

REVIEW PAPER

WAYS OF IMPROVING UNIVERSITY AND ENTERPRISE COOPERATION IN B&H

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ABSTRACT

Today's fast growth has made it difficult for businesses to react to market demand if they depend only on their capabilities; thus, many businesses seek to collaborate with universities to innovate, enhancing their innovation capacity and competitiveness. In addition, the institution will commercialize its scientific research to accomplish the desired win-win partnership. In this paper, university-enterprise cooperation serves as the context for a review of the impact of various factors on the innovation performance of university-enterprise collaboration. The review is divided into three aspects: cooperation network structure, spatial geography, and social factors.

The inadequacy of engineering students' professional characteristics and technical abilities to match work requirements is a significant issue. For this reason, universities and universities are actively studying and revising the present people training model to discover solutions to an issue in which the university-enterprise partnership model is growing in popularity. University enterprise collaboration method may meet the purpose of staff training, increase the vitality and strength of operating universities, and raise the level and quality of operating universities and education. Simultaneously, it will help satisfy the demands of social and economic growth, supply firms with high-quality resources, and address the issue of engineering student employment in universities.

Keywords: University-Enterprise Cooperation, Innovation Performance, Influencing Factors, higher education



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INTRODUCTION

Industry-University Partnerships were first implemented in the United States and Canada in 1906 and 1957, respectively, through co-op programs in engineering programs (Haddara & Skanes, 2007). Universities - enterprise cooperation refers to the contact between any aspect of the higher education system and industry with the primary objective of promoting knowledge and technology transfer (Bekkers & Freitas, 2008; Siegel et al., 2003). UEC has a long history (Bower, 1993; Oliver, 2004) as a method for companies to grow their knowledge base (Cricelli & Grimaldi, 2010). The United States (Lehrer, Nell, & Garber, 2009), Japan (Woolgar, 2007), Singapore (Lee & Win, 2004), and European Union countries (Lee & Win, 2004) have all seen considerable growth in these partnerships in recent years (Barrett, Austin, & McCarthy, 2000; Powers, 2003; Gertner, Roberts, & Charles, 2011). This growth has been linked to industrial and academic pressures (Meyer-Krahmer & Schmoch, 1998; Giuliani & Arza, 2009). Pressures such as fast technological development, shorter product life cycles, and fierce global rivalry have drastically altered the competitive climate for the majority of businesses (Bettis & Hitt, 1995; Wright, Clarysse, Lockett, & Knockaert, 2008). Regarding universities, pressures have included the expansion of new information, the difficulty of growing expenses, and financial issues, which have imposed significant resource loads on universities for them to stay at the forefront of all academic fields (Hagen, 2002). In addition, universities are under increasing public pressure to be seen as economic development engines and less as fulfilling the larger social mission (education and knowledge production) they have had in the past (Blumenthal, 2003; Philbin, 2008). These demands on both sides have increased the impetus for establishing UECs that seek to boost innovation and economic competitiveness at institutional levels (nations and industries) via information exchange across academic and commercial areas (Perkmann et al., 2013). Moreover, UEC has been generally seen as a viable instrument for building organizational capacity in open innovation - when a company uses external networks to produce creativity and knowledge (Dess & Shaw, 2001) as an alternative to conventional internal R&D. (Harvey & Tether, 2003).

Due to the rapid development of economic globalization and information technology, it is difficult for businesses to adapt to the changing market demand based solely on their capabilities. As a re-

sult, businesses should collaborate extensively with various objects for innovation activities, including suppliers, competitors, users, universities, and research institutions, the scientific research strength of which cannot be overlooked. This cooperation model reduces the cost of innovation and the risks faced by enterprises to a certain extent; universities play a role in bolstering the promotion of technological innovation, and they can also commercialize scientific research; university-enterprise cooperation has good complementarity, so it has attracted widespread interest from all walks of life. Based on this environment and related academic research, this study reviews innovation performance aspects primarily from the network, space, and social perspectives on university-business collaboration.

The nations considered to be industrially developed have elevated collaboration between private business and public research institutes to the position of a significant policy goal. At the same time, academics who study innovation economics have researched the many modes in which public-private interaction might take place. Since the 1980s, there have been more studies on how to help transfer technology, improve public research results, and use these results. These first concentrated on the idea of the national innovation system (Freeman, 1987; Lundvall, 1992; Nelson, 1993), and then in the 1990s turned to examine the regional innovation system (Cooke et al., 2004), as well as the "triple helix" model of national development (Etzkowitz & Leydesdorff, 1998), which presented close interaction between the three spheres of public research, industry, and government institutions as the ideal method for increased innovation and regional development

Collaboration between the public and business sectors in research is one of the primary channels via which technology is transferred. This phenomenon has been the subject of research from a few different studies. In general, these studies explore the links between universities and industries along two primary dimensions: the contribution of universities to the creative activities of industry or how the relations produce and actualize (D'Este & Patel, 2007; Muscio, 2010). One line of inquiry has focused on possible personal and institutional motivations, and it has viewed collaboration as an exchange relationship that benefits both partners (Meyer-Krahmer & Schmoch, 1998; Manjarrés-Henríquez et al. 2009).

More prominent universities are perceived by businesses that have just begun the process of looking for potential partners as being able to provide larger research groups and a more comprehensive range of academic specializations. While this is happening, another study has shown that more prominent businesses, as opposed to smaller ones, are more likely to participate in collaborative efforts (Fontana et al., 2006; Segarra-Blasco & Arauzo-Carod, 2008). Studies that adopt a "gravitational model" (Ponds et al., 2007) also show that the capability for collaboration between pairs of public research institutions and private enterprises from different systems (meaning, for example, from different territories) depends on the product of their respective masses, as well as on the square of the distance between the pair (Ponds et al., 2007). Lee and Mansfield (1996) support that even if a university's reputation is influential, geographic distance is a deciding factor. This is likely due to the expenditures that are connected with traveling to a farther location.

Additionally, Lindelof and Lofsten (2004) showed that proximity to a university encourages exchanging information and ideas through official and informal networks, which benefits emerging technology-based businesses. Meanwhile, excellence in universities in a particular region has positive consequences for innovation, which even extend to neighboring regions (Jaffe, 1989; Jaffe et al., 1993), while the flow of knowledge from the public sector to industry weakens progressively with increasing distance (Arundel & Geuna, 2004). In general, the frequency of collaborations between partner pairs diminishes at an exponentially faster rate the more apart those pairs of partners are from one another (Katz, 1994).

Europe's academic and industrial collaboration landscape is characterized by its diversity. Because of their organizational structures and cultures, companies and universities approach technology management from quite different vantage points. Cooperation between businesses and educational institutions is a relatively new development that is still in its infancy (Unger et al., 2018; Jarábková, Chrenková, and Roháiková, 2019). There is still a substantial amount of space for greater and more intensive collaboration between universities and enterprises; nevertheless, challenges still exist in terms of trust and understanding of the operation on both sides (Roud & Vlasova, 2018). Despite this, there is a lack of adequate models or theoretical frameworks to comprehend how clients and

other stakeholders collaborate with businesses to produce value (Frow et al., 2015). Recent years have seen a significant shift in research focus, emphasizing case studies involving well-known institutions and giant multinational corporations (Edmondson, 2012). A limited number of studies have considered the possibility of collaboration between academic institutions, small and medium-sized businesses, and non-governmental groups.

The University-Enterprise-Cooperation (UEC), also known as Industry-University Partnerships (Smith et al., 2018) and Academia-Industry Cooperation (Shapira & Rosenfeld, 2011), is a pedagogical form of education approach and thinking that focuses on the cultivation of graduates with a high level of innovation capability and practical skills through the full utilization of resources from the university and company/industry (Liu & Zhong, 2011). According to Russell and Stouffer (2003), many undergraduate programs that produce construction professionals were not designed to prepare students to be competent and successful project managers. Therefore, the university, the construction industry, professional organizations, and the government should build a comprehensive partnership to cultivate construction professionals with solid leadership abilities (Toor & Ofori, 2008). The American Society of Civil Engineers (ASCE) also realized this issue and created the practitioner-in-residence program for civil engineering students. It was suggested that engineering schools build their practical capabilities, which may be accomplished through working in the construction business and networking with active engineers (Koehn, 2004).

Moreover, the National Academy of Engineering (NAE) produced a paper in 2005 titled Educating the Engineer of 2020 that underlined the need for industry and academic partnership in producing engineers with strong theoretical foundations and practical experiences (NAE, 2005). Gann (2001) argued that academic researchers typically publish in refereed journals. In contrast, refereed journals are not the most appropriate means of producing research output for applied research in construction-related fields, either for advancing knowledge or disseminating it to the construction industry. Shapira and Rosenfeld (2011) found that collaboration between academia and the construction industry was crucial to the success of an innovative research and development (R&D) project and that the R&D endeavor could not be accomplished without this cooperation.

Higher education institutions and businesses both stand to gain from working together, and because cooperation fosters the dissemination and exchange of information, it also makes it easier to form lasting business relationships (Guan & Zhao, 2013). In the process of innovation, it is also increasingly highlighted the importance of collaboration between science, information, and technology (Rebelo et al., 2015; Unger & Meiran, 2020) and that, in the advanced industrial economy, there is a strong integration of the activities of science and technology systems. The ability to work together effectively is rapidly becoming a significant source of competitive advantage. However, there are certain flaws in the knowledge transfer process, particularly concerning communication and collaboration between institutions and businesses. These flaws affect both parties' capacities for innovation and jeopardize the collaboration's success. However, key factors present in the interaction determinants that, once identified and adequately addressed, will assist in managing collaboration between universities and businesses, thereby making it more profitable and a source of value for both parties and society.

Businesses in Bosnia and Herzegovina primarily collaborate with universities to gain access to more qualified graduates. In addition, they emphasize the desire to gain access to new technologies and improve their reputation. In addition to collaborating for organizational reasons, they collaborate to affect society. This is the bottom line for business involvement at UEC: impacting meaningful improvements in education quality throughout the entire tertiary education system, acting with its educational resources, and producing more graduates who meet the business needs.

THEORETICAL BACKGROUND

Business leaders are being challenged by an intensifying level of competition, globalization, shifting technical landscapes, and a new way of thinking strategically. It is necessary to combine limited resources to reach a critical mass to accelerate the introduction of innovation into the market. Innovation is not only the act of coming up with new ideas; it is also the product of intricate social interaction, communication, and information sharing. Innovation in the context of the global economy is defined as the capacity to generate new ideas and translate those ideas into new goods and processes with commercial value. The ability of civilizations to innovate is becoming increasingly important in determining their health and prosperity.

Science and technology are emerging as essential drivers of competitive advantage. Culturally diverse and varied cultural configurations should stimulate creativity, which is vital for generating new knowledge and ideas. The more mature and advanced an economy gets, the more creative it has to be to keep up with the ever-increasing amount of information, innovation, and creativity that it is capable of absorbing. This supports the formation of "creative knowledge spaces," which may be defined as surroundings, contexts, and surrounding regions that have a favorable impact on human beings who are participating in a creative activity.

1.1 University enterprise cooperation models

Modalities and perspectives of university enterprise cooperation (UEC) include various forms of research and development, the mobility of students, faculty, and staff, curricular cooperation, and adult education. Todtling and Trippl describe the differences between peripheral, formerly industrial, and metropolitan areas and the resulting € issues. Understanding the diversity of policy perspectives is essential for appreciating their strengths and weaknesses. In the United Kingdom, Crespi et al. (2011) found that increasing incentives for academics to patent and seek financial returns may not be desirable above a certain threshold because they publish less and connect with companies through other channels less frequently. De Fuentes and Dutrenit (2012) systematized conventional inquiries, including why research organizations and businesses work together.

Universities and businesses' knowledge exchanges (UEC) are two very different approaches to knowledge exchange that substantially affect intellectual property protection, the number of industry partners, and the nature of the results. Ankrah and Al Tabaa (2015) advocated for a comprehensive, methodical evaluation of UEC. Various factors, including necessity, reciprocity, and effectiveness, are used to evaluate the differences between the two approaches. The fifth element comprises variables that promote UEC, such as money, incentives for cooperation, and the legal framework. The sixth section comprises UEC's results, including revenue and product patents. Some researchers attempt to determine which organizational factors correlate with the collaborative style of a productive team member (Bozeman et al., 2012).

1.1.1. The Triple Helix model

The Triple Helix model asserts that the potential for innovation and economic development in a knowledge-based society lies in a more prominent role for the university. The model emphasizes the relationship between differentiation and integration in forming the industry-academia-complex government system. The change to an entrepreneurial university comes from academia's "inner logic" and can be seen as an improvement, not a perversion of education. The entrepreneurial university can be viewed as an evolutionary process comprised of two interrelated dynamics. Exogenous factors include commercial opportunities in research and the emergence of entrepreneurial research groups.

The "first academic revolution" was the process by which universities came to view research as equally crucial to their mission as teaching. Government policies that sought to strengthen ties between universities and society, particularly business, were a major driving force.

1.2 University enterprise cooperation benefits

A new vision of business R&D management emerged in the 1990s, focusing on integrating learning and research into corporate strategy. Businesses have formed new alliances (partnerships, cooperative programs, consortia with universities, government laboratories, and other companies) to gain access to external sources of technology and knowledge. In this era, openness to collaborative research ceased to be viewed as a company's weakness and became a crucial form of knowledge acquisition. As a result of the European Union's (EU) decision to become the most competitive economy in the world, university-business cooperation has become a popular area of study. Universities grew from a simple information factory focused on new outputs to a regionally active, entrepreneurial-relational university with industry ties and publicly and privately funded research contracts.

1.3 Benefits for the university

Universities have become more involved in socioeconomic development and commercialization of research output. Some attribute it to declining government funding for academic research and changes in funding flows. Others see it as a consequence of the shifting social division of labor

between academic and business R&D. New institutional structures and organizational forms have emerged at the university-business interface. An entrepreneurial university has new management and marketing functions more tailored to the private sector.

Strategically, the university adopts a strategic mindset, invests in priority fields, closes ineffective study programs, and develops market-responsive curricula. In practice, collaboration with industry indicates market competitiveness for education services, training, and research. We observe entrepreneurial activity in the transfer of knowledge in Europe; universities utilize research to stimulate economic growth and regional development.

1.4 Benefits for the students and society

UEC is defined as any engagement between HEIs and businesses for mutual gain (Davey et al., 2011) and is considered a key driver of knowledge-based economies and communities. UEC not only assists HEIs in addressing some of their most pressing challenges, such as the need for capital and innovation but also significantly impacts the local economy. To improve employment, productivity, and social cohesion in Europe, it is necessary to strengthen the bonds between the public sector, private sector, and HEIs. Most organizations, especially SMEs, lack the financial and human resources necessary for systematic innovation. UEC can give SMEs access to new knowledge, technology, procedures, and talent to attain and maintain a competitive advantage. It can assist educators in meeting the needs of the labor market by providing graduates with more relevant knowledge and skills, thereby increasing their employability.

1.5 The entrepreneurial sector's readiness to cooperate with academic institutions

There is still a substantial gap between the knowledge created by researchers and the knowledge used in practice. European universities have the potential to significantly increase their appeal because partnerships have become a top priority. The "European paradox" refers to the contrast between the continent's high research capacity and its inability to transform that knowledge into innovative products. Collaboration between researchers and businesses can be achieved through various channels, but it is crucial to emphasize the importance of trust to initiate and maintain the relationship. When negotiators have mutual trust, they are

more likely to develop a plan for value creation and problem resolution. The next step is understanding the factors determining the collaboration's ultimate success (Rajalo & Vadi, 2017).

2. UNIVERSITY ENTERPRISE COOPERATION IN EUROPE

The report "The state of European university-business cooperation" (EC, 2011) details the status of the eight forms of cooperation in the Member States. Collaboration in R&D is the most prevalent form, and commercialization of results requires appropriate legislation and support mechanisms. The ERASMUS program is an instrument that facilitates the temporary or permanent transfer of students from one university to another or from the university to the business world. The European University-Business Forum (UB-Forum) was established in 2008 as one of the most significant EC-level responses to supporting dialogue for UEC. The Forum was established to assist the academic and business communities in achieving regular and sustainable dialogue, exchange, sharing, and learning. This project aims to contribute to that growth by enhancing knowledge of the current state of UEC in Europe.

2.1 University enterprise cooperation in Albania

Albania's Higher Education Institutions (HEIs) need to increase their role in local and regional social and economic development, authors argue. University-industry collaboration can increase the opportunities for bachelor's, master's, and doctoral students to collaborate on projects, work with industry representatives, and find employment in the industry sector. A lack of information is the primary factor hindering cooperation between universities and businesses.

2.2 University enterprise cooperation in Montenegro

Relationships are the driving force behind UEC development in Montenegro. Academic and HEI administration is primarily motivated by the UEC's existence of a shared objective and mutual trust. In Montenegro, UEC-supporting mechanisms are perceived to be more developed than the European average. For non-cooperating academics, the most significant barrier to UEC cooperation is the dearth of business personnel with scientific knowledge.

3. UNIVERSITY ENTERPRISE COOPERATION IN BOSNIA AND HERZEGOVINA

3.1 Period before 1992

After World War II, Yugoslavia became one of the six republics that constituted the Federal People's Republic of Socialist Federal Republic of Yugoslavia. Despite recurrent persecution, universities remained sites of critical thought, social protest, and political activism. Yugoslavia changed its research policy after the Infoburo fight and invested heavily in atomic and nuclear scientific research to develop an atomic bomb. HE development in Bosnia and Herzegovina began after the First World War, but Yugoslavia hindered it. In 1946, the first university was founded, followed by universities in major cities nationwide. By 1975 there were four universities and several of their branches, and by 1980 there were 53. The HE system was an exclusively state-funded and -controlled system of education for 45 years.

3.2 After Dayton period

Bosnia and Herzegovina's HE system is by far the most complex in the Western Balkans, primarily because of its administrative structure. The pre-war network of four universities has evolved into three separate HE systems under the jurisdiction of the RS and Brcko District, or, in the case of FBiH, the ten cantons. There is no ministry responsible for higher education at the level of BiH, but each of the 10 cantons has its ministries of education.

3.3 University Policy Framework for Promoting Entrepreneurial Activity

The strategy identifies issues in entrepreneurial education, with a lack of communication between the business sector and universities being the most significant. Entrepreneurial education was not identified as a component of university-level curricula in 2012 (before the plan's adoption) This provides insight into the emergence of entrepreneurship as a value in education systems after 2012.

3.4. University innovation and entrepreneurship in Bosnia and Herzegovina

The number of higher education institutions in Bosnia and Herzegovina has changed dramatically over the past 15 years. Public research institutes with a mission-oriented focus have been shut down, privatized, or left with unclear legal standing.

Entrepreneurship is not a priority for private institutions, while beneficial changes have occurred in recent years at public universities. Many companies in Bosnia and Herzegovina rely primarily on external resources for R&D, and most have collaborated with highly regarded researchers. There is little study or data to explain the motivations that motivate university professors and academics to collaborate individually with businesses. Before 1992, primary funding for public universities was derived from the public budget, and there is a shortage of data regarding charitable foundations and professional groups that provide financing for research from private sources such as businesses.

CONCLUSION

Globalization, increasing competition, changing technology, and new strategic thinking are challenging business leaders. Innovation is the ability to create and commercialize new ideas. Cultural diversity should inspire creativity, which is essential for innovation. University enterprise cooperation models involve research and development, student, faculty, and staff mobility, curricular cooperation, and adult education. Appreciating policy strengths and weaknesses requires understanding their diversity.

Crespi et al. (2011) found that above a certain threshold, academics may not benefit from patenting and seeking financial returns. De Fuentes and Dutrenit (2012) systematically asked why research organizations and businesses collaborate. Universities and businesses' knowledge exchanges (UEC) differ greatly in intellectual property protection, industry partners, and results. Ankrah and Al Tabaa (2015) urged systematic UEC evaluation. The Triple Helix model suggests that a more prominent university role in a knowledge-based society will boost innovation and economic growth. The "first academic revolution" saw universities view research as important as teaching. Government policies to strengthen university society, particularly business, pushed it.

In the 1990s, business R&D management emphasized integrating learning and research into corporate strategy. University-business cooperation is popular due to the EU's goal of becoming the world's most competitive economy. Due to declining government funding for academic research and funding flows, universities have become more involved in socioeconomic development and research commercialization. An entrepreneurial uni-

versity has a strategic mindset, invests in priority fields, closes ineffective study programs, and develops market-responsive curricula. UEC—HEI-business collaboration for mutual benefit—drives knowledge-based economies and communities. Strengthening public-private-HEI ties will boost European employment, productivity, and social cohesion. UEC can provide SMEs with new knowledge, technology, procedures, and talent to gain and maintain a competitive edge and help educators meet labor market needs by providing graduates with more relevant knowledge and skills.

Researchers' knowledge and the entrepreneurial sector's willingness to collaborate are still far apart. Trust is key to starting and maintaining research-business collaboration. Understanding how the collaboration will succeed is the next step. "The state of European university-business cooperation" (EC, 2011) describes eight forms of Member State cooperation. R&D collaboration is the most common, and commercialization requires legislation and support.

The European University-Business Forum (UB-Forum) was founded in 2008 to help academics and businesses maintain regular and sustainable dialogue, exchange, sharing, and learning. This project seeks to improve European UEC knowledge to support that growth. Albanian university-business cooperation Albania's Higher Education Institutions (HEIs) need to play a larger role in local and regional social and economic development, and university-industry collaboration can help bachelor's, master's, and doctoral students collaborate on projects, work with industry representatives, and find jobs in the industry. The ERASMUS program helps students move between universities or into business. Scientifically literate businesspeople are the biggest obstacle to UEC cooperation.

Due to its administrative structure, Bosnia and Herzegovina's HE system is complicated. The pre-war network of four universities has become three separate HE systems under the RS, Brcko District, or FBiH's ten cantons. Over the past 15 years, public research institutes have closed, privatized, or lost legal status, reducing the number of higher education institutions. Private institutions don't prioritize entrepreneurship, but public universities have improved. Few studies have examined why university professors and academics collaborate with businesses.

This study examines academic-business collaboration in Albania, Bosnia and Herzegovina, and Montenegro. Public universities collaborate with businesses less than private universities, while private companies collaborate with universities more than state companies. The study aims to understand university-business cooperation at all levels. The Sustainable University-Enterprise Cooperation for Improving Graduate Employability/SUCCESS project collected the data. Research hypotheses were tested using the Pearson chi-square test.

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