed that academic entrepreneurship in the form of contract research is performed by 78% of the evaluated HEIs/faculties. 75% of the evaluated HEIs/faculties perform academic entrepreneurship in the form of training courses and 74% of HEIs/faculties in the form of consulting.

No statistically significant differences were proven in the scope of use of the evaluated soft entrepreneurial activities from the point of view of variously financed HEIs/faculties on the basis of the Pearson's Chi-square test. A statistically significant difference was however proven in the scope of use of soft entrepreneurial activity in the form of contract research from the point of view of variously specialised HEIs/faculties (asymptotic significance (2-sided) of Pearson's Chi-square test 0.029). This form of academic entrepreneurship is performed more by HEIs/faculties in Group 1.

From the point of view of hard entrepreneurial activities, we examined whether HEIs/faculties operating in the Czech Republic perform academic entrepreneurship in the form of creation of or participation in technology parks, business incubators or clusters and in the form of spin-off firm formation. It is evident from the survey performed that hard entrepreneurial activities are performed to the greatest extent in the form of creation of or participation in business incubators (24% of HEIs/faculties), followed by hard entrepreneurial activities in the form of creation of or participation in technology parks (20% of HEIs/faculties) and in the form of creation of or participation in clusters (20% of HEIs/faculties). Hard entrepreneurial activity is performed in HEIs/faculties

operating in the Czech Republic to the least extent in the form of spin-off firm formation (14% of HEIs/faculties). Pearson's Chi-square test did not prove any statistically significant differences in the scope of use of the evaluated hard entrepreneurial activities either from the point of view of variously financed HEIs/faculties or from the point of view of variously specialised HEIs/faculties.

In the case of hard entrepreneurial activities, respondents evaluated the benefit of these forms of academic entrepreneurship, this being again using the Likert seven-point scale (Table 3).

T a b l e 3

Benefit of Hard Entrepreneurial Activities

Hard activities	Relative frequencies (in %)							Median	Mean
	1	2	3	4	5	6	7		
Creation of or participation in technology parks		3.9	2.6	1.3	3.9	6.6	2.6	5.00	4.69
Creation of or participation in business incubators		2.6	1.3	5.3	3.9	6.6	5.3	5.00	5.05
Creation of or participation in clusters	1.3	1.3	1.3	2.6	6.6	5.3	2.6	5.00	4.81
Spin off firm formation	1.3	2.6	1.3	2.6	3.9	1.3	1.3	4.00	4.00

Source: Authors' calculations.

It is evident from Table 3 that the hard entrepreneurial activities used are most frequently evaluated as being very beneficial or quite beneficial. Hard entrepreneurial activity in the form of creation of or participation in business incubators is evaluated as being the most beneficial. This also concerns hard entrepreneurial activity which is used most by the monitored HEIs/faculties operating in the Czech Republic. Respondents regard spin-off firm formation as the least beneficial hard entrepreneurial activity.

3.3. Entities Initiating Academic Entrepreneurial Activities

Examination was performed within the framework of the study as to which organisational units or entities in HEIs/faculties initiate academic entrepreneurial activities. The respondents chose all relevant units and entities from the offer of possible units and entities which initiate academic entrepreneurship. The offer included a specialised unit of the HEI, HEI management, a specialised unit of the faculty, faculty management, heads of department and individual academic workers; respondents were also able to add other units or entities where applicable. It is evident from the survey performed that these are always initiated by several organisational units or entities. From the point of view of HEIs of a university type, i.e. HEIs subdivided into faculties, academic entrepreneurial activities are most frequently initiated by faculty management (91% of faculties), followed by individual academic workers (86% of faculties), heads of department (82% of

faculties), HEI management (39% of faculties), a specialised unit of the HEI (32% of faculties) and a specialised unit of the faculty (32% of faculties). From the point of view of HEIs of a non-university type, i.e. HEIs not subdivided into faculties, academic entrepreneurial activities are most frequently initiated by HEI management (82% of HEIs), followed by individual academic workers (77% of HEIs), less by heads of department (41% of HEIs) and to the least extent by a specialised unit of the HEI (12% of HEIs).

Pearson's Chi-square test proved statistically significant differences from the point of view of variously financed HEIs/faculties, not from the point of view of variously specialised HEIs/faculties. Academic entrepreneurship is significantly more initiated at public and state-run HEIs/faculties by specialised units of the HEIs, HEI management and heads of department as compared to private HEIs (significance values 0.035, 0.000 and 0.003).

4. Discussion and Conclusion

It is evident from the results of the study that managers of HEIs/faculties operating in the Czech Republic are aware of the role of academic entrepreneurship. All of the evaluated HEIs/faculties perform entrepreneurial activities with at least one institutional type of economic entities. Relations were evaluated with three representatives of institutional sectors – the for-profit sector (enterprises), the non-profit public sector (public institutions) and the third sector (non-profit organisations), this being both on a national and international level. HEIs/faculties operating in the Czech Republic most frequently perform entrepreneurial activity with three of these six categories of entities. Almost a quarter HEIs/faculties perform entrepreneurial activity with all six types of entities. A negative finding is however that HEIs/faculties operating in the Czech Republic perform entrepreneurial activities to a greater extent in relation to domestic economic entities. An alarming finding is that more than a quarter of HEIs/faculties do not enter into a relationship with even one foreign entity. This significantly limits the possibility of establishing Word Class Universities as conceived by the World Bank (Salmi, 2009), but also the possibility of sharing valuable foreign know-how.

In our experience, the reason for orientation towards national partners can first and foremost be regarded as a lack of contacts with suitable foreign partners, often also accompanied by insufficient language skills and ignorance of the local conditions, an issue which is for example also pointed out by Ankrah and Al-Tabbaa (2015). Another reason is the still persisting misgivings of some foreign partners regarding collaboration with HEIs/faculties operating in a post-communist country. These stem from erroneous ideas about the security situation in the country or often justified fears about the environment of corruption which for

example Sandholtz and Taagepera (2005) draw attention to within the context of post-communist countries. Another reason is the often-perceived low prestige of such partnerships from the point of view of partners from western countries.

HEIs/faculties operating in the Czech Republic most frequently enter into contact with Czech public institutions and Czech enterprises within the framework of their academic entrepreneurship.

The fact that HEIs/faculties operating in the Czech Republic cooperate to the greatest extent with Czech public institutions is in particular given by the fact that Czech public institutions are a reliable, very financially secure partner. In our opinion, another reason can be seen in the legitimacy theory (Ankrah and Al-Tabbaa, 2015; Deegan, 2014), in terms of which development of positive relations with public institutions declares the legitimacy of functioning and public support for HEIs/faculties.

In the case of entities in the form of Czech enterprises, we can assume that the reason for development of frequent relations with them is the broad scope of contacts to this type of economic entity, often lasting for decades, supported by a wealth of experience in cooperation with enterprises. In addition to this, partnership with enterprises and its effective communication nowadays positively influences the image and competitiveness of HEIs/faculties, a fact which is among others pointed out for example by Franco and Haase (2015) or Horta (2009).

As regards forms of academic entrepreneurship, HEIs/faculties operating in the Czech Republic, just like European HEIs/faculties, in particular perform soft entrepreneurial activities. Roughly ¾ of HEIs/faculties operating in the Czech Republic perform contract research, training courses and consulting. A positive finding is that contract research is performed in the greatest scope, closely related to the second academic mission and creation of innovation. Rakovska, Pavlin and Melink (2012) or Muscio (2009) also draw attention to its significant representation within the framework of academic entrepreneurship of EU countries. Contract research is however performed significantly more by Group 1 HEIs/faculties (technical, natural science and medical HEIs/faculties). This finding corresponds to the conclusions of Philpott et al. (2011) who refer to the importance of this form of entrepreneurial activities from the point of view of HEIs and faculties with such a specialisation. Our experience has shown that HEIs and faculties in these sectors operating in the Czech Republic have the best premises for performance of academic entrepreneurship, as they create know-how for performance of product and process innovations. From the point of view of external entities, these are perceived as the most valuable in comparison with marketing or organisational innovations (Husarova, 2007; Prokop, Odei and Stejskal, 2018), creation of which may be participated in by HEIs/faculties in Group 2 or Group 3.

A negative finding is that HEIs/faculties operating in the Czech Republic only apply hard entrepreneurial activities in a limited scope. Approximately 20% of HEIs/faculties participate in the activities of technology parks, business incubators or clusters and only 14% of HEIs/faculties perform academic entrepreneurship in the form of spin-off firm formation.

It is also evident from the results of the study that respondents stated the management of the organisational unit which they themselves are part of as the unit which most frequently initiates academic entrepreneurship. In the case of university HEIs, the respondents of which were the respective vice deans, this concerned faculty management. In the case of non-university HEIs, the respondents of which were vice rectors, this concerned HEI management. The question thus is whether their statements are not to a certain extent influenced by their personal involvement in the issue at hand. Though Husarova (2007) also came to the conclusion that the key initiator of academic entrepreneurship is the management of HEIs/faculties.

The second most frequently stated entity initiating academic entrepreneurship both in the case of university and also non-university HEIs were academic workers. Attention is also drawn to their fundamental role by Muscio (2009) who investigated academic entrepreneurship in Italy. The key role of personal contacts and development of cooperation on the lowest level while developing academic entrepreneurship is thus evident. Heads of departments took third place and specialised units of HEIs or faculties came in last. In this case too, the conclusions concur with the conclusions reached by Muscio (2009). The management of HEIs, heads of department and specialised units of HEIs then initiate academic entrepreneurial activities significantly more at public and state-run HEIs in comparison with private HEIs. In our opinion, this fact is influenced by the nature of private HEIs operating in the Czech Republic. Several of these HEIs do not operate as conventional HEIs. This is to say that they employ almost exclusively academic workers of public HEIs as their second job. These workers then concentrate exclusively on ensuring the first mission of HEIs, i.e. teaching.

In conclusion, it can be stated that the academic entrepreneurship of HEIs and faculties operating in the Czech Republic represents a developing activity in the context of European affairs. However, from our point of view, the negative consequences of the different political system dating back to the socialist era still exhibit themselves in a negative manner. Two contradictory factors thus clash here.

The tradition of Czech higher education accompanied by several success stories during fulfilment of the first and second mission contribute towards the development of academic entrepreneurship. The substantial network of personal relations established over the course of decades on a national level also contributes towards development of academic entrepreneurship.

On the other hand, however, development of academic entrepreneurship is hindered by a lack of practical experience with performance of academic entrepreneurial activities and examples of good practice (Ministry of Education, Youth and Sports CZ, 2015), this in particular being while performing activities in the form of relatively new, economically and socially very desirable hard entrepreneurial activities. Another problematic factor is the limited systemic institutional support. Regulatory institutions only declare the need to develop academic entrepreneurship and watch over its implementation within the framework of the accreditation process, but specific measures are lacking (Rakovska, Pavlin and Melink, 2012; Tetrevova and Vlckova, 2018).

First and foremost, elaboration of methodological recommendations specifying procedural processes would contribute towards development of academic entrepreneurship, as would creation of a central information database which would record data about parties interested in collaboration (Ministry of Education, Youth and Sports CZ, 2015). It would also seem expedient to create a high-quality system of motivation, be this on a central level or on the level of individual HEIs and faculties which would, in particular via financial instruments, provide motivation for development of academic entrepreneurism. On a central level the only possible form of support for academic entrepreneurship is for the time being selected operational programmes supported by EU funds, the benefit of which is rated very highly by managers of HEIs and faculties operating in the Czech Republic (Husarova, 2007; Tetrevova and Vlckova, 2018). Adoption of suitable motivational measures is also necessary on the level of individual HEIs/faculties, this in particular being in the form of direct financial rewards awarded for development of individual forms of academic entrepreneurship, differentiated with a view to their importance and benefit for development of HEIs/faculties (Husarova, 2007; Rakovska, Pavlin and Melink, 2012; Tetrevova and Vlckova, 2018).

However, another limiting factor holding back academic entrepreneurship is the administrative demands relating to the high level of bureaucracy in this country which is typical for post-communist countries. The appropriate measures should also be adopted both on the level of the central regulatory bodies and on the level of HEIs. The excessive administration of individual HEIs, requiring the need to repeatedly report all planned, ongoing and past activities, and in the majority of cases also requiring their approval by several bodies of the HEIs, complicate and slow down the process of academic entrepreneurship as well as making it more expensive. In many cases, these administrative demands completely discourage workers at HEIs and faculties from performing academic entrepreneurial activities (Tetrevova and Vlckova, 2018).

As regards academic entrepreneurship of HEIs and faculties operating in the Czech Republic performed on an international level, effective development of academic entrepreneurial activities implemented in relation to foreign entities is prevented in particular by the absent network of high-quality relations developed in particular on a personal basis. Periods of study abroad or meetings at international conferences and workshops could help to develop these contacts (Kahle et al., 2018). At present, teacher mobility and student mobility are contributing towards this significantly, in particular involving students of doctoral study programmes, implemented with the support of the EU within the framework of the Erasmus+ programme. In relation to this, it would seem expedient to focus our attention on broadening of knowledge in this area and the related strengthening of the competences of workers at HEIs and faculties in the field of networking (Tetrevova and Vlckova, 2018). An important role should also be played by sharing of examples of good practice, in particular the practice of foreign HEIs (Knight, 2007).

The originality of the contribution lies in the fact that it provides unique quantitative data indicative of the level of academic entrepreneurship in one of the post-communist countries – the Czech Republic, data which is critically analysed and discussed in a European context. A limiting factor of the article is its focus on one small post-communist economy. Space is however created here for further related studies which would evaluate the given aspects of academic entrepreneurship from the point of view of the V4 or EU28 countries. It would also seem expedient in future to focus attention on evaluation of the financial and non-financial benefits of academic entrepreneurship.

References

ABREU, M. – GRINEVICH, V. (2013): The Nature of Academic Entrepreneurship in the UK: Widening the Focus on Entrepreneurial Activities. Research Policy, *42*, No. 2, pp. 408 – 422.

ACS, Z. J. – AUDRETSCH, D. B. – STROM, R. J. (eds) (2009): Entrepreneurship, Growth, and Public Policy. Cambridge: Cambridge University Press. ISBN 978-0521894920.

ANKRAH, S. N. – AL-TABBAA, O. (2015): Universities-industry Collaboration: A Systematic Review. SSRN Electronic Journal, *31*, No. 3, pp. 387 – 408.

AUDRETSCH, D. B. (2014): From the Entrepreneurial University to the University for the Entrepreneurial Society. The Journal of Technology Transfer, *39*, No. 3, pp. 313 – 321.

BARBOLLA, A. M. B. – CORREDERA, J. R. C. (2009): Critical Factors for Success in University-industry Research Projects. Technology Analysis & Strategic Management, *21*, No. 5, pp. 599 – 616.

BERBEGAL-MIRABENT, J. – GARCÍA, J. L. S. – RIBEIRO-SORIANO, D. E. (2015): University-industry Partnerships for the Provision of R&D Services. Journal of Business Research, *68*, No. 7, pp. 1407 – 1413.

BIGLAN, A. (1973): The Characteristics of Subject Matter in Different Academic Areas. Journal of Applied Psychology, *57*, No. 3, pp. 195 – 203.

D'ESTE, P. – PERKMANN, M. (2011): Why do Academics Engage with Industry? The Entrepreneurial University and Individual Motivations. The Journal of Technology Transfer, *36*, No. 3, pp. 316 – 339.

DEEGAN, C. (2014): An Overview of Legitimacy Theory as Applied within the Social and Environmental Accounting Literature. In: BEBBINGTON, J., UNERMAN, J. and O'DWYER, B. (eds): Sustainability Accounting and Accountability. New York: Routledge, pp. 248 – 272.

ETZKOWITZ, H. (2001): The Second Academic Revolution and the Rise of Entrepreneurial Science. IEEE Technology and Society Magazine, *20*, No. 2, pp. 18 – 29.

ETZKOWITZ, H. (2003): Research Groups as „Quasi-firms": The Invention of the Entrepreneurial University. Research Policy, *32*, No. 1, pp. 109 – 121.

ETZKOWITZ, H. – WEBSTER, A. – GEBHARDT, C. – TERRA, B. R. C. (2000): The Future of the University and the University of the Future: Evolution of Ivory Tower to Entrepreneurial Paradigm. Research Policy, *29*, No. 2, pp. 313 – 330.

FRANCO, M. – HAASE, H. (2015): University-industry Cooperation: Researchers' Motivations and Interaction Channels. Journal of Engineering and Technology Management, *36*, April – June, pp. 41 – 51.

GOLDSTEIN, H. A. – GLASER, K. (2010): Research Universities as Actors in the Governance of Local and Regional Development. The Journal of Technology Transfer, *37*, No. 2, pp. 158 – 174.

GRIMALDI, R. – KENNEY, M. – SIEGEL, D. S. – WRIGHT, M. (2011): 30 Years after Bayh--Dole: Reassessing Academic Entrepreneurship. Research Policy, *40*, No. 8, pp. 1045 – 1057.

GRIMPE, C. – FIER, H. (2009): Informal University Technology Transfer: A Comparison between the United States and Germany. [ZEW Discussion Papers, No. 09-033.] Mannheim: Zentrum für Europäische Wirtschaftsforschung.

HORTA, H. (2009): Global and National Prominent Universities: Internationalization, Competitiveness and the Role of the State. Higher Education, *58*, No. 3, pp. 387 – 405.

HUSAROVA, A. (2007): Analýza potřeb univerzitního managementu, akademiků a zástupců firem a organizací veřejného a neziskového sektoru v oblasti jejich vzájemné spolupráce. [Research Report.] Olomouc: DMD Agency.

JESSOP, B. (2017): Varieties of Academic Capitalism and Entrepreneurial Universities. Higher Education, *73*, No. 6, pp. 853 – 870.

KAHLE, J. – RISCH, K. – WANKE, A. – LANG, D. (2018): Strategic Networking for Sustainability: Lessons Learned from Two Case Studies in Higher Education. Sustainability, *10*, No. 12, pp. 1 – 24.

KLOFSTEN, M. – JONES-EVANS, D. (2000): Comparing Academic Entrepreneurship in Europe – The Case of Sweden and Ireland. Small Business Economics, *14*, No. 4, pp. 299 – 309.

KNIGHT, J. (2007): Internationalization Brings Important Benefits as Well as Risks. International Higher Education, *46*, Winter, pp. 8 – 10.

KOLB, D. A. (1981): Learning Styles and Disciplinary Differences. In: CHICKERING, A. W. (ed.): The Modern American College. San Francisco: Jossey-Bass, pp. 232 – 255.

MINISTRY OF EDUCATION, YOUTH AND SPORTS CZ (2016): List of Tertiary Education Institutions in the Czech Republic. Available at: <http://www.msmt.cz/vzdelavani/vysoke-skolstvi/prehled-vysokych-skol>.

MINISTRY OF EDUCATION, YOUTH AND SPORTS CZ (2015): The Long-Term Intention for the Area of Higher Education Institutions for the Period of 2016 – 2020. Available at: <http://www.msmt.cz/vzdelavani/vysoke-skolstvi/dlouhodoby-zamer>.

MUSCIO, A. (2009): What Drives the University Use of Technology Transfer Offices? Evidence from Italy. The Journal of Technology Transfer, *35*, No. 2, pp. 181 – 202.

NEVES, M. – FRANCO, M. (2018): Academic Spin-off Creation: Barriers and how to overcome them. R&D Management, *48*, No. 5, pp. 505 – 518.

PAHURKAR, R. N. (2015): Creating Entrepreneurs through Entrepreneurial Universities. Management, *5*, No. 2, pp. 48 – 54.

PAVLIN, S. (ed.) (2009): Report on the Qualitative Analysis of Higher Education Institutions and Employers in Five Countries: Development of Competencies in the World of Work and Education. Available at: <http://www.decowe.org/static/uploaded/htmlarea/finalreportshegesco/Qualitative_Analysis_of_HEIs_and_Employers_in_Five_Countries.pdf>.

PERKMANN, M. et al. (2013): Academic Engagement and Commercialization: A Review of the Literature on University-industry Relations. Research Policy, *42*, No. 2, pp. 423 – 442.

PHILPOTT, K. – DOOLEY, L. – O'REILLY, C. – LUPTON, G. (2011): The Entrepreneurial University: Examining the Underlying Academic Tensions. Technovation, *31*, No. 4, pp. 161 – 170.

PROKOP, V. – ODEI, S. A. – STEJSKAL, J. (2018): Propellants of University-Industry-Government Synergy: Comparative Study of Czech and Slovak Manufacturing Industries. Ekonomický časopis/Journal of Economics, *66*, No. 10, pp. 987 – 1001.

PROKOP, V. – STEJSKAL, J. (2017): Different Approaches to Managing Innovation Activities: An Analysis of Strong, Moderate, and Modest Innovators. Inžinerinė ekonomika – Engineering Economics, *28*, No. 1, pp. 47 – 55.

RAKOVSKA, N. – PAVLIN, S. – MELINK, M. (eds) (2012): Assessment of Corporation between Higher Education Institutions and Employers in Europe. Available at: <https://www.eurashe.eu/library/mission-phe/EMCOSU_Assessment%20of%20cooperation%20between%20higher%20education%20institutions%20and%20employers%20in%20Europe%20-%20WP4%20Report.pdf>.

RASMUSSEN, E. A. – MOSEY, S. – WRIGHT, M. (2014): The Influence of University Departments on the Evolution of Entrepreneurial Competencies in Spin-off Ventures. Research Policy, *43*, No. 1, pp. 92 – 106.

RASMUSSEN, E. A. – SØRHEIM, R. (2006): Action-based Entrepreneurship Education. Technovation, *26*, No. 2, pp. 185 – 194.

SALMI, J. (2009): The Challenge of Establishing World-Class Universities. Washington, DC: The World Bank.

SANDHOLTZ, W. – TAAGEPERA, R. (2005): Corruption, Culture, and Communism. International Review of Sociology, *15*, No. 1, pp. 109 – 131.

SCHMITZ, A. – PIERRY TEZA, G. A. D. – DE SOUZA, J. A. (2014): Universities as Knowledge Intensive Business Services – A Systematic Literature Review and a Case Study of a Research Group. International Journal of Engineering and Innovative Technology, *3*, No. 7, pp. 40 – 47.

SHATTOCK, M. (2009a): Entrepreneurialism and Organizational Change in Higher Education. In: SHATTOCK, M. (ed.): Entrepreneurialism in Universities and the Knowledge Economy. Maidenhead: McGraw-Hill, pp. 1 – 8.

SHATTOCK, M. (2009b): Research, Technology, and Knowledge Transfer. In: SHATTOCK, M. (ed.): Entrepreneurialism in Universities and the Knowledge Economy. Maidenhead: McGraw-Hill, pp. 33 – 48.

SIEGEL, D. S. – WRIGHT, M. (2015): Academic Entrepreneurship: Time for a Rethink? [ERC Research Paper, No. 32.] Coventry: Enterprise Research Centre.

STRIER, R. – SHECHTER, D. (2015): Visualizing Access: Knowledge Development in University – Community Partnerships. Higher Education, *71*, No. 3, pp. 343 – 359.

TETREVOVA, L. et al. (2017): Společenská odpovědnost firem společensky citlivých odvětví. Prague: Grada Publishing. ISBN 978-80-271-0285-3.

TETREVOVA, L. – VLCKOVA, V. (2018): Benefits, Limitations and Measures Concerning the Development of Cooperation between Higher Education Institutions and External Entities. Tertiary Education and Management, *24*, No. 4, pp. 377 – 394.

TODOROVIC, Z. W. – MCNAUGHTON, R. B. – GUILD, P. (2011): ENTRE-U: An Entrepreneurial Orientation Scale for Universities. Technovation, *31*, No. 2, pp. 128 – 137.

WONG, P. K. (ed.) (2011): Academic Entrepreneurship in Asia: The Role and Impact of Universities in National Innovation Systems. Cheltenham: Edward Elgar Publishing. ISBN 978-1-84980-307-6.