

Supporting mechanisms in European University-Business Collaboration

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Abstract. Despite the high innovation potential for universities to play a leading function in regional development, there is an increasing identification of supporting university-business ecosystem. European universities include different types of higher education institutions. Each institution received some sort of external support and extra funding for the application their development and implementation for successful selection at European level. To broaden understanding of cooperation activities, we tried to identify main supporting mechanisms in European success stories. Good practice case studies shared across the institutions are necessary for further observation. In the context of university-business collaboration, this article studies supporting mechanisms which can improve linkages between universities and business. With a sample of 42 case studies, we identified a dominant supporting mechanism in European regions and mutual differences between mechanisms. The main results highlight the relevance of the combination of more than one supporting mechanism which lead to more competitive society and knowledge-based economy.

Keywords: university-business collaboration, supporting mechanisms, innovation, higher education, Europe

JEL classification: I23, O38

1 Introduction

University-business collaboration (UBC) refers to the interactions between any parts of the higher educational ecosystem represents by universities and business through knowledge and technology transfer [3, 10]. Increasingly perceived as a vehicle to improve innovation through knowledge exchange [2]. UBC may have an overall positive influence based on knowledge and technology transfer, especially a strengthening of the regional and national economy and the development of the region

the country themselves [6] and presents a key innovation strategy for sustainable economic growth [31]. The benefits of university-business linkages may be wide-reaching: they can help stimulate additional private R&D investment, they can coordinate R&D agendas and avoid duplications or utilize synergies and complementarities of scientific and technological capabilities [19].

In 2000, the continued significance of academic knowledge for regional economic initiatives was identified by the European Council's Lisbon Strategy [37] which encouraged universities to develop their technology transfer policies and offices to create and diffuse academic knowledge. Strategy Europe 2020 targets smart growth through strengthening the relations between research institutions and industries. Cross-national programs such as Horizon 2020 by the European Commission [11] or OECD New Evidence and Policy Options [30] emphasize the idea of collaboration between public and private sectors to improve innovation performance, generate jobs and better quality of life. Supporting mechanisms need to be put in place to encourage and support cooperation. They should aim to help reduce or eliminate the largest barriers, offers facilitators, and provide incentives that reward universities and business to undertake the activity. This can include creating new policies, strategies, activities, and structures [13].

The purpose of this paper is identified main supporting mechanisms in university-business linkages of good practice case studies across the Europe. In the first section of this article, we examine position of supporting mechanisms in UBC based on literature and introduce our methodological approach. The main aim is a comparative analysis of documents from European Commission (EC) and present the findings related to the supporting mechanisms UBC.

2 Theoretical Framework

The technology transfer industry has become established particularly in the USA in the last 40 years. It has grown as an outcome of legal changes arising from enactment of the Bayh–Dole Act which gave universities ownership of their research outputs [9]. Europe has called for own European Bayh Dole Act that involves one single patent system with uniform validity [13]. Given that human nature is generally characterized by resistance to change [4, 34], the supporting mechanisms aim to change the culture of higher educational institutions (HEIs) [25] and bridge cultural differences between universities and businesses.

The literature shows that support mechanisms are used in number of key areas of UBC. Supporting mechanisms need to be aligned with the culture and mission that facilitating UBC through the fast development of dedicated strategies [38]. The absence of supporting mechanisms causes that UBC remains isolated and a rare activity only reliant on the whims of those individuals willing to engage in collaboration. Furthermore, they are expected to link and connect all levels of the institutions. Taking on the additional task of developing support mechanisms and implementing processes, it requires the university to transform into an institution in which university-business linkages are encouraged, supported and fostered for all relevant stakeholders in regional

development [1]. Location of the HEIs might also relate with the development of UBC. Several international studies point to a differences between countries [7, 23, 24], with a great diversity environment that can support and/or inhibit UBC [17]. Authors in their articles present many instruments and activities for technology transfer provide by HEIs, business sector and government. Academics are increasingly interested in bridging the separate worlds of academia and business despite managing the balance between academic and entrepreneurial activities, [9]. The structural dimension interest for UBC which focused mainly on the commercialization areas of collaboration including patents, licenses, spin-offs, involving primarily a unidirectional flows of knowledge economy [8, 16]. Research on support mechanisms is typically in the middle of the mechanisms supporting the transfer of technologies, such as technology transfer offices and university incubators [35].

At the strategic level, the management of the support HEIs and incentives are properly identified, while the operational level includes the management of UBC offices and promote organizational strategies. Strategic mechanisms promote the new third mission by creating and implementing strategies to support and stimulate UBC activities includes establishing long-term strategies and an inclusive strategic approaches directed at business interaction [8, 20, 38]. For instance, Phan and Siegel [33] found that the most startups generated by HEIs are those that establish well-defined and clear extend strategies. A mechanism used in top management to institutionalize the importance of UBC is the presence of people in business on the HEIs board and the presence of academics on company boards. The HEIs guarantee that with these mechanisms their education and research is going to remain relevant for the society. Operational mechanisms in UBC present one of the most common ways of promoting UBC at the highest level of the institution [15, 27, 36], which emphasize the desired behavior [8, 18]. HEIs give attention to UBC topics in the media inside the HEI and in their respective regions or countries with awards or special events in order to stimulate an innovation environment that support UBC. Some HEIs also promote business and managerial cultures, skills and abilities amongst researchers and students through workshops to improve their chances of successful valorization [26]. The main advantage of operational mechanisms is predominantly the lowest cost, the easiest and quickest to set up [7] because they can be established by stakeholders within the HEI: management and faculty level, or at the individual program, academic or student level.

The using of governance mechanisms aims at mitigating risks of opportunistic behavior and coordinating resources [5, 22], because of governments serve to avoid dysfunctionalities, predominantly in the context of collaboration and integration complementary to the competencies of the cooperating partners [39]. Policy mechanisms can be classified as: economic and financial mechanisms, regulation mechanisms and other policy mechanisms that do not belong to either of the first two categories. Governments provide various conditions, such as – giving a space for UBC strategic mechanisms to creating and involving the establishment of structural mechanisms (e.g., creation of a knowledge transfer center) that can initiate the development of operational mechanisms (e.g., UBC workshops for academics) [13]. Therefore, heterogeneous regional and national research programs have been initiated by governments (e.g., Vinnova – Swedish government agency for innovation policy

which promotes sustainable growth by funding research). Governments have been compelled by the global changes in the competitive and technological challenges to take actions to support research interactions between the two actors. Governments believe that universities could aid in long-term economic regeneration [28, 32].

3 Methodology

In the article, we applied qualitative research to provide responsible results. Our qualitative research started with a review of literature emphasizes the the importance of university-business collaboration and supporting mechanisms which need to be put in place to support and sustain cooperation.

We used a document analysis as a data source in our qualitative research. Furthermore, we evaluated electronic documents – case studies which represent single success stories in university-business collaboration in European regions. These documents offer a rich descriptions and background information which help us to understand other insights.

In the next part, based on previous qualitative research, we analyzed 42 case studies which were published by EC. Each study illustrates example of good practice in university-business collaboration including case studies focusing on different activities [12]. Our research outcome represents 26 European countries which was selected into four European regions (number represent case study quantity by region) (Table 1) – Northern Europe (11), Western Europe (11), Eastern Europe (10) and Southern Europe (10). Countries which were considered for case study selection were current members of the European Union (EU) or those committed to the EU economy as member of the European economic Area (EEA) by the end of year 2018.

Table 1. Classification of countries

REGION	COUNTRIES	NO. OF COUNTRIES IN REGION	NO. OF CASE STUDIES
NORTHERN EUROPE	SWEDEN, FINLAND, DENMARK, NORWAY, ICELAND, IRELAND, UNITED KINGDOM	7	11
WESTERN EUROPE	BELGIUM, NETHERLANDS, GERMANY, FRANCE, AUSTRIA	5	11
EASTERN EUROPE	HUNGARY, SLOVAKIA, POLAND, CZECH REPUBLIC, SLOVENIA, LATVIA, ESTONIA, LITHUANIA	8	10
SOUTHERN EUROPE	PORTUGAL, SPAIN, ITALY, GREECE, CROATIA, MALTA	6	10

Source: Own elaboration based on the case studies [12]

In each case study we have identified four types of supporting mechanisms between HEIs and business which have been used. Related to the central question of the research, we organized information into categories for further quantitative analysis

(Table 2). HEIs represents all types of institutions, which offer higher education, but must be formally recognized by the suitable national/regional authority. The concept of supporting mechanisms includes strategic, structural, operational and policy conditions as we can see in Table 2. The main aim was to find out which of these mechanisms is the most efficient or most frequently used.

Table 2. Four types of supporting mechanisms

TYPE OF MECHANISM	POLICY	STRATEGIC	STRUCTURAL	OPERATIONAL
REPRESENT BY	funding and regulations, organizations/information created by regional/national/international governments	drafting and implementation of high-level plans/methods/series	constructions, personnel, and institutional programs	actions or events of a practical nature
THE MAIN AIM	maximizing economic performance, welfare, or other policy objectives with focus on or relation to UBC	HEIs that will enable it to achieve its long-term objectives with respect to UBC	created a strategic decision within/related to a HEI that enable UBC	undertaken by a HEIs to create and support UBC
RESPONSIBILITY	governments	HEIs	regional agencies, governments, HEIs, business	regional agencies governments, HEIs, business

Source: Own elaboration based on the case studies [12]

4 Results

As we have shown in previous section, we have analyzed 42 good practices case studies from 26 European countries. Good practices case studies are one of main components of the project „The state of University-Business Cooperation in Europe” which have been conducted during years 2016-2018 by a consortium of Science to Business Marketing Research Centre in Germany for the Education and Culture. These documents were created on institutional level and systematically provide information from its establishment, through educational mission development and building institutional relationships to the present. The project studied the state of UBC in different European countries via more factors like objectives and motivations, stakeholders, barriers, and drivers, supporting mechanisms, activities and key success factors or future challenges. We chose supporting mechanisms due to their importance in overall success of UBC.

The paper provided insights from the support UBC in Europe in four case study regions: Northern Europe, Eastern Europe, Western Europe, and Southern Europe. Most of the regions generated a positive impact in terms of supporting mechanisms both for HEIs and business sector. Territorial dimension of supporting mechanisms is characterized by complex of 10 or 11 studies in each region. In general, there is a dominance of structural supporting mechanisms in all four regions (see Fig. 1.).

In Northern and Western Europe, case studies illustrate a dominance of both structural and operational mechanisms. Universities in Denmark, Finland, Sweden and Norway are leading universities in Europe because of their innovation potential which show results of European Innovation Scoreboard [14]. They provide plenty activities lead to maximize the commercialization of technologies develop by researchers and students. Such as created technology transfer offices and innovation hubs (e.g., Skylab at Technical university of Denmark or Hothouse on Dublin Institute of Technology), entrepreneurial education improves job market perspectives and job performance for students. The character of using supporting mechanisms was slightly different in Southern and Eastern Europe. In these regions, we can see still dominant structural mechanisms, but a mix of other three mechanisms too. Case studies from Eastern Europe provide mainly collaboration between HEIs and big industrial manufactures like Audi, Gorenje, Kolektor Group, GroGlass.

Generally, 90 % studies used more than one supporting mechanism. The combination of mechanisms in multiple ways is useful in removing barriers. As illustrated in Fig. 1., 83 % of all case studies (it represents 35 case studies) have been used structural, 59 % operational, 28 % strategic and 14 % policy supporting mechanisms.

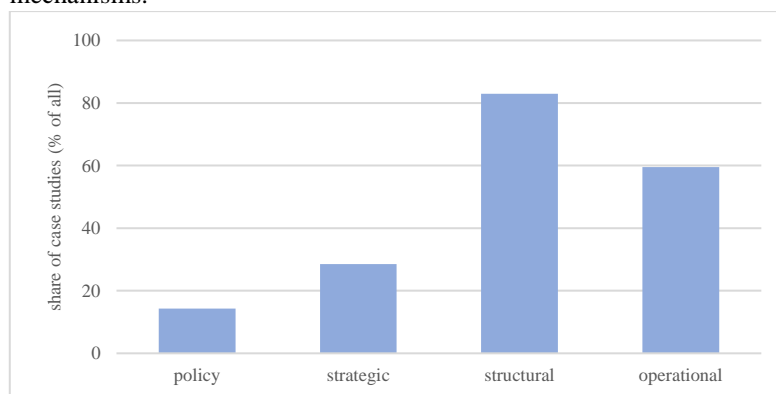


Fig. 1. Analysis of supporting mechanisms used in case studies

Source: Own elaboration based on the case studies [12]

Structural mechanisms were the most applied in every region of Europe (Fig. 2). This type of mechanism consists of activities in the field of bridging structures, infrastructure, employability, career services and external integration structures. It is the most common mechanism because of cooperation more actors like universities, government, and business too. Bridging structures representing technology transfer offices, innovation, or industry liaison offices. Likewise, career offices and alumni networks structures are very helpful for students and graduates. However, infrastructure like science parks, incubators and co-working space can be expensive, but necessary for external integration and cooperation with partners. Good example is the University of Twente (UT) in the Netherlands. The key mechanism in this case is the Kennispark Twente and its Foundation, which join initiative of local stakeholders. Together, they

are drivers behind regional innovation and sustainable growth in the Twente region. Their collaborative activities have led to over 100 new start-ups per year on average. Other recent mechanisms are the establishment of three investment funds – The Twente Technology Fund, Innovation Industries and The Dutch Student Investment Fund. Twente's entrepreneurial ecosystem has been very attractive for foreign investors, but the UT spin-offs account 10 % of the fastest growing high-tech companies in the Benelux region. On the other hand, two of the barriers is underdeveloped investment climate and limited proportion of new jobs in the Twente region that require higher or medium levels of education [13].

Furthermore, operational mechanisms were on second stage. They present academic and student network dedicated to UBC and external communication. In most universities is offered entrepreneurial courses for students and academics, information sessions and forums too. HEIs with high development of UBC apply a set of mechanisms at both operational and structural level simultaneously (Fig. 2.). For instance, at the Athens University of Economics and Business (AUEB), there is an important operational instrument, designed program of education and entrepreneurship development with input of industry consultants and practitioners – The Innovation Design and Entrepreneurial Action (IDEA) programme developed by the Athens Centre for Entrepreneurship and Innovation (ACEin). It uses project model based on open innovation to help and assist talented students, startups or entrepreneurial teams to solve and unravel their entrepreneurial potential and specific business issues. One driver of UBC was the investment by the Municipality of Athens, to create the special office and incubator space at ACEin. The challenges are now to make IDEA programme more sustainable and bring entrepreneurial spirit in engaged students and businesses. Future challenge is financial self-sufficiency with good strategy in funding [13].

Strategic supporting mechanisms include paper and implementation strategies. The strong association of strategies incentives with supporting UBC, documented mission, top level management committed to UBC or coordinated communication approach for UBC [13]. We want to indicate the Strategic plan for the University of Tartu - an ambitious Estonian business university through the development of enterprising spirit and entrepreneurship. The main supporting mechanism is the leading university' strategy and its implementation. Every year, university makes the management plan for the following year where defines the types of activities that should be financed in the next year. Some activities that need longer period to start are marked to be financed for two, three or more years. There are five priority areas in the university strategy: research, teaching, entrepreneurship, organizational development and protecting Estonian language and cultural heritage [13]. On the contrary, the great barriers are financial resources and lack on an entrepreneurial ecosystem around it because of geographic location.

In the last stage, policy mechanisms were used in the minimum of case studies. In 26 countries involved in the study, policy mechanism using only in six studies

(14 %). These types of activities often fall into ministries or agencies in countries. In few countries, strategies are translated into specific instruments and unique programs. Nonetheless, it is also interesting to see position of policy mechanisms, due to financial government instruments like grants, tax credits as well as the creation of a legal environment supporting research and development and may benefit from most regional/ national research programs initiated by governments [21, 32]. In Northern and Western Europe, we found one example which present active cooperate universities with local influence (Fig. 2.). We chose the policy direction of the Bavarian state government in Germany, including initiatives to push Bavaria and Germany's Silicon Valley. The proactive approach taken by the State Government focus and finance allow centers of innovation and new ventures to develop into world leaders. On the contrary, to foster entrepreneurship need to be created multiple access point to entrepreneurship thinking and acting.

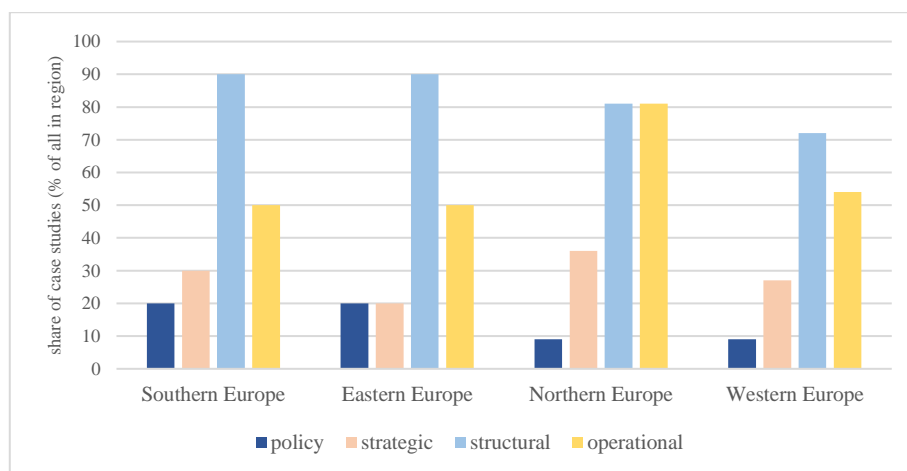


Fig. 2. Supporting mechanisms divided into European regions

Source: Own elaboration based on the case studies [12]

5 Conclusion

In conclusion, we can say that supporting mechanisms are important during the foundation, development and all functioning each success story of UBC. But all stakeholders are still facing lot of barriers - lack of funding and resources, regional and cultural differences, few business activities, bureaucracy and more. It is very important focus on developing the drivers an using a wide variety of mechanisms supporting UBC. EC has attempted to address the modernization of European HEIs mainly through several policy instruments which encourage and pressure HEIs in equal measures [29] to make a greater contribution to sustainable economic development. However, the EC policy supporting UBC does not directly regulate organizational mechanisms because these are often regulated at national/regional level [16].

This research paper has clearly shown that supporting mechanisms have special place in development UBC in European regions. Having a support for collaborating with HEIs is an inseparable part of each case study. It is important to note that each case study is individual and unique. They try to fit the region's strength, environmental framework and regional limitations. An overview of our research shows, that HEIs use four types of supporting mechanisms: policy, structural, strategic and operational. A brief across Europe showed the variety of instruments that regional stakeholders use to support UBC activities and highlight many gaps. The most used mechanism was structural. It encourages new offices and infrastructure which can bridging structures between universities and business in regions. The involvement of different institutional actors (HEIs, firms, ministries/agencies, etc.) create common aim strengthen their competitive advantage. Without suitable national and regional government help it would be more difficult to create successful UBC.

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