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M.I. Dabylova[1*], J. Grabara[2], G. Alibekova[3]

[1]Al-Farabi Kazakh National University, Kazakhstan, Almaty
[2]Czestochowa University of Technology, Poland, Czestochowa
[3]Institute of Economics of the Ministry of Education and Science of Republic of Kazakhstan, Kazakhstan, Almaty
[*]e-mail: malika.dabylova@gmail.com

UNIVERSITY-BUSINESS COOPERATION IN KAZAKHSTAN: INFLUENCING FACTORS

The importance of collaboration between universities and business (UBC) continues to grow in all countries. The reasons for this are numerous, such as changes in innovation structures, the development of the knowledge society, and national and international higher education policies. Kazakhstan, as a rapidly developing country, is experiencing all these changes. Nowadays, activities of university are evolving from the basic functions of teaching and research to commercialisation of research results where the partnership with the private sector is one of the most important elements. The purpose of the article is to identify influencing factors, driving factors and barriers for UBC, as well as recommendations for the future. The data for analysis was obtained using an online survey. The survey was conducted among University employees and company employees. More than 100 respondents took part in the survey. The results of the survey show that the main factors influencing the cooperation of universities and business: sources of funding, innovative indicators of universities, the impact of funding sources on control mechanisms and innovative activities of universities, also, the likely reason for the lag is the slow and still incomplete transition of Kazakhstan from the "traditional" innovation system to the modern innovation ecosystem.

Key words: university-business collaboration, innovation performance of universities, universities' entrepreneur, innovative activity, industry, Kazakhstan.

М.И. Дабылова[1*], Я. Грабара[2], Г. Алибекова[3]

[1]Әл-Фараби атындағы Қазақ ұлттық университеті, Қазақстан, Алматы қ.
[2]Ченстохов технологиялық университеті, Польша, Ченстохов қ.
[3]ҚР БҒМ Экономика институты, Қазақстан, Алматы қ.
[*]e-mail: malika.dabylova@gmail.com

Қазақстандағы ЖОО мен бизнес ынтымақтастығы: ықпал етуші факторлар

Университеттер мен бизнестің ынтымақтастығының маңыздылығы барлық елдерде өсуде. Мұның басты себебі инновациялық құрылымдардың өзгеруі, білім жүйесінің дамуы және ұлттық және халықаралық жоғары білім саясатының көптеген факторларына байланысты. Қазақстан жедел дамып келе жатқан мемлекет ретінде осы өзгерістердің бәрін бастан кешуде. Қазіргі уақытта ЖОО-ның қызметі болып табылатын білім беру мен зерттеу негізде қосымша серіктестерінің маңызды элементтердің бірі ретінде жеке сектормен бірге зерттеу нәтижелерін коммерциализациялауға дейін дамуда. Жұмыстың мақсаты университеттер мен бизнестің ынтымақтастығына әсер ететін факторларды, қозғаушы факторларды және кедергілерді, сондай-ақ болашаққа ұсыныстарды анықтау болып табылады. Талдау үшін мәліметтер онлайн сауалнаманың көмегімен алынды. Сауалнама университет қызметкерлері мен компания қызметкерлері арасында жүргізілді. Сауалнамаға 100-ден астам респонденттер қатысты. Сауалнаманың нәтижесі университеттер мен бизнестің ынтымақтастығына әсер ететін негізгі факторлар ретінде: қаржыландыру көздері, университеттердің инновациялық индикаторлары, қаржыландыру көздеріне қатысты университеттердің басқару және инновациялық қызметін басқару механизмдері екенін көрсетіп, сондай-ақ, Қазақстанның «дәстүрлі» инновациялық жүйеден қазіргі заманғы инновациялық экожүйеге баяу және әлі толық емес өтуі осы арақатынасты дамытуда артта қалудың басты себебі екенін көрсетті.

Түйін сөздер: университет пен бизнестің ынтымақтастығы, университеттердің инновациялық тиімділігі, кәсіпкерлік университет, инновациялық қызмет, индустрия, Қазақстан.

М.И. Дабылова[1*], Я. Грабара[2], Г. Алибекова[3]
[1]Казахский национальный университет им. аль-Фараби, Казахстан, г. Алматы
[2]Ченстоховский технологический университет, Польша, г. Ченстохова
[3]Институт экономики Министерства образования и науки Республики Казахстан, Казахстан, г. Алматы
*e-mail: malika.dabylova@gmail.com

Сотрудничество университета и бизнеса в Казахстане: влияющие факторы

Важность сотрудничества между университетами и бизнесом продолжает расти во всех странах. Причины этого многочисленны, такие как изменения в инновационных структурах, развитие общества знаний и национальная и международная политика в области высшего образования. Казахстан как быстро развивающаяся страна переживает все эти изменения. В настоящее время деятельность университета развивается от основных функций преподавания и исследований к коммерциализации результатов исследований, где партнерство с частным сектором является одним из наиболее важных элементов. Целью работы является определение влияющих факторов, движущих факторов и барьеров для сотрудничества университета и бизнеса, а также рекомендаций на будущее. Данные для анализа были получены с помощью онлайн опроса. Анкетирование проводилось среди сотрудников университета и сотрудников компании. Более 100 респондентов приняли участие в опросе. Результаты опроса показывают, что основными факторами влияния на сотрудничество университетов и бизнеса являются источники финансирования, инновационные показатели вузов, влияние источников финансирования на механизмы контроля и инновационную деятельность университетов, также вероятной причиной отставания является медленный и все еще неполный переход Казахстана от «традиционной» инновационной системы к современной инновационной экосистеме.

Ключевые слова: университетско-деловое сотрудничество, инновационная эффективность университетов, предпринимательский университет, инновационная деятельность, промышленность, Казахстан.

Introduction

Despite the growing importance of University-business collaboration (UBC), our understanding of University-business collaboration remains vague. Collaboration between universities and businesses is a complex concept. Because it can take many forms, such as research, knowledge transfer, lifelong learning, commercialization, or education. Integration of knowledge, resources of universities and industries has become a common method of maintaining the innovative potential of industries. Recently, cooperation between universities and industry has intensified in order to achieve harmonious development within the framework of the open innovation paradigm. However, the level of satisfaction of participants in the program of cooperation between universities and industry is insufficient (Brem and Radziwon, 2017; Seong et al., 2011). Most previous research in academic entrepreneurship has focused on the interaction between University research and technology transfer activities in the form of collaborative research, additional revenue, licensing, and patenting. However, questions remain about the role of academic entrepreneurship in education and training. Lifelong learning has become a top priority for many higher education institutions, with greater emphasis on developing students‘ various skills, including entrepreneurship (Rossano, 2016).

The importance of University-business cooperation (UBC) for innovation and education is widely recognized (Rybnicek and Königsgruber, 2019) and is becoming increasingly important as economies face increasing competition in global markets and the race for innovation and growth (Clauss and Kesting, 2017; Sarpong et al., 2015). Around the world, policymakers are emphasizing the importance of a close relationship between business and higher education as a means of stimulating economic activity, investing significant amounts of funds to encourage UBC (Brem and Radziwon, 2017). Thus, while the emphasis has been on the past two decades, the recognition of UBC as critical to future economic and social prosperity has never been as widespread in the fields of politics, management, and science as it is today (Quintana et al., 2016; Ripoll Feliu and Diaz Rodriguez, 2017). Thus, the need for a long-term perspective and a clear path to continuous improvement of UBC, as well as maximizing its benefits for all stakeholders, is stronger than ever, not only in policy in practice, but also in academic circles (Orazbayeva, 2019).

Interaction between universities and the business environment plays a key role in solving all these problems. Any interaction between the two

stakeholders should benefit both parties. Profit forms the basis of long-term relationships. The principles of cooperation are determined by the full course of interaction, and studies of the principles of cooperation prove that this is the most important aspect of the relationship. To achieve stable and longer-term cooperation between universities and industries, it is important to fully understand the motivation of scientists. Collaboration between universities and businesses can help improve corporate performance. However, there is a lack of research on its internal mechanism.

Literature review

In light of the high importance of universities as sources of knowledge, collaboration between universities and businesses offers significant opportunities for businesses to use external academic research and innovation. Unlike knowledge-intensive collaboration with other businesses, UBC has features that need to be taken into account, in particular the role of professors as individual decision makers. Numerous studies show that businesses can significantly improve the effectiveness of their innovations by collaborating with universities (Greitzer et al., 2010, Winkelbach and Walter, 2015). This is because the acquisition and acquiring of external knowledge is impossible or more difficult to obtain compared to internal research and development. Mechanisms that facilitate the relationship between University and industry have received considerable attention (Minguillo et al., 2015, Perkmann et al., 2013, Wright et al., 2008). The relationship between University, industry, and government is known in the established literature as the" triple helix", and its effectiveness in knowledge transfer has been endorsed through, say, a" double helix " (for example, Ivanova and Leydesdorff, 2014) or in general (Fernandez-Esquinas et al., 2015, Nielsen and Cappelen, 2014). Helix subjects are known for their inability to share common interests, which makes knowledge transfer more difficult and limited (see Huggins et al., 2012, Serbanica et al., 2015; Rossi and Rosli, 2015). However, the study of inter-organizational cooperation shows that relational management is not sufficient and should be supplemented by transactional management mechanisms (Abdi and Aulakh, 2014, Bounken et al., 2016, Cao and Lumino, 2015). In the field of education, universities benefit from cooperation with industry and collaborate with it to create opportunities for student mobility, harness the needs of industry, to participate in lifelong learning, and to involve the business world in the development and implementation of the curriculum. In the field of research, universities offer research knowledge for business through academic mobility and collaborative research and development. In the field of commercialization, universities enter the market with the creation of additional companies and start-ups or provide knowledge for industry (Galán-Muros, 2017). Currently, at the European level, the structure of institutional analysis dominates UBC's analysis. It is based on the structures of higher education systems, business organizations, and the government base; the latter is described as an "action level" that controls the "factor level", which then leads to a "result level" (Davey et al. 2013a, b). Since the University and the private sector, as well as the public sector system, are now seen as the main source of national competitiveness, there is also a tendency to view it as an ecosystem in which "multiple actors need to work together and in a coordinated manner" (Davey et al.2013a; Nyman 2013). Universities should be aware of the constant updating of business collaboration forms and models (Samuel, 2014): what is now called "collaboration" is increasingly becoming knowledge sharing, ecosystem partnerships, and the creation of dynamic value networks (Peltonen et al., 2013). Universities can and should play an important, new role based on academic values in achieving two goals: developing cost-effective businesses and promoting their beneficial social impact.

Technology transfer between universities and industry is a key element of innovation strategies in most countries, and universities are increasingly becoming ambiguous institutions that perform both scientific and commercial tasks (Ambos et al., 2008, Huyghe et al., 2014). Knowledge transfer in universities has been the subject of considerable recent interest, from support systems (Hewitt-Dundas, 2012) to specific channels for transfer efficiency (Bekkers and Bodas, Freitas, 2008), but the common denominator has rested on the role of the transmitting unit itself and their critical success factors (for example, Berbegal-Mirabent et al., 2012). When using technologies developed at the University, academic by-products meet the needs of the market by offering innovative products or services.

Tseng (2020) considers how factors influence cooperation between universities and the business environment: the management mechanism, the innovative climate of universities. Larisa Ivascu points out the following influencing factors of cooperation: 1. Having a well-defined structure at the University that effectively supports research projects; 2. Having effective project management and especially

communication and monitoring well implemented; 3. Involving young researchers in identifying the characteristics of the economic environment; 4. Developing new partnerships and supporting existing projects to launch new opportunities. 5. Organizational culture is an important pillar of openness with which universities collaborate with industry; 6. The distribution strategy should be strengthened to share research and use marketing elements to attract new partners. Pleśniarska (2016) notes it is important to emphasize that the literature has indicated many more advantages for universities, among which there are three categories of advantages, i.e. Economic nature (for example, obtaining additional funds for research and development), organizational nature (for example, the possibility of mutual knowledge exchange between partners) and strategic nature (for example, protecting research results from competition). M.K. Dan notes that in addition to the advantages of cooperation with business, there are also such threats as: the bureaucratic structure of the University, the lack of specialized personnel in marketing or technology transfer departments, and high administrative costs. Moreover, there is a risk that "an external financier may impose special research topics that may limit the freedom of research or contribute to brain drain when professors and researchers move to the private sector, because of the lack of incentives". The course for the development of an innovative economy in the Republic poses new challenges for universities. Among them, the most important are the development of research and innovation activities, involvement in the economic and social processes of the region, as well as the commercialization and implementation of scientific research (Turginbayeva, 2018). In the modern economy, the creation of academic by-products for the commercialization of University research and knowledge is a fruitful mechanism for stimulating the economy, creating jobs and innovation (Fini et al., 2011, Gilsing et al., 2010, Bathelt et al., 2010). To maintain the competitive advantage of businesses, the integration of industry funds and production resources with the research capabilities and knowledge of universities has become an established policy in many countries. According to Dzhumambayev (2019), the current model of the Kazakh labour market has largely exhausted its potential as a driver of economic growth. Its modernization, taking into account the experience of developed countries and the specifics of the country's development, will allow for a more accurate forecast of labour market parameters, including labour demand.

Methodology

The analysis data was collected using an online survey conducted between November 2019 and January 2020 among University employees and business leaders. The questionnaire was sent out to more than 300 respondents. Respondents in each company were managers who were most closely associated with universities, a third of whom were from the human resources Department. The choice of businesses in each sample took into account the size of the companies, the level of technology, the geographical scope of operations, and the scope of collaboration. About half of the sample was made up of SMEs, followed by large and micro companies. The choice was based on the sector that was most relevant for cooperation (for example, information and communication technologies, other technology sectors, energy). Although the results are not statistically significant, the survey helps you analyze the relationships between the selected elements and the interaction processes. We used an asymmetric 5-point Likert scale to measure the relative importance of each factor for two groups, it doesn't matter 1 point, 3 is moderately important, 5 is very important. In response to Likert's question, respondents indicate their level of agreement or disagreement on a symmetrical agreement – disagreement scale for a series of statements. Thus, the range reflects the intensity of their feelings about the subject (Burns, 2008).

Results and discussions

The total number of respondents is 130. Of these, 50 respondents are University employees, the majority of University representatives are from Al-Farabi Kazakh National University, Turan University, Satpayev KazNITU. 80 respondents are representatives of the company. 84% from the private sector and 16% from the public sector. From the private sector, 15% are international companies, 18% are joint-stock companies, and 67% are limited liability partnerships. The survey participants are 57% women and 43% men.

In order to determine the influencing factors for cooperation between universities and businesses, we suggested the types that could be selected as the most important:

Table 1 – Influencing factors UBC

Influencing factors UBC (selected)	Universities		Enterprises	
	+	-	+	-
Funding sources	50	0	29	51
Innovation performance of universities	43	7	72	8
Influences of funding sources on control mechanisms and innovation performance of Universities	50	0	29	51
Note – compiled by authors				

The above mentioned factors of cooperation are indicated as influencing factors of cooperation between the University and business in the works of foreign authors. These include: sources of funding, innovative indicators of universities, the impact of funding sources on control mechanisms and innovative activities of universities. The majority of respondents confirmed that these three categories are influencing factors of cooperation between universities and the business environment. Sources of funding-79, innovative indicators of higher education institutions-115, influence of sources of funding on control mechanisms and innovative activity of universities-79.

Universities are non-profit institutions, the funding for UIC activities is a major source of income for universities. Funding for UIC can be classified as either internal or external (Auranen and Nieminen, 2010). Government funding is the main source of research funding in many countries. This is confirmed by the results of the survey. 61% of respondents indicate government funding as the main source of funding that most affects the cooperation between the two sides. 24 % – financing of the industry (figure 1).

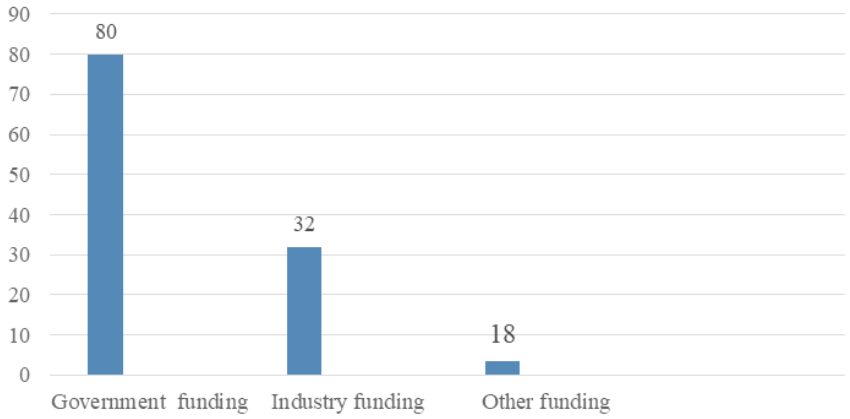

Figure 1 – Funding sources for university-industry collaboration
Note – compiled by authors

We measure the innovative performance of the University using the previously described indicators. In particular, we use the number of patents issued and licensed to determine the degree of development of science and technology at the University, as well as the amount of intellectual property income and the number of business incubators, to understand the degree of commercial communication between universities and industry. All these results-oriented indicators make it easier to evaluate the University's innovation performance (Hsueh-Liang Fan, 2019). Innovation indicators of higher education institutions are evaluated by 4 categories: licensing patents and issued patents, the amount of income from intellectual property creation of a business incubator. According to the survey results, the most important innovation indicator of the University is the creation of business incubators. The majority of respondents are representatives of the company-75%.

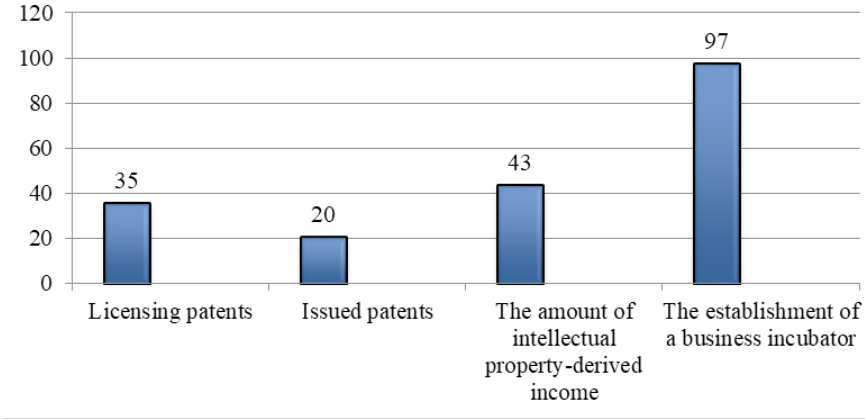

Figure 2 – Innovation performance of universities
Note – compiled by authors

Organizational control is defined as a mechanism used by managers to motivate members to act in accordance with the company's requirements (Cardinal 2001; Snell 1992). Previous literature has identified several types of organizational control: the management mechanism, the implementation of regulations, and the innovative climate in universities. The mechanism of cooperation management is ranked first among the most influential factors of cooperation between universities and business – 67%.

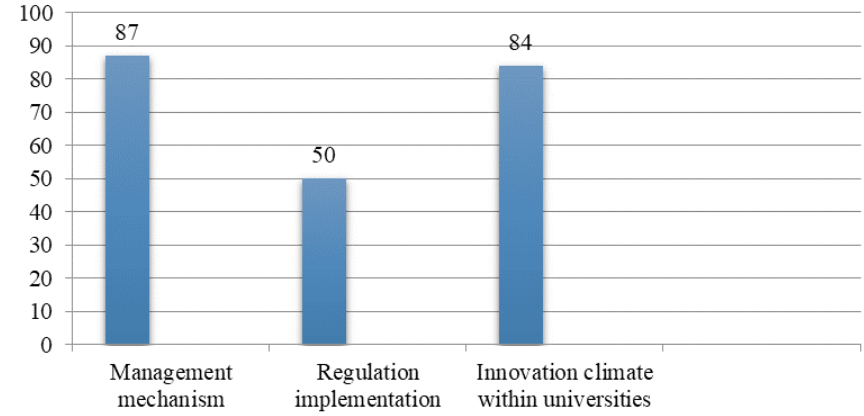

Figure 3 – Influences of funding sources on control mechanisms
nd innovation performance of Universities
Note – compiled by authors

To solve the problems of interaction, we additionally identified barriers to cooperation. The survey results are shown in figures 4-6.

1. Barriers to cooperation:

94% – personal barriers (various methods of communication and language between universities and business, time horizons between universities and business, and motivation and values between universities and business);

66% – bureaucracy (bureaucracy inside or outside universities and confidentiality of results);

42% – barriers related to resources (difficulties in finding suitable people in universities, limited ability to transfer knowledge and the current financial crisis).

In these barriers, more than 56% of managers consider personal barriers a very important problem. University staff indicate only an important degree of barrier.

Overview of a study on university-business collaboration identified by the following barriers (table 2):

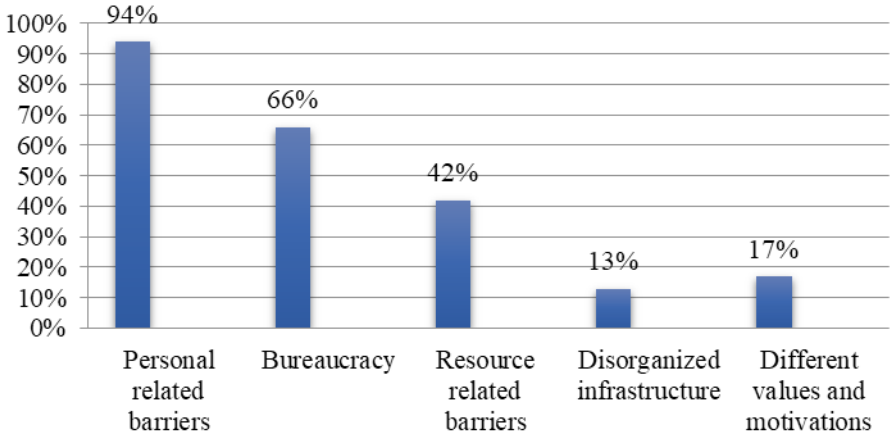

Figure 4 – Barriers to cooperation
Note – compiled by authors

Table 2 – Barriers to university-business cooperation

Barriers to university-business cooperation (selected)	Universities	Enterprises
Problems related to the management of intellectual property rights	+	+
A lack of adequate infrastructure and financial resources	+	+
A lack of interest in cooperation	+	+
Workload of scientists (their own research and/or teaching activities)	+	-
Fears of accusing the university of promoting technological solutions of a given company	+	-
Confidentiality of results	-	+
Difficulties to estimate the value of cooperation	-	+
Differing time horizons and motivation	+	+
Differing mode of communication	+	+
A lack of awareness of opportunities arising from university-business cooperation	+	+
Limited ability of business to absorb research findings	-	+
No appropriate initial contact person	+	+
Note – compiled by authors based on (Bryła et al., 2013b)		

Important ways to collaborate:

– 92 % – supporting the development of student competencies and careers (participation in the activities of alumni networks, cooperation with HEIs' career offices and participation in study, teaching and research activities);

– 58 % – strategic managerial cooperation (participation of academics in company boards and of business people in HEI boards);

– 25 % – participation in innovation departments (cooperation with institutes focused on UBC and cooperation with incubators for the development of new businesses);

– 62 % – interactions with specific goals (on the basis of contracts);

– 27 % – social activities.

While the last group of activities is relatively easy to realize in short-term, the first two types of cooperation might cause certain difficulties (Taratukhin, 2016). Employability of graduating students is a main precondition for successful university to work transition. Discrepancies on the labor market in terms of demand and supply of highly qualified specialists, increasing requirements and expectations of recently university graduates towards their future jobs, high speed of technological changes resulting in new jobs for which educations is lagging behind and increasing demand for well-developed transferable skills are some of the main challenges which universities are facing nowadays (Yordanova, 2018).

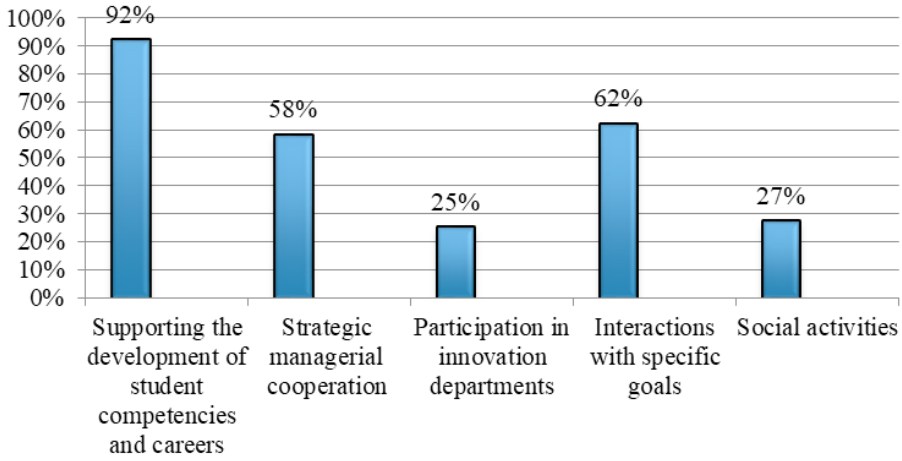

Figure 5 – Important ways to collaborate
Note – compiled by authors

3. Drivers of cooperation:

95% – mutual trust, 53% – obligations, 29% – financial resources for work, 61% – common goals (Figure 3). Combined with the results of a survey conducted by Davey et al. (2011), the EMCOSU survey (2015) also provides a simple comparison of the elements and processes listed above. Higher education institutions face a growing competitive environment with increasing financial constraints, and universities have a strong motivation to engage more actively with the firm to create new sources of funding and provide additional investment in research (Madudova, 2017).

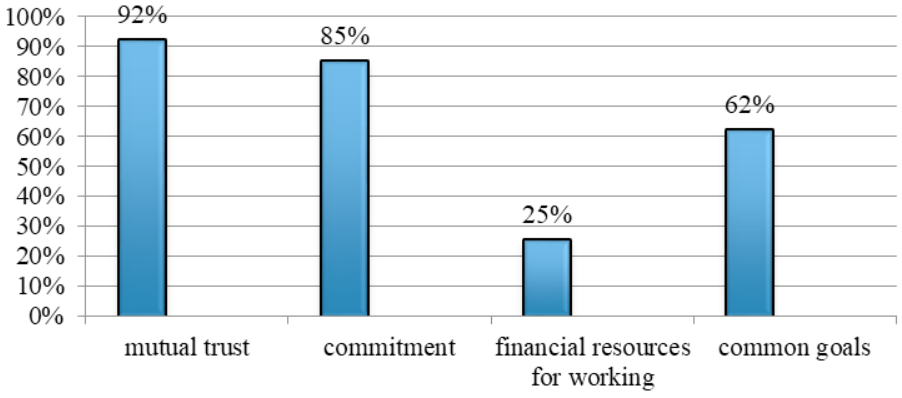

Figure 6 – Drivers of cooperation
Note – compiled by authors

Results of the survey of respondents to the question: how important is the interaction of universities with business on the Likert scale: in the total number of respondents, 78% of the answers give "Very important". As for the two groups, the degree of importance of "Very important" is 66%, according to business leaders, 34% – University employees. Consequently, UBC receives more support in terms of human resources, infrastructure investment, and invested funds, with policy makers around the world recognizing the potential for closer interaction between these two proposals (Tartari et al., 2012). The challenge for those who manage or control this process is to maximize the results achieved from investments that require a strategic review and understanding of how the entire UBC phenomenon works. Similarly, researchers in the UBC field are expected to contribute to new conceptualizations and conclu-

sions that promote UBC as a research field (Galán-Muros, 2017).

Conclusion

Cooperation between universities and businesses has its own peculiarities depending on the country. The forms of cooperation may differ depending on the economic status, cultural characteristics, commercial opportunities, educational policy, etc. But regardless of these differences, there are General principles of cooperation. These forms of cooperation will help to achieve a closer relationship. Solving problems to achieve your goals gives you the key to the next level of collaboration. As the results show, all the barriers that both sides face are relevant today. Personal barriers, bureaucracy, and resource barriers require joint solutions in collaboration. Based on the results of the respondents' responses, it can be understood that a third party will benefit from this cooperation. These are third-party students. Supporting the development of students' competencies and careers (participation in graduate networks, collaboration with University employment offices, and participation in academic, teaching, and research activities) is important for everyone. This proves that educational institutions and enterprises have common goals of cooperation. Cooperation can take various forms, depending on the local and national nature. An open policy on both sides can open up unplanned opportunities that will lead to profitable interaction. Technological progress, working with big data, and quickly deleting information will require big changes in everything. Research results may be inaccurate due to the limited number of respondents. However, with the help of the survey, we found out the factors that influence cooperation between universities and the business environment, indicating representatives of two groups. The following research topics should explore the collaboration process in more detail.

References

Abdi M., Aulakh P.S. (2014) Locus of uncertainty and the relationship between contractual and relational governance in cross-border interfirm relationships. *Journal of Management*, pp. 1-33

Ambos T.C., Mäkelä K., Birkinshaw J., D'Este P. (2008) When does university research get commercialized? Creating ambidexterity in research institutions. *J. Manag. Stud.,* vol.45, No.8, pp. 1424-1447.

Auranen O., Nieminen M. (2010) University Research Funding and Publication Performance: An International Comparison. *Research Policy*, vol. 39(6), pp. 822-834.

Bathelt H., Kogler D.F., Munro A.K. (2010) A knowledge-based typology of university spin-offs in the context of regional economic development. *Technovation*, vol. 30, No. 9, pp. 519-532.

Bekkers R., Bodas Freitas I.M. (2008) Analysing knowledge transfer channels between universities and industry: to what extent do sectors also matter? *Res. Policy,* vol. 37, pp. 1837-1853.

Berbegal-Mirabent J., Sabaté F., Cañabate A. (2012) Brokering knowledge from universities to the marketplace: the role of knowledge transfer offices. *Manag. Decis.,* vol. 50, No. 7, pp. 1285-1307.

Bouncken R.B., Claub T., Fredrich V. (2016) Product innovation through coopetition in alliances: Singular or plural governance? *Industrial Marketing Management,* vol. 53, pp. 77-90.

Brem A., Radziwon A. (2017) Efficient triple Helix collaboration fostering local niche innovation projects–a case from Denmark. *Technol. Forecast. Soc. Chang.,* vol. 123, pp.130-141.

Bryła P., Jurczyk T., Domański T. (2013b) Klasyfikacja barier podejmowania współpracy z otoczeniem gospodarczym przez uczelnie wyższe. *Marketing i Rynek*, No. 5, pp. 10-16.

Burns A., Burns R. (2008) Basic Marketing Research (Second ed.). New Jersey: Pearson Education. pp. 245. ISBN 978-0-13-205958-9.

Cao Z., Lumineau F. (2015) Revisiting the interplay between contractual and relational governance: A qualitative and meta-analytic investigation. *Journal of Operations Management,* vol. 33-34, pp. 15-42.

Cardinal L.B. (2001) Technological Innovation in the Pharmaceutical Industry: The Use of Organizational Control in Managing Research and Development. *Organization Science*, vol. 12(1), pp. 19-36.

Clauss T., Kesting T. (2017) How businesses should govern knowledge-intensive collaborations with universities: An empirical investigation of university professors. *Industrial Marketing Management,* vol. 62, pp. 185-198.

Dan M.C. (2013) Why Should University and Business Cooperate? A Discussion of Advantages and Disadvantages. *International Journal of Economic Practices and Theories*, vol. 3, no. 1, pp. 67-74.

Davey T., Baaken T., Galan Muros V., Meerman A. (2011) The State of European University Business Cooperation. Final Report Study on the Cooperation between Higher Education Institutions and Public and Private Organisations in Europe. Science to Business Marketing Research Centre.

Davey T., Meerman A., Allinson R., Muros V.G., Baake T., Baaken T. (2013a) EU University Business-Collaboration: Country report UK. ISBN 978-90-820668-1-4

Davey T., Muros V.G., Baake T., Meerman A. (2013b) Presentation at the Pre-Conference Special Events for the Triple Helix Conference. Oxford & Cambridge Club

Dzhumambaev S. (2019) Problems of forecasting demand for labor force in the labor market in Kazakhstan. *The Journal of Economic Research & Business Administration*, vol. 127, No. 1, pp. 276-285.

Fernandez-Esquinas M., Pinto H., Yruela M.P., PereiraTracing T.S. (2016) The flows of knowledge transfer: latent dimensions and determinants of university–industry interactions in peripheral innovation systems. *Technol. Forecast. Soc. Chang.,* vol. 113, Part B, pp. 266-279.

Fini R., Grimaldi R., Santoni S., Sobrero M. (2011) Complements or substitutes? The role of universities and local context in supporting the creation of academic spin-offs. *Res. Policy,* vol. 40, No. 8, pp. 1113-1127.

Galán-Muros V., Van der Sijde P., Groenewegen P. et al. (2017) Nurture over nature: How do European universities support their collaboration with business? *J. Technol. Transf*., vol. 42, pp.184-205.

Gilsing V.A., Van Burg E., Romme A.G. (2010) Policy principles for the creation and success of corporate and academic spin-offs. *Technovation*, vol. 30, No.1, pp. 12-23.

Greitzer E.M., Pertuze J., Calder E., Lucas W.A. (2010) Best practices for industry-university collaboration. *MIT Sloan Management Review*, vol. 51, No. 4, p. 83.

Hewitt-Dundas N. (2012) Research intensity and knowledge transfer activity in UK universities. *Res. Policy,* vol. 41, No.2, pp. 262-275.

Hsueh-Liang Fan, Mu-Hsuan Huang, Dar-Zen Chen (2019) Do funding sources matter? The impact of university-industry collaboration funding sources on innovation performance of universities. *Technology Analysis & Strategic Management*, DOI: 10.1080/09537325.2019.1614158

Huyghe A., Knockaert M., Wright M., Piva E. (2014) Technology transfer offices as boundary spanners in the pre-spin-off process: the case of a hybrid model. *Small Bus. Econ.,* vol. 43, No. 2, pp. 289-307.

Ivanova I.A., Leydesdorff L. (2014) Rotational symmetry and the transformation of innovation systems in a triple helix of university–industry–government relations. *Technol. Forecast. Soc. Chang.,* vol. 86, pp. 143-156.

Ivascu L., Cirjaliua B., Draghici A. (2016) Business model for the university-industry collaboration in open innovation. *Procedia Economics and Finance*, vol. 39, pp. 674-678.

Madudova E., Majercakova M. (2017) The influence of university-firm cooperation on firm value chain. *16th International Conference on Information Technology Based Higher Education and Training (ITHET),* Ohrid*,* pp. 1-6.

Minguillo D., Tijssen R., Thelwall M. (2015) Do science parks promote research and technology? A scientometric analysis of the UK. *Scientometrics*, vol. 102, No.1, pp. 701-725.

Nielsen C., Cappelen K. (2014) Exploring the mechanisms of knowledge transfer in university–industry collaborations: a study of companies, students and researchers. *High. Educ. Q.,* vol. 68, No. 4, pp. 375-393.

Nyman G.S. (2015) University-business-government collaboration: from institutes to platforms and ecosystems. Nyman Triple Helix, 2:2.

Orazbayeva B., Plewa C., Davey T., Galan Muros V. (2019) The Future of University-Business Cooperation: Research and Practice Priorities. *Journal of Engineering and Technology Management,* vol. 54, pp. 67-80.

Peltonen J., Tuomisaari H., Karjalainen J., Nyberg T., Nyman G. (2013) Examining the foundational properties of dynamic value networks. Paper presented at the 2013 IEEE International Conference on Service Operations and Logistics, and Informatics, Dongguan, Guangdong, China.

Perkmann M., Tartari V., McKelvey M., Autio E., Broström A., D'Este P., Sobrer M. (2013) Academic engagement and commercialisation: a review of the literature on university–industry relations. *Res. Policy,* vol. 42, No.2, pp. 423-442.

Pleśniarska A. (2016) Współpraca nauki z biznesem na rzecz rozwoju gospodarczego, [in:] H. Ten- dera-Właszczuk, W. Bąba, M. Zajączkowska (eds.), Nowe wyzwania integracji europejskiej, Difin, Warszawa

Quintana C.D.D., Mora J.G, Pérez P.J. et al. (2016) Enhancing the development of competencies: The role of UBC. *European Journal of Education*, vol. 5, No. 1, pp.10-24.

Ripoll Feliu V., Díaz Rodríguez A. (2017) Knowledge transfer and university-business relations: Current trends in research. *Intangible capital,* vol. 13, No. 4.

Rossano S., Meerman A., Kesting T., Baaken T. (2016) The Relevance of Problem based Learning for Policy Development in University-Business Cooperation. *European Journal of Education*, vol. 51, pp. 40-55.

Rossi F., Rosli A. (2014) Indicators of university–industry knowledge transfer performance and their implications for universities: Evidence from the United Kingdom. *Studies in Higher Education*, vol. 40, pp. 1-22.

Rybnicek R., Königsgruber R. (2019) What makes industry–university collaboration succeed? A systematic review of the literature. *Journal of Business Economics*, vol. 89, No. 2, pp. 221-250.

Samuel A. (2014) Established companies, get ready for the collaborative economy. *Harvard Business Review,* HBR Blog Network.

Sarpong D., AbdRazak A., Alexander E. et al. (2015) Organizing practices of university, industry and government that facilitate (or impede) the transition to a hybrid triple helix model of innovation. *Technological Forecasting and Social Change*, vol. 123, pp. 142-152.

Seong T.K., Joh H.D., Lee D.H., Sommers P. (2011) The role of university research about the industry R&D and innovation. *Ind. Innov. Res*., vol. 27, pp. 1-23.

Serbanica C., Constantin D., Dragan G. (2015) University–Industry Knowledge Transfer and Network Patterns in Romania: Does Knowledge Supply Fit SMEs' Regional Profiles? *European Planning Studies*, vol. 23.

Snell S. (1992) Control-theory in Strategic Human-resource Management – The Mediating Effect of Administrative Information. *Academy of Management Journal*, vol. 35(2), pp. 292-327.

Taratukhin, V., Yury V., Kupriyanov, J. Becker. (2016) Towards a Framework for Educational University-Industry Cooperation: Industry Perspective. *American Society for Engineering Education.* p.17240

Tartari V., Perkmann M., Salter A. (2012) In good company: The influence of peers on industry engagement by academic scientists. *SSRN Electronic Journal*, pp. 1–44.

Tseng F., Huang M., Chen D. (2020) Factors of university–industry collaboration affecting university innovation performance. *J Technol Transf*, vol. 45, pp. 560-577.

Turginbayeva A.N., Sadykhanova G.A., Tanassoglo Y., Tarabella A.A. (2018) Entrepreneurial universities in the Kazakhstan socio-economic landscape. *The Journal of Economic Research & Business Administration*, vol. 3 (125), pp. 117-126.

Winkelbach A., Walter A. (2015) Complex technological knowledge and value creation in science-to-industry technology transfer projects: The moderating effect of absorptive capacity. *Industrial Marketing Management*, vol. 47, pp. 98-108.

Wright M., Clarysse B., Lockett A., Knockaert M. (2008) Midrange universities' linkages with industry: knowledge types and the role of intermediaries. *Res. Policy,* vol. 37, No. 8, pp. 1205-1223.

Yordanova D. (2018) University-industry cooperation for encouragement of graduating employability – methodology for evaluation. *Proceedings of the International Conference on Business Excellence,* vol. 12(1), pp. 1048-1058.