Notions of entrepreneurial university: some European models

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Abstract

The goal of this paper is to present a conceptual framework for analyzing interactions between universities and local companies aimed to fulfil the third mission of universities. The framework focuses on the university-firm interactions Europe wide and targets to reveal country specifics in order to define the different notes of entrepreneurial university. Country based benchmarks can provide critical inputs to the theoretical and empirical related contribution in the topic of operation of entrepreneurial universities. Fulfilling the third mission can be more efficient and better determined in the European or global era if details of entrepreneurial university's operations are under continuous analysis. Author first revisit the latest related literature, then methodological discussion continues with representing empirical data and steps and phases of data analysis, which follows the logic of grounded theory building process. Among the two determined research categories of the paper – institutional relations and university-firm interactions data hubs are represented from case studies and data with data analysis leads to consequences in topics of differences in university roles, sustainability of each partnerships and level of diversification in the industry. Papers contribution to the literature is summarized along these dimensions.

Keywords: Entrepreneurial University, Grounded Theory, Knowledge, University-firm interactions, Europe

Methodological discussion

The concept of grounded theory allows a systematized data collection, which is suitable for theory creating and coding with empirically valid findings (Martin and Turner 1986). Grounded theory's method gives a constant comparative way of scientific activity, which accepts qualitative, quantitative and hybrid data collection from case studies as well (Glaser 1998). Regular comparison and continuous data collection is a conscious or not conscious background of many researchers in sociology long time ago. Grounded theory functions as guideline in case studies is tested by Fernández (2004) in field of IS research.

Theoretical framework

Applying case studies surrounded by grounded theory method is rarely used in field of entrepreneurial universities' research. Despite of the fact, that significant part of the entrepreneurial university's or university-firm linkages' literature is case-based. The study has a basic standpoint, that the theoretical saturation of entrepreneurial universities is not high, so theoretical sampling can be implemented in the collected data. The paper starts with short literature review supporting these statements. Cunningham and O'Reilly (2018) collects the macro, meso and micro perspectives of technology transfer. Motivated by this, the paper follows the logic of external and internal influencing categories and calls "institutional relations" as external influencing category, widely beginning with the historical background. Internal influencing category is called "university-firm interactions", which covers the personal relationships, but also special processes of knowledge transfer in each institution.

From external point of view, "institutional relations" is the first highlighted influencing category of the paper. Mascarenhas et al. (2017) gives a comprehensive literature review about the study of entrepreneurial universities from 1900 to nowadays. Slaughter (1997) focuses on the effects of policy changes on the corporatization process of universities. This gives the highlighted observation of the paper, that in European terms contiguously corporatized universities are keen on the changes of the economic history. Policy tools and legislation supports technology transfer at national level focusing on regions or different industries (Rothwell and Dodgson 1992, Worell et al. 2001). The given national economic environments on time frame provide different institutional backgrounds, which effects relations of universities. Tseng et al. (2018) investigates the effects of the governmental and the industrial funding of university-firm collaborations on the technology performance in Taiwan. Different innovation climate within universities support diverse funding of collaborations. Fekete (2018) represents different university roles in local governance of a post-socialist case. Filipetti and Savona (2017) focusing on different level of academic engagement and explores the barriers of university-firm linkages. These are the incentives and behaviors of individual academic entrepreneurs; the firms' barriers to cooperation with public research institutions; and the individual behaviors, incentives and organizational bottlenecks in late developing countries. This paper considers the last two ones as data hubs, with the reason that research method of behaviors of individual academic entrepreneurs varies from data analysis presented here. Firms' barriers with public research institutions can is described here with highlighted data. Individual

behaviors, incentives and organizational bottlenecks in late developing countries are presented in the related institutional background of the analyzed countries.

From internal point of view influencing category of the paper is called the "university-firm interactions". Among the different goals of the interactions Fichter and Tieman (2018) name sustainability and hold it as general value of all the interactions. Sustainability should be addressed in higher education system is functioning as basic view for nowadays. Arza and Carattoli (2017) analyze the social ties, actors and specific aspects in an Argentinian case. Valuable finding is that stronger ties serves the knowledge benefits of the analyzed university and weaker ties provides the financial benefits through university services.

Based on the above summarized literature two category were named in the paper Category1 is institutional relations. Category2 named by the author is the university firm interactions. Service placement and types, differentiation from educational services and availability of them is well represented in the progressed case researches. Among these aspects country-based benchmarks can provide critical inputs to the theoretical and empirical related contribution in the topic of operation of entrepreneurial universities.

Empirical Data

Data used in this paper is originated from a comprehensive research process ended up and stepped into dissemination period in the past years. Fekete (2015) collected and described new regional development methods in a research project, in which framework information from structured interviews, institutional documents, other public platforms and cooperation processes have been collected and analyzed in 19 cities of 9 European countries. Operation of universities and their relational networks was significant base on the case researches. This information base gives the data input being used in this paper mainly. Other information sources are literature and other publicized information on university or local governments' website providing valuable data for the object of this paper. Through data collection and analysis represented in Figure 1 from the above summarized literature two category were named in the paper Category1 is institutional relations. Beside this historical background as introduction is represented. The analyzed countries have different evolution of present political systems i.e. Central and Eastern European countries' case. Beside universities the role of governmental and non-governmental institutions is progressed in the paper in the framework of coordinative institutions. Industry is the last element of the Category. Category2 named by the author is the university firm interactions. Beside the number of formalized ones, service placement and

types, differentiation from classical educational services and availability of them is well represented in the progressed case researches.

Paper attempts to progress case researches' information referring to R+D+I. There are relations between each elements of categories, which are highlighted in the conclusions. Finally, paper determines the country specifics based on logic of the previously represented literature.

Categories	Data hubs	Collection	Methods
1. Institutional relations	Historical background	case researches, structured interviews and literature	Progression of information in RDI cooperation. Observing relations between the two categories. Determination of country specifics: - Differences in university roles. - Level of diversification from the industries. - Level of sustainability.
	Coordinative institutions		
	Industry		
2. University-firm interactions	Service placement	case researches, structured interviews and university websites	
	Services		
	Differentiation from educational services		
	Nr. of formalized interaction.		
	Contact details		

Figure1-Data collection and analysis

Analysis

As methodological discussion represents, analysis in this paper follows the logic of the grounded theory building process.

Fundamental components of grounded theory study is collected by Sbaraini et al. (2011). Paper highlights the following criteria, on which the data analysis is related.

- Coding is based on a process of breaking data down into much smaller components and labelling those components. Data comparison is data with data, case with case, event with event, code with code, to understand and explain variation in the data. Codes are eventually combined and related to one another - at this stage they are more abstract and are referred to as categories or concepts.

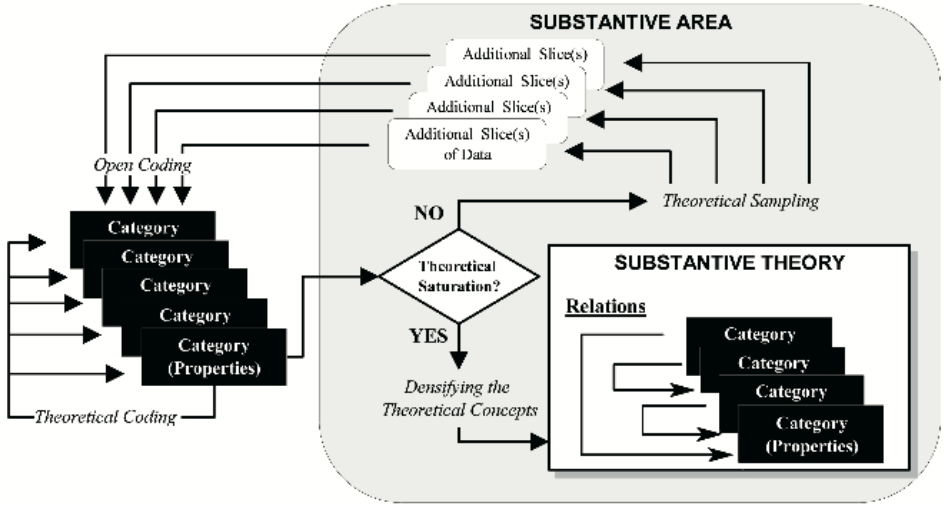

Figure2 – Grounded theory's building process (Fernández, 2005 based on Lehmann, 2001)

Additional slices followed by the paper, in harmony with Lehmann's (2001) process of building grounded theory *(Figure 2).* Analysis focuses on cases of European universities located in middle sized cities, where automotive industry dominates. Basic case of the analysis is the Hungarian case. By processing this case categories (institutional relations, university-firm interactions) are defined, which gives the requirement of sampling for the next cases. To these categories data hubs are linked. These are based on research materials of Fekete (2015) and other available actual sources connected. Paper highlights the contribution or relation the other cases to the basic case. Thus, areas of the substantive theory are presented as the synthesis of the paper.

Conclusions

Through this method there are areas in the paper, which are unifies by the author. There are trends in areas of knowledge transfer in entrepreneurial universities, quality of services provided by them and their functions in partnerships, which are differ from each other in Western Europe and Central and Eastern Europe. Author attempts to define sub models beside these two side of trends and so to clarify the notions of entrepreneurial universities in the analyzed country groups.

Basic Case: Széchenyi István University – Győr, Hungary

Significant historical input in Hungary's case is the regime change and the start of the market economy. There is a current, Europe-wide measurement that classifies Hungary as a group of countries that imitate innovation (Capello 2014). This may be due to the fact that the Hungarian economy, especially in rural areas, is mostly based on manufacturing. In the case of

large companies, developments are often in other headquarters located in other countries. Concerning that the old regime has passed only thirty years ago, there are several development processes, which shows the roots of sustainable knowledge-based economy. As a basic case a very dynamically town was chosen with a relatively young university, founded in 1968, but getting the rank of university in 2002. Győr with is surrounding is one of the most dynamically developing regions of Hungary - the Western-Transdanubian region. It should be noted that in the beginning of the 2010s significant investments in vehicles were started from both national economy and foreign direct investment. As a consequence, the amount of funds spent on the acquisition and upgrading of tangible assets increased significantly during this period. Thus, in terms of the per capita investment in 2011, ahead of Central Hungary – the capital region of Hungary. In 2013, the growth of retail sales in this region was the most significant. Western Transdanubia is one of the regions in which the organizational share of industry is significant. With respect to foreign investment per capita, the region is on the same level as the capital region with the range of EUR 10-12 thousand per person. This is well above the Hungarian average, which is EUR 5,7 thousand per person. The export per import ratio of industrial production is highest in the Western Transdanubia region with an 85.6% export level. At the same time, in terms of R & D expenditures as a percentage of GDP, the region represents lower values, at a level with the Northern Hungarian region (0.6%). The R & D staff, however, grew most dynamically, showing a 18% increase over the previous year's figure (KSH 2015). Concerning the university, there is no university-firm related service placement on the website. There are several projects which are visible locally. First and biggest is the Audi Hungaria Faculty of Automotive Engineering as biggest formation of cooperation of the university and its biggest global partner. There are many development projects, but on the website, we cannot find their summarized goals-the fields of cooperation or collected activities. Consequently, there is no differentiation in educational and university-firm services (Uni-Győr 2018). Based on information of the case research there is a preparation process of a cooperation center of higher education and industry in which well managed desk research introduces the real, need-based cooperation actions. Time frame for that is 2020 and there are three research groups on the university dealing with this preparation.

Case2.: University of Bremen – Bremen, Germany

Due to its history University of Bremen can be paralleled by the Széchenyi István University. Referring to industry the researched town is a port point and trading town with strong representativeness in vehicle industry. Science industry represents itself in the city marketing very strongly. There is transparent service placement in this case. The website of the

University of Bremen introduces higher education and industrial co-operation activities (Uni-Bremen 2018) in the "Information for Enterprises" section. Services are grouped along the following areas: knowledge and technology transfer; special training opportunities; employment and recruitment; hire opportunity of university infrastructure, university services; marketing services through the university; university as a client. The above listed opportunities are formalized in sub menus and all of them have contact representative of the university. Differentiation from educational services is clearly visible in this case, but formalized partnerships are not represented in this point. Information to this was given on the interview and there are several research projects on faculty's websites, which refers to these relations.

Case3.: University of Rennes – Rennes, France

Examined city of France is Rennes. Industry of the town is dominated by automotive sector. Citroen represents itself since 1961 mainly due to the cheaper working force in primer sector compared to the capital region of France. According to history institutionalized educational-industrial co-operation has already been carried out in the operation of primary and secondary education institutions, academies. Businesses and academies enter into collaborative contracts, which schedule specific activities and programs that are beneficial to both parties. In France, this is a long-running, well-established system. Educational institutions have the opportunity to form a workforce that meets the expectations. Companies can comment on the education, make suggestions and contribute to ensure that training is in the right direction. Flagship services are as follows: regular information and joint consultation, informing young generation, special cooperation led by companies and educational institutions. Concerning to the University of Rennes "entrepreneurship, industrial partnership" is available as sub menu on the website (Uni-Rennes 2018). Contents have the following points: student entrepreneurship, foundation and different departments dealing with industrial and business activities. In this case, these university departments are like separated institutions taking care of all the university's business activities. Beside this separated budget allows them to manage the financial and administrative aspects for the research results. There is one contact way without name on the website and several news about formalized cooperation. Based on this differentiation from educational services has lower level.

Case4.: University of Poznan – Poznan, Poland

Similarly to the basic case, the country has changed its regime and started the market-based economy from 1990. Connected to the European Union in the same year as Hungary. Poznan is a typical city of automotive industry. Dominating formalized industrial-higher education cooperation can be observed in Poznan. The Volkswagen factory is most directly

linked to Poznan Technical University at the national level. Elements of cooperation: joint research and development projects; joint lectures and workshops organized at the university; internships, trainees and doctoral programs; grants; courses; professional events organized by business researchers and executives; science centers. The operation of science centers is closely linked to higher education is based on methods to facilitate understanding. Science centers are institutions of higher education and industry cooperation that adapt to the profile of development areas (automotive, IT, medicine, etc.). In several cases, state or local government-based centers. Their overall task is to provide community services tailored to local industrial needs. Their overall goal is to increase the competitiveness of development. The following activities are related to higher education and industrial cooperation: Communicating and organizing the services provided by higher education to economic actors and society; presentation of the innovation results of the region on transparent way; introducing and communicating the upcoming disciplines in higher education; wider dissemination of academic achievements with the goal to explain science the local society on understandable way; providing career guidance and career guidance services (e.g. organizing company visits for graduate students) in order to bring local labor supply and demand closer together in the longer term; expand the social and public relations of the higher education institution; there are seven Science Centers in Poland with different profiles. After the above observation a hypothesis created itself: Poznan University of Technology as the biggest one in the town can give representative case about these links. After analyzing the available publicized data, Science Centers are mentioned as financing institutions by different project. There is no university-firm service placement on the website. Research and development projects have a short description and contact detail (Uni-Poznan 2018).

In terms of contribution related to theory, application of grounded theory method is appropriate for the synthetization in country specifics and recovering notions of entrepreneurial university. Thus, paper contributes to the logic of existing literature, focusing on entrepreneurial transformations of universities (e.g. Clark 1998). Regarding empirical relevance, recovered country specifics of entrepreneurial universities contributes to the efficient enrichment of third mission.

Countries/Specifics	Basic case and Case3	Case1 and Case2
Role of university	High level of representing and highlighting one cooperative partner, low level of managed cooperation systems	High level of managed industrial partnerships, but low level of representing formalized, highlighted partners.
Sustainability	High	Low
Diversification	Low	High

Figure3- Classification of the four cases according to Category1 and Category2 – Country specifics of entrepreneurial universities

Concerning country specifics, it can be seen in Germany that in this case there is a centralized university-firm cooperation phenomenon at the university. The advantage is that companies interested in the university can find institutionally what they are interested in. The service character of the university was formed as service department. In the case of France, the role of academies implemented to secondary education is highlighted by the paper. System of academies is a well-built knowledge transforming field. The educational institutions become involved already on lower level, thus this may have the advantage that the entrepreneurial middle-school system prepares the stakeholders to university level. Academies call on businesses, they are the initiators who can choose through the academies which institution they want to build a collaboration platform. Services found at the university can be regarded as centralized. For Germany and France, there are formalized platforms at universities, where extensive partnership dominates. In case of Hungary there are no centralized co-operations managed or otherwise named within the university but formalized platform is under preparation. In the case of Poland management of university services is delegated to the Science Centers. Going back to Arza and Carattoli (2017) finding is that stronger ties serves the knowledge benefits of the analyzed university and weaker ties provides the financial benefits through university services. In these cases knowledge benefits can be advantageous.

Concerning to sustainability stronger ties can be realized in case of Hungary and Poland with the global firms. In the other cases broader ties are represented parallel to Arza and Carattoli (2017) finding again.

Level of diversification in the industries shapes opposite way. In case of stronger ties, there are smaller chance to diverse from automotive industry. Having the tools and platforms of the management of broader ties serves bigger opportunity to diversify toward other industries.

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