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UNIVERSITIES – INDUSTRY COLLABORATION: THE STRENGTH OF STRONG TIES

Introduction

The strength of contemporary economy is based on developed relationships between entities representing various potentials and competences. The links between universities and companies constitute a particular case. Science generates new ideas, breaks stereotypes and crosses the barriers of thinking. Business takes risks and faces various expectations existing on the market. The marriage of science and business can lead to the creation of new values generating the competitiveness of individual companies and entire economic structures. The article presents research carried out by WSB University team and was aimed at identifying relations between universities and the business sector. In particular, the scope of this cooperation and the premises conditioning its effectiveness were analysed. The study was conducted on a nationwide sample of enterprises[1].

1. Towards knowledge-based economy

The processes of social-economic development of the 21st century are becoming increasingly complicated and difficult to describe unambiguously. The age of

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postmodernism and "liquid reality" undermined the common canons of thinking about the future of societies and economy. Among processes determining the complexity and dynamics of the contemporary world, one can list, e.g.:

- globalisation related to an increase in the density of relationships and the widening of their spatial range, and at the same time to an increase in the sensitivity of economic entities to changes occurring in various parts of the world,
- the development of sectoral networks and cross-sectoral relationships; the transfer of achievements between business, science, education, culture and public institutions,
- balancing competitive and cooperative relationships, including the development of business enterprises based on the strength of associates (the construction of own distinguishing competences in correlation with the competences of partners),
- intergenerational changes, related to the high dynamics of expectations and aspirations of people representing subsequent generations, affecting changes on the labour market and demand on the consumer market,
- an increase in the significance of intelligent specialisations in development policies laid down at a European, national and regional level,
- the necessity to shape the labour market in correlation with changes, and in particular with increasing the qualifications of human capital,
- climatic changes forcing the search for new models of development, both in the technological and in the organisational aspect.

The pressure of changes occurring in the surroundings makes it necessary to look for new ways of development, new products or new technologies. The shaping of the economic change in relation to local economic structures requires a partnership approach, combining the activities and potentials of entities from various sectors. Economic change is not an exclusive feature of the business sector. An equally significant part in this process is played by the public and civil sector, labour market institutions, and the business environment, education, science, as well as the field of research and development.

Economy of the 21st century is based primarily on knowledge; according to the definition of the OECD, it consists of sectors generating, relaying and applying knowledge and information in practice. Knowledge is becoming a product, an independent entity, which drives the development of a company, an industry, an area and the communities inhabiting it. The foundation of success in the knowledge-based economy is the ability to implement radical changes in numerous dimensions of the functioning of companies and partnership shaped at a local, regional, national and EU level. The value of contemporary managerial staff results from the ability to "forget" the previous knowledge and habits, and introduce in their place new knowledge useful from the standpoint of strengthening the competitiveness of a company.

Innovativeness should be perceived in a complex, comprehensive and procedural manner. It is a kind of a social mechanism being a basis for the process of generating

new goods or services. Innovative environment is created and strengthened in the process of establishing and developing enterprises and their creation of new products, technologies and markets. In this process, the companies' partners include entities specialised in creating and spreading knowledge, in particular universities [Golińska-Pieszyńska, 2017: 261–270]. In the course of strengthening this role, universities may become central actors in processes of innovation diffusion in regional systems [see: Tagliazucchi, Marchi, Gherardini, Leali, 2021]. The cooperation of science and business is one of the foundations of a self-sustaining, innovative economic development, using a set of specific local resources, in particular those which result from the knowledge and entrepreneurship of local communities.

The ability of companies to absorb, generate and use knowledge (create innovations with a commercial value) is determined not just by a set of internal potentials and capabilities, but also by the surroundings which provide economic entities with a set of the so-called external benefits. These surroundings should be considered not so much as the location of an enterprise (e.g. in terms of transport connections, distances from business partners or recipients), but primarily as a system consisting of entities representing various sectors. In such a system, what also matters apart from the enterprises are the public authorities, non-government organisations, the entities of education, culture and science [Kleiber, 2004]. Contemporary economy is based on a network of complex relationships between partners representing various competences and resources. The combination of complementary potentials determines the innovativeness of both the individual companies, as well as of the entire economic structure. Among mechanisms determining the level of vitality of cities and regions, key significance is attributed to the cross-linking mechanism, related to the inclinations and capabilities of local entities to share various material and immaterial resources, in particular knowledge and ideas, mutual inspiration, the development of cooperation discovering new possibilities for growth, synergistic combination of potentials, including especially in the cross-sector approach [Wrana, 2017; Wrana, 2018].

The challenges presented above inspired the team of WSB University in Dąbrowa Górnicza to undertake research in 2021 on current and postulated relations occurring between universities and business in Poland. The main objective of the study was to identify the premises and conditions for forming long-term relations between higher education institutions and entrepreneurs (with particular emphasis on tools based on modern technological and IT solutions). Among the basic research assumptions is the fact that the diagnosis of partnership relations between science and business needs to be considered at three levels:

- the science sector as the core of innovation in business,
- the science sector as the factor of transforming the competences of personnel,

- the science sector as a force supporting the development and transformation of the economic structure, including the factor of creating relationships and partnerships. The main research issues included:
- evaluation of the current state of cooperation of the surveyed entities with universities,
- desired scope of cooperation,
- factors determining the effectiveness of cooperation,
- perception of universities by the respondents in the context of the represented characteristics and realised cooperation,
- analysis of the current and desired image of HEIs in the context of cooperation.

The conducted research allowed for answering the following question: for what purpose partnerships between universities and companies are (or can be) established, in particular within the scope of:

- directions of interaction and cooperation shaped (emerging) between the science and business sectors,
- the forms of partnership existing between universities and companies, as well as the scope and duration of the partnership,
- motivations of universities and companies forming a basis for the development of partnership – answering the question why entities of the science sector and the business sector establish or want to establish a partnership,
- factors supporting and hindering the development of partnership relationships between a university and a company,
- foundations for industries based on knowledge along with the identification of entities which form or can establish temporary or lasting partnerships in the business-science arrangement,
- supply chains, in which science constitutes a core value, commercialised by business, in particular being a creator of solutions contributing to the development, implementation and improvement of new technologies [Howaniec, Okrzesik, 2015: 167–179].

The role and expectations of universities in terms of their impact on socio-economic development are changing. The research examines different forms of influence of universities on socio-economic objectives [see: Dwitya, Ali, Dawei, 2021: 9–22]. Partnership relationships between the science sector and the business sector can be approached in a broad or in a narrow manner. In the wide approach, it can be assumed that:

- they are shaped around interests bonding entities from the indicated sectors, which can be pursued more efficiently via interaction/cooperation/partnership and the transfer of various values and solutions between the entities,
- they are based on common ideas of success, starting with a vision linking the interests of entities from the science sector and the business sector, and ending with an image of the result of specific jointly performed actions or projects,

- they are implemented via practical actions with a high potential of innovativeness and creativity, aimed at changing the current reality, creating a reality desired by partners from the business and science sectors,
- they refer to relationships established in a situation when partners are expecting that partnership is a way to reach a status, in which the sum of all benefits for each side is larger than possible difficulties resulting from a joint action and the overcoming of divergences resulting from differences between entities operating in sectors with various goals, experiences, competences, etc.,
- they constitute a lasting cement for the coalitions of individual entities representing the science sector and the business sector (taking into account other sectors greatly involved in the creation and implementation of innovations with a commercial value).

In the narrow approach, the partnership of science and business involves two or more partners from these sectors having coordinated – the same or complementary – objectives; partnership is linked with the process of reaching an understanding in order to achieve the effects of synergy, take joint actions with consideration for the sharing of resources, work, risk, responsibility, decision making, power, and above all the benefits which outweigh the costs.

When seeking bases for developing relationships between science and business, one cannot neglect the fact that universities and the academic community are also characterised by a certain type of entrepreneurship. The manifestations of this entrepreneurship vary and they include, e.g. creating and managing research teams, acquiring funds for research, discovering research niches, establishing start-up companies at universities, etc [Chyba, Grudzewski, 2011].

2. The science-business partnership assessed by entrepreneurs

Research project carried out by WSB University team, uses a number of research tools to gather information on the determinants of cooperation between the university and the business sector[2]. It utilises the method of Focused Group Interview (FGI), in an on-line mode; 4 interviews were completed. The research was performed in March 2021, and the respondents consisted of people representing companies both cooperating and not yet cooperating with universities.

For companies not cooperating with universities, 2 FGIs were performed with a total of 12 people from companies from three provinces: Mazowieckie, Świętokrzyskie and

[2] The survey was performed by the *Lokalne Badania Społeczne Company for the WSB University*, under the project titled *PERFECT – Regional Initiative of Excellence at the WSB University*.

Śląskie. Only people representing entities hiring at least 10 employees were qualified for the survey; in each group there were people representing entities hiring more than 50 employees. Industries to be represented in the survey were not precisely defined; however, the preferred industries included finances, insurance, energy, FMCG, pharmacy, fuel, mining, industrial production, services, trade and transport. Respondents included members of the managerial staff and/or decision-makers: people in charge and/or employees co-responsible for making decisions related to the development of companies.

There were also 2 FGIs conducted with companies cooperating with universities; they included a total of 12 members of the managerial staff or decision-makers. Assumptions related to the size of the company, the industry, or the location, were analogical to the companies which did not cooperate with universities. However, a detailed qualification criterion was adopted, requiring the company to engage in at least one of the following activities:

- 1: providing internships for students,
- 2: searching for employees or volunteers at universities,
- 3: opinionating the educational programmes of universities,
- 4: organising joint education modules, courses, trainings,
- 5: participation in meeting and conferences organised at universities,
- 6: cooperation with universities as a partner in projects, e.g. of research and development,
- 7: making use of the expert knowledge of the academic staff,
- 8: making use of the results of research performed at universities,
- 9: involvement in charity events and other social actions organised by universities,
- 10: participation in advisory bodies operating at universities,
- 11: inspiration by innovations which are popularised by a university, e.g. new technologies,
- 12: inviting a university as a partner in organised undertakings, activities, etc.

The performed survey indicates a somewhat ambiguous, but still promising image of relationships shaped between science and business. The managers of companies recognise that cooperation based on mutual favours is a source of benefits and satisfaction resulting from this type of cooperation. Such a statement proves how important it is to base partnership to identify properly each party's expectations. Moreover, each partner must first rethink and clearly define their own expectations, and then precisely communicate them to the potential partner. In other words, the unidirectional model of relationships does not encourage the formation of bonds between universities and companies; it lowers the level of satisfaction with the cooperation, it discourages work on the partnership and its strengthening or deepening.

The level of satisfaction with the pursued cooperation is also confirmed by quantitative data developed in the CATI survey examining a sample of 350 companies[3].

The conducted research indicates that the level of satisfaction of companies regarding their cooperation with universities is high, as expressed by 93% of respondents. A higher value of the level of satisfaction (98%) was recorded in the group of entities organising joint education modules, courses or trainings in cooperation with universities.

Table 1. The level of satisfaction with cooperation carried out so far

	Satisfied (4+5) (%)	Dissatisfied (1+2) (%)	Average on a scale of 1–5[a]
Cooperation type	93	1	4.34
providing internships for students	94	1	4.45
searching for employees or volunteers at universities	95	2	4.44
making use of the expert knowledge of the academic staff	95	1	4.44
making use of the results of research performed at universities	96	-	4.41
participation in meetings and conferences organised at universities	94	2	4.4
inspiration by innovations which are popularised by a university, e.g. new technologies	94	3	4.37
organising joint education modules, courses, trainings	98	-	4.33
involvement in charity events and other social actions organised by universities	95	-	4.33
cooperation with universities as a partner in projects, e.g. of research and development	95	-	4.3
inviting a university as a partner in organised undertakings, activities, etc.	90	3	4.26
opinionating educational programmes of universities	90	1	4.23
participation in advisory bodies operating at universities	86	5	4.19

[a] Participants in the survey rated the strength of relationships with universities using a five-degree scale, where 1 – very dissatisfied, 5 – very satisfied.

Source: own study based on Report on the research performed under the project: *PERFECT – Regional Initiative for Excellence at the WSB University* [2021].

Another key aspect is the permanence and longer, indeed strategic prospect of cooperation, which – according to the respondents – should not be action-based, or temporary. It is a desired model to build mentioned cooperation in a procedural aspect; as part of this process, it is recommended to define stages accepted by the partners,

[3] CATI qualitative research under the project *PERFECT – Regional Initiative of Excellence at the WSB University* in a period from November 2020 to March 2021.

or milestones related to specific effects and the consecutive phases of partnership. This will facilitate monitoring the results of cooperation, and it will also constitute motivation for gradual transformation and consolidation of partnership.

Graduate relationships are an important factor influencing the cooperation with universities. The respondents provided both positive and negative examples of building relationships with their alma maters; however, it is beyond doubt that there is a potential for the creation of this type of solutions; they can be relationships with graduates who today hold managerial positions in companies, but also with the employees of lower levels in companies.

The entrepreneurs believe that they are usually the ones being initiators and cooperation-seeking parties. Such an opinion proves an important chance for the development of cooperation, which is the perception of the significance of partnership by managers. At the same time, the respondents clearly expressed their desire for increased activity of universities within the aforementioned scope. According to the surveyed entrepreneurs from both groups, universities do not take initiatives of this type of cooperation, which according to the respondents can result from the absence of proper organisational units, or people assigned to execute this type of tasks. For the interviewees, the structure of universities lacks transparency and seems incompatible with the specifics of cooperation with economic entities. Respondents representing companies both cooperating and not cooperating with universities believe that universities function under entirely different logic, which is completely unlike the principles of operation of commercial entities, which focus on practical aspects and on achieving market successes. There are barriers of a structural and conscious nature, involving, e.g. the set of shared values defining the organisational culture. In the respondents' opinions, there is a lack of space, or developed mechanisms for this type of cooperation (the so-called good practices), related to the creation of possibilities to meet and exchange the experience of practitioners of business and the academic community. The creation of this type of solutions (e.g. conferences, cooperation platforms) could become a key element of the designed model of establishing or strengthening relationships between universities and external stakeholders.

Among chances which can drive the cooperation of universities with business, one can list "demand" chances resulting from expectations expressed by the respondents, referring to the important functions served by universities in their environment. Among them, the following stand out:

- commitment to inhabitants, the local community,
- dissemination of innovations and new technologies (this aspect was addressed, e.g. in the context of the current needs of business, related to the necessity of functioning in a remote mode during the COVID-19 pandemic),
- training of staff for the economy and the society,

- extensive cooperation with business, e.g. research performed along with entrepreneurs,
- focusing on practice and on solving real problems,
- dissemination of knowledge on various subjects; social education,
- expertise, counselling in the social and economic environment – this type of services should be "tailored", and thus adjusted to the individual needs of entrepreneurs, identified based on a comprehensive diagnosis,
- cooperation with graduates,
- taking initiative, greater openness in relationships with the outside world, "reaching out…",
- being up to date, catching up with the current knowledge, setting trends.

It is clear that the expectations of companies with respect to universities are highly diverse. It should be noted that they do not apply to purely implementational issues, meaning the creation of solutions with a market value. Companies see in universities the leaders of the contemporary world, the creators of ideas, entities popularising knowledge from various areas.

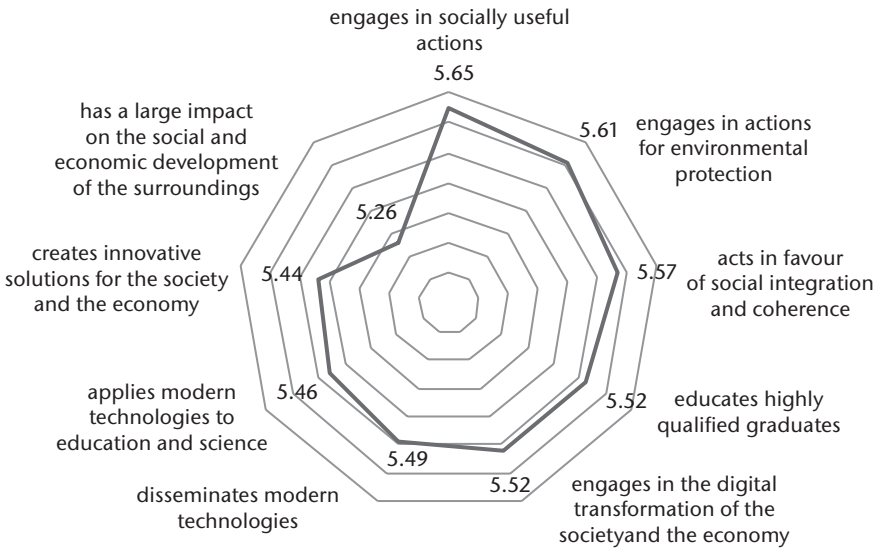
Here, one should mention the assessment of the role which the representatives of enterprises see in a university. In the aforementioned quantitative study, enterprises emphasised the issues of the universities' commitment to their surroundings and the quality of education as the key role of universities.

The representatives of companies not cooperating with universities are considering the initiation of obvious, elementary forms of cooperation with the science sector; it confirms the stereotype that, at the initial stage of establishing relationships, the developed relationships are rather shallow, based on utilisation of the potential and competences of universities (a relationship of the "service provider – service recipient" type, using a university's offer of education or expertise). It may seem that companies focus on searching for simple forms of cooperation, since they do not possess the knowledge that it is possible to build more advanced relationships. Respondents from this group underlined the necessity for the universities to emphasise the fact that it is attainable to establish more permanent and deeper partnerships related to various issues, in particular cooperation regarding technology, personnel or design.

Companies cooperating with universities indicated different types of experiences. Although some of them also pursued simple forms of cooperation with universities, in the studied group there were also people representing entities with much more advanced and long-term relationships with the sector of higher education. Such entities implemented more complex joint undertakings with universities, including research and development projects. The evaluation of such cooperation among entrepreneurs is high, proving good prospects of cooperation for the future. In spite of various barriers of a structural and conscious nature, there is a need to create this

type of links, like, e.g. platforms for exchanging experience and matching partners (e.g. based on solutions similar to brokering).

Figure 1. The rated perception of the activity of universities (on a scale of 1–7[a])



5.65 engages in socially useful actions
5.61 engages in actions for environmental protection
5.57 acts in favour of social integration and coherence
5.52 educates highly qualified graduates
5.52 engages in the digital transformation of the society and the economy
5.49 disseminates modern technologies
5.46 applies modern technologies to education and science
5.44 creates innovative solutions for the society and the economy
5.26 has a large impact on the social and economic development of the surroundings

[a] Participants in the survey rated the strength of relationships with universities using a seven-degree scale, where 1 – I definitely disagree, 7 – I definitely agree.

Source: own study based on Report on the research performed under the project: *PERFECT – Regional Initiative for Excellence at the WSB University* [2021].

The examined entrepreneurs from all groups appreciate the substantive competences of universities, and they also see a considerable change in the manner of their functioning within a longer timeframe, related to a noticeable improvement with respect to the infrastructure of universities (e.g. residential facilities, equipment, inventory); this is largely related, e.g. to the utilisation of external funds, including from the EU, which support the execution of research projects, the extension of the educational offer, and above all the initiation of research and development projects. In the past, universities were perceived as outdated and not adjusted to the requirements

of the present day, while currently this way of perceiving them is undergoing a visible evolution. The image of universities is diverse, depending on the industry represented by entrepreneurs; however, it can be clearly seen that there is an increasing appreciation for the uniqueness of access to specialised equipment, as well as innovations and technical novelties which can be offered by the entities of the higher education sector; this is noticed in particular by the representatives of the medical and metallurgical industries, paying attention to the necessity of performing research or certification.

The interviewees also see a noticeable evolution of approaches in the academic environment, towards modernity and greater openness to cooperation with entrepreneurs. The above phenomenon is associated by respondents mainly with the generational change at universities.

Respondents from all groups expressed their interest in learning about or using various solutions related to computer technology. It should be especially stressed that, in spite of appreciation for the weight of this type of tools, e.g. related to work in the on-line mode, cyber safety, or the robotisation and automation of processes, the respondents greatly emphasise the strong need to maintain interpersonal relationships. This particular aspect cannot be neglected in the process of developing and strengthening bonds between universities and the outside world.

Table 2. Limitations and barriers for developing or strengthening relationships with universities

Companies not cooperating with universities	Companies cooperating with universities
Negative experiences from the past (e.g. feeling of no benefits, unilateral benefits – only for the university	Negative experiences from the past, "bad practices"
No partnership relationships	Incompatibility with the needs of the market (including the labour market)
No initiative on the university's part	No initiative and will of cooperation on the university's part
Incomparably high expenses relative to the produced results (e.g. time-consuming, inefficient cooperation)	The organisational structure and the manner of managing universities; no people or organisational units specialised in cooperation with entrepreneurs
Low level of the entrepreneurs' knowledge, no flow of information about the possibilities of using the university's offer	Low quality of education at certain universities or faculties (e.g. sharing outdated, obsolete knowledge)
Incompatibility of the university regarding cooperation with entrepreneurs (e.g. no assigned people or organisational units)	Low level of knowledge about the possibilities of (more advanced) cooperation; no ideas for innovative actions; focusing on simple forms of cooperation
No flexibility or openness of the university to cooperation ("fossilised structures...")	
Limitations resulting from the specificity of certain industries ("there is simply no such need...")	

Source: own study based on the results of focused group interviews.

Conclusion

The performed research indicates that Polish companies do not need to be particularly persuaded into the partnership of science and business. There are visible potential benefits of cooperation and conditions determining its efficiency. However, the managers also point out a number of barriers hindering, and sometimes even preventing such cooperation. The deficiencies of partnership are rather attributed to universities, which are sometimes perceived as entities with not enough openness to the surroundings, low flexibility, focusing on actions with moderate practical usefulness. Such opinions result partially from previous experience, and partially from the lack of knowledge about what goes on at universities. However, the criticisms do not obscure the assets which can be provided to companies due to their cooperation with universities. Among such benefits, one should mention values related to the shaping of human capital, the implementation of innovative solutions, opening new perspectives of thinking about the market, and supplying both companies and larger communities with new ideas.

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UNIVERSITIES – INDUSTRY COLLABORATION: THE STRENGTH OF STRONG TIES

Abstract

The partnership of science and business still cannot be considered a rule. There are still numerous barriers and prejudices limiting the strength and scope of cooperation between these two sectors. It is recommended to constantly monitor the attitudes and beliefs of company managers and researchers about the values which could be achieved due to the cooperation of companies and universities. The purpose of the article is to provide a broader context of science-business relationships, and to present real conditions for the partnership of these sectors, in particular based on research performed with the participation of the managerial staff of companies.

Keywords: partnership of science, partnership of business, science-business relationships

JEL classification codes: M10, M13, M14, 031, 032, 033, 034

WSPÓŁPRACA MIĘDZY UNIWERSYTETAMI A PRZEMYSŁEM: SIŁA TRWAŁYCH WIĘZI

Streszczenie

Partnerstwo nauki i biznesu nie może być jeszcze uznawane za regułę. Wciąż występuje wiele barier i uprzedzeń ograniczających siłę i zakres współpracy między tymi dwoma sektorami. Warto stale monitorować postawy i przekonania menedżerów firm i naukowców na temat wartości, które mogą być osiągane dzięki kooperacji firm i uczelni. Celem artykułu jest nakreślenie szerszego tła relacji nauka–biznes oraz przedstawienie realnych uwarunkowań warunkujących partnerstwo tych sektorów, zwłaszcza opierając się na badaniach zrealizowanych przy udziale kadry menedżerskiej przedsiębiorstw.

Słowa kluczowe: partnerstwo w nauce, partnerstwo w biznesie, relacja nauka-biznes

Kody klasyfikacji JEL: M10, M13, M14, 031, 032, 033, 034