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JEL Classification: I23, O32

COOPERATION WITH BUSINESS AS AN EXPRESSION OF THE IMPLEMENTATION OF THE ENTREPRENEURIAL UNIVERSITY MODEL. A CASE STUDY

WSPÓŁPRACA Z BIZNESEM JAKO WYRAZ REALIZACJI MODELU UNIwersYTETU PRZEDSIĘBIORCZEGO. STUDIUM PRZYPADKU

<https://doi.org/10.34739/maj.2024.01.01>

Abstract: Since the innovativeness of the economy is influenced by education and science (especially higher education), building bridges between the worlds of science and business has become a necessity. This approach is reflected in the practical implementation of the entrepreneurial university model. This article presents the essence of this model, with particular emphasis on the university-business cooperation along with the resulting benefits and selected areas of its implementation. The aim of the article is to indicate the activities of universities that fit into the entrepreneurial university model. Versatile forms of cooperation with enterprises implemented in 2017-2023 were indicated on the example of the activity of the Department of Logistics and Innovations of the University of Łódź. The study used the *participant observation* method. The article is of a theoretical and empirical nature.

Keywords: entrepreneurial university, third generation university, cooperation between universities and enterprises, benefits of university-business cooperation

Streszczenie: Na innowacyjność gospodarki ma wpływ m.in. funkcjonowanie edukacji i nauki (zwłaszcza szkolnictwa wyższego), dlatego konstruowanie pomostu pomiędzy światem nauki a biznesu staje się koniecznością. Podejście to ma swój wyraz w praktycznej realizacji modelu uniwersytetu przedsiębiorczego. Celem artykułu jest wskazanie aktywności uczelni, które wpisują się w model uniwersytetu przedsiębiorczego. Krótko przedstawiono ewolucję modelu uniwersytetu, by w dalszej części skupić się na istocie modelu trzeciej generacji. Wskazano formy transferu wiedzy z uczelni wyższych do otoczenia oraz główne zadania centrów współpracy z biznesem oraz omówiono płaszczyzny możliwej współpracy oraz określono wynikające z niej korzyści (dla obu stron). Przyjmując perspektywę B. Clarka oraz J.G. Wissema wskazano na działania Uniwersytetu Łódzkiego, które wpisują się w model uniwersytetu przedsiębiorczego. Na przykładzie aktywności Katedry Logistyki i Innowacji UŁ wskazano formy współpracy z przedsiębiorstwami zrealizowane w latach 2017-2023 (w badaniu zastosowano metodę *obserwacji uczestniczącej*). Konstatacja autorki jest taka, że biorąc pod uwagę wielopłaszczyznowe korzyści z kooperacji uczelni wyższych i biznesu państwo powinno tworzyć ekosystem, w którym biznes będzie realnie współpracował z uczelniami. Artykuł ma charakter teoretyczno-empiryczny.

Słowa kluczowe: uniwersytet przedsiębiorczy, uniwersytet trzeciej generacji, współpraca uczelni z przedsiębiorstwami, korzyści ze współpracy uczelni z biznesem

*The value of an education in a liberal arts college
is not the learning of many facts
but the training of the mind to think something
that cannot be learned from textbooks.*

Albert Einstein

Introduction

According to Wissema, the evolution of changes in the functioning of universities can be presented as follows (Wissema, 2009, p. 6):

- a medieval university (first generation), focused on education and defending the truth;
- Humboldt University (second generation), focused on education and research (to explore nature);
- an entrepreneurial university (third generation), with the aim of not only educating and conducting research, but also to use knowledge to generate value outside the university walls (including in cooperation with business).

The aim of the article is to identify the scope and nature of cooperation between universities and enterprises. The considerations will be exemplified based on the activities undertaken at the Department of Logistics and Innovations of the University of Łódź in 2017-2023. The study defines both the essence of the entrepreneurial university model as well as its main components. The basic areas of cooperation between science (universities) and business were presented, and its advantages were identified.

Literature review - the essence of an entrepreneurial university and principal areas of cooperation between science and business

At the beginning of the 19th century, universities underwent a transformation and became second-generation universities (Humboldt model), focusing on research and scientific development, which resulted in (Rosigkeit, 1996, 24-25; Matusiak, 2010, p. 162): the development and cultivation of independent scientific research and the development of students' characters in the spirit of neo-humanism.

After World War II, academic centers forged an openness to the needs of industry and the economy. In the following years, innovative organizational experiments in dealing with business carried out by universities in the USA initiated a new model of the third generation university, the effects of which – technologies and innovative solutions – would constitute the basis for the creation of new enterprises (Kumański, 2016, p. 90). In the 1990s, thanks to Clark, the concept of the 'entrepreneurial university' became popular with the aim of (Jóźwiak, Morawski, 2009, p. 52):

- strengthening the control center to search for and exploit the opportunities for change; more efficiently;
- developing peripheral segments necessary to overcome the divisions within a traditional university into disciplines and develop cooperation with the environment;
- diversification of financing sources which are necessary especially when obtaining funds from outside the budget;
- activation of the academic center consisting in structural changes that break down stereotypes of thinking about science in terms of disciplines and traditional organizational units of universities;
- developing an entrepreneurial culture that integrates new organizational elements with the university's tradition.

The challenges of the modern world and the knowledge-based economy increase the belief in the need to create a third-generation university (Wissema, 2005), e.g. the Glasgow Declaration of 2005 entitled *Strong universities for a strong Europe*, document of the European University Association, says: 'Europe needs strong and creative universities as key actors in shaping the European knowledge society through their commitment to wide participation and lifelong learning, and by their promotion of quality and excellence in teaching,

learning, research and innovation activities.’ In the report prepared for the European Commission, the authors use the concept of the cooperation between universities and business defined as ‘any type of interaction between higher education institutions and enterprises to obtain mutual benefits’ (European Commission 2018). According to Wissema, if the universities are to obtain benefits from cooperation with business, they should acquire competences consisting in (Wissema, 2005):

- restoring academic integrity by introducing research assessment based on the direct control using an appeals system (expert assessment);
- two-track education for students: general education¹ and elite education²;
- internationalization of studies (by inviting students and lecturers from foreign universities);
- obtaining money for the development not only from public funds, but also (or perhaps primarily) from enterprises (that want to introduce product, technological or organizational innovations);
- replacing departments with specialized and highly qualified teams of employees³.

The full implementation of the entrepreneurial university model encounters institutional barriers in terms of the absence of fixed patterns, a culture of entrepreneurship, existing scientific promotional procedures (to some extent related to the commercialization of knowledge). And then there often exists a lack of trust between the parties (university vs business) (Pgilpott, Doolet, O’Reilly, Lupton, 2011). What is more, considering ‘academic entrepreneurship as a specific type of entrepreneurship focused on both the creative attitudes of the scientific community and the use of the results of their work in economic practice’ may constitute the main impediment to the development of this model (Poznańska, 2014).

Various concepts are used in literature to define the university-business relationship. The most general of them covers all interactions, both intentional and unintentional, beneficial or unfavorable, commercial and non-commercial, through diverse contact channels. Within these relationships, there is cooperation between universities and enterprises, which includes intentional, voluntary interactions aimed at obtaining benefits for the cooperation partners (D’Este, Perkmann, 2011; Lai, Lu, 2016; Gattringer, Hutterer, Strehl, 2014). Cooperation can also be defined as an action undertaken with a partner to achieve maximum benefits using the resources available to both parties (Hardy, Phillips, Lawrence, 2013). It differs in the degree of formalization, the scope of activity of the parties (from passive, one-way use of knowledge to active co-creation), the type of knowledge transferred (explicit vs. tacit), the need for physical mobility, the number of cooperation partners (bilateral and network projects) and others. University cooperation can take three forms: collaborative research, commissioned research, and consulting (D’Este, Perkmann, 2011).

Given the observable effects of cooperation, four forms of relatively easily observable joint activity can be identified (Levy, Roux, Wolff, 2009): co-authoring of scientific articles⁴; patents⁵; contractual cooperation arrangements between universities and enterprises and projects financed by the European Union involving cooperation between universities and enterprises.

The term ‘partnership,’ understood broadly as ‘any joint activity involving a university and enterprises’ can also be used to describe the relationship between universities and enterprises (Kwiek, 2015). Strictly speaking, however, partnership should be understood as a collaborative activity based on a formal agreement between partners regarding goals, financing, and management. Transfer of knowledge and technology comprise the result of cooperation between universities and enterprises (Rossi, Rosli, 2015).

Four main forms of knowledge transfer can be identified (Arvanitis, Kubli, Woerter, 2008): informal activities (such as acquaintance with the research results, participation in conferences, informal contacts);

¹ Based on standard teaching programs and lower-level research.

² Based on individual teaching programs and experimental research.

³ Both strictly professional and entrepreneurial.

⁴ Written as a result of cooperation between scientists and practitioners.

⁵ As a result of collaborative inventions and innovative solutions developed by scientists and entrepreneurs.

education (e.g. employment of graduates and participation of students in research projects); research projects in collaboration and consulting.

Then, when it comes to technology transfer, the following types of forms can be identified (Klimczuk, 2010): subject-related⁶; organizational, regarding cooperation in conducting research; institutional and legal with the focus on agreements between enterprises, universities, and foreign institutions.

To implement the third generation university model, centers for cooperation with business which deal with the transfer of knowledge and technology are being established at the universities. Specific activities undertaken towards the environment may include:

- researching the needs and expectations of the entities in the socio-economic environment;
- stimulating the lasting cooperation with partners from the university environment, establishing and developing this cooperation;
- coordinating the flow of information between entities of the socio-economic environment and organizational units of the university⁷,
- mediating in establishing contacts between students, universities, employers, and labor market institutions (including practices and internships);
- coordinating the process of involving outstanding university graduates in various forms of the development of the scientific and professional careers of the most talented students;
- implementation of the development projects and programs in cooperation with business⁸;
- organizing seminars and conferences between universities and business to exchange experiences and promote university achievements;
- taking actions to develop relationships with enterprises.

A literature review allows us to identify the following areas of cooperation between science and business (Milczarek, Grabowska-Szaniec, Walkowiak, Smakulski, 2016):

- joint supervision of master's and doctoral theses,
- lectures given by business representatives at universities⁹,
- business financing of university employees,
- transition of university employees to business,
- joint university-business projects (including commissioning scientific research to universities),
- establishing enterprises by university employees,
- joint publications by scientists and business employees,
- continuation of education offered by the university for business representatives,
- scientific employees' internships in enterprises,
- practices/internship¹⁰ for students,
- paid courses conducted by the enterprise experts and business practitioners which provide a unique opportunity to obtain information on how theoretical solutions work in practice¹¹,

⁶ Mainly connected with the exchange of information, improvement of employee qualifications and exchange of licenses and know-how.

⁷ In a way that ensures professional service from the beginning to the end of the process.

⁸ Including consulting university's educational programs, increasing the involvement of practitioners in the teaching process.

⁹ To establish cooperation/build an attractive image, some enterprises organize free lectures for students (concerning their business operations, market knowledge or other technical or technological issues).

¹⁰ Organizing internships for students within a given enterprise is a typical form of cooperation between enterprises and universities. Enterprises usually provide one or several positions for students with the aim of transferring professional knowledge and experience. Practices/internships usually last from one to three months and then they are summarized and assessed at the end.

¹¹ Professionals provide a unique opportunity to obtain information on how theoretical solutions work in practice. This type of lecturer is highly interested in the practical application of scientific research and demonstrates an important level of usefulness in teaching students. Providing courses fully paid for by the university, taught by enterprise experts and professionals seems to be the best way to strike a balance between theory and practice.

- enterprise training center at the university¹²,
- workshops and training in the enterprise¹³,
- collecting data for student diploma theses¹⁴, enterprises provide internal materials on various aspects of business activities, which is an important form of assistance supporting the graduation process;
- ordering topics for student diploma theses¹⁵,
- dedicated financial support for teaching equipment¹⁶.

The further part of the article indicates the activities discussed above that have been undertaken by the Department of Logistics and Innovations of the University of Łódź.

The condition for the effectiveness of the innovation system is the creation of efficient connections between enterprises and the scientific and research sphere (which will translate into innovation and competitiveness of enterprises). Some of these connections are direct (when scientific research leads to application discoveries, engineering research techniques or instruments), others are indirect (when graduates or published scientific knowledge contribute to improving the operations of enterprises) (Milczarek, Grabowska-Szaniec, Walkowiak, Smakulski, 2016). The effectiveness of the system can/should appear at various levels – talking about the benefits of cooperation between universities and enterprises, we can point to:

1. The enterprise's perspective, including (Pietrzyk, 2015):

- employee education¹⁷ and access to qualified staff¹⁸ (Alonso, O'Neill, 2011; Sobaih, Jones, 2015);
- use of the university's infrastructure and research resources, influence on the direction and access to scientific research;
- increase in innovation (Caloghirou, Giotopoulos, Kontolaimou, Korra, Tsakanikas, 2021; Fontana, Geuna, Matt, 2006; Higuchi, Yamanaka, 2017; Hoarau, Kline, 2014; Schartinger, Schibany, Gassler, 2001);
- obtaining and/or maintaining competitive advantages and, consequently, improving competitiveness (Higuchi, Yamanaka, 2017; Liao, Hu, 2007);
- increasing employment or creating new enterprises (Hudson, Meng, Cárdenas, So, 2017);

¹² The aim of the said center is to improve the competences which are required at a remarkably prominent level in a given enterprise. An enterprise that is looking for a well-qualified staff can recruit them at a selected university (among the youth) and at the same time support the development of specific skills that are most valued within a given organization. The enterprise provide training for future trainers (university instructors) who then conduct trainings at the university. Thus, the enterprise saves money that would be spent on initial training (no expenditure on staff) and the university offers students unique opportunities to develop competences - each partner benefits from the cooperation.

¹³ Internal training carried out in the enterprise is based on the approach that a significant business environment is conducive to maximizing the training effect. If students are to discuss, for example, issues of innovation, locating this type of training in a technology park seems to be a good solution. Not only do the students gain knowledge, but also, they have the opportunity to see how ideas are implemented. Numerous enterprises organize internal training and workshops to initially 'screen' job candidates. Moreover, it is also a form of transferring practical skills and solutions to students.

¹⁴ Diploma theses should rather be based on practical observations of business phenomena and thus many students each year need information about the functioning of enterprises. For this purpose, entities usually provide internal materials on various aspects of business activities. This comprises a particularly important form of assistance supporting the graduation process.

¹⁵ This is a much more advanced form of cooperation with students preparing to graduate. Organizing this type of cooperation is a good solution when the student looks for a research topic and the enterprise tries to establish new methods to solve a selected problem or wants to analyze a certain aspect of its activity in more detail. Ordering topics for student diploma theses, especially when the conclusions drawn can be implemented in the enterprise, brings benefits to both parties to such an agreement: the enterprise receives a free analysis of a selected aspect, and the student receives a wide range of materials to work on and the opportunity to consult directly with the enterprise. Such cooperation may result in the graduate's employment in the enterprise.

¹⁶ Providing dedicated financial support (regarding the development of teaching equipment, teaching methods or other essential elements of the teaching process) is an effective way to increase the presence of enterprises at the university. On the one hand, it allows the university to implement new tasks more efficiently and effectively, and on the other, it increases the recognition of the enterprise among lecturers and students.

¹⁷ Improving employee qualifications by co-organizing specialized courses, postgraduate studies, or fields of study.

¹⁸ Recruiting graduates trained during student internships, using the intellectual resources of academic employees.

- product enrichment, tailoring the offer to customer needs (Higuchi, Yamanaka, 2017);
 - reducing operating costs (Schartinger, Schibany, Gassler, 2001);
 - improvement of the image of the enterprise (Fontana, Geuna, Matt, 2006).
2. The benefits for the university, including (Piétrzyk, 2015):
- adapting educational programs and outcomes to the expectations of the recipients of the educational services offered, improving the quality of education;
 - limiting the effects of the demographic decline through the recruitment for ordered fields of study;
 - using the partner's technological and intellectual resources;
 - acquiring specialist practitioners (exchange of knowledge and experiences);
 - establishing research centers at the university;
 - development of university entrepreneurship, increasing staff mobility;
 - raising funds for research, development, and education.

It is worth emphasizing, thus, that through joint projects, universities and business can work towards innovative solutions that support sustainable development. The combination of academic knowledge with the experience of enterprises provides conditions for developing novel solutions to business and social problems.

Research methodology

The University of Łódź carries out activities typical of a third-generation university:

1. In the areas indicated by Clark:

- appointing a vice-rector for cooperation with the environment responsible, among others, for searching for opportunities for change (and using them) as well as developing cooperation with the environment;
- diversifying financing sources for research and scientific activities;
- operation of the Center for the Outward-Oriented Cooperation (www.uni.lodz.pl), which cooperates with both the economy and non-governmental organizations; creates fields of study with the involvement of practitioners; develops the culture of entrepreneurship – by providing webinars that create entrepreneurial attitudes for students or supporting startups; mediates in student practices/internships; organizes job fairs and maintains relationships with graduates (e.g. by monitoring graduates' careers, implementing the VIP UŁ graduate program or the UŁ mentoring project).

2. Defined by Wissema, e.g.:

- introduction of co-financing for research conducted by employees based on direct assessment using the appeal system (expert assessment) – IDUB program;
- two-track student education: general and elite education (implemented thanks to academic tutoring programs);
- internationalization of studies;
- offering direct support to the surrounding entities (those that want to implement changes in their operation) as part of the Science Hub UŁ program¹⁹.

Such activities are implemented at the central level but may have an impact on the functioning of individual university units, employees, or students. The study used the participant observation method. And the article is intended to represent a case study of the cooperation with the environment implemented by the

¹⁹ The aim of this project is to connect university students carrying out applicable scientific projects (including diploma theses) together with the external entities, such as local enterprises, institutions, and non-governmental organizations with the support of scientific supervisors. Its idea is to strengthen the cooperation of the University of Łódź with its environment by creating a university-wide platform for cooperation between the University of Łódź and external partners. The project is scheduled for 2022-2024 and is financed by the Ministry of Science and Higher Education as part of the Scientific Excellence program. (<https://www.science-hub.uni.lodz.pl>).

Department of Logistics and Innovations of the University of Łódź in the years 2017-2023. Therefore, our attention will now be directed to selected examples of this activity.

Results and discussion - selected areas of cooperation between the Department of Logistics and Innovations of the University of Łódź and business

Since all the logistics students undergo compulsory internships, they constitute the most ordinary form of cooperation between the Department of Logistics and Innovations and business. As the Internship Manager, an employee of the Department is responsible for the compliance of the internship with the field of study, its proper conduct and settlement of its implementation. During the internship, students may collect materials for their diploma thesis, but it sometimes happens that they return to the enterprise later to obtain information relevant to the thesis topic approved by the supervisor. Annually, approximately 130-150 male and female students complete this mandatory element of their studies.

Employees can also complete internships in enterprises; but they rarely take advantage of this opportunity²⁰ and opt for scientific internships and/or consulting services for the enterprises.

The form of cooperation between the Department and the business with the longest history is the Logistics Practice Academy, in which business representatives²¹ present at biweekly meetings the mechanisms of operation of various functional areas of enterprises; to include solutions to problems occurring in their enterprises. The topics of the speeches related to both hard aspects of business functioning and soft skills needed in the workplace²². Over 7 years, almost a hundred meetings were held, attended not only by students of logistics, but also of other fields and even of other universities. Furthermore, they continued during the pandemic – on the Teams platform – and their topics were related to current economic challenges²³. Thanks to such cooperation, students often gain a good insight into the specifics of the TSL sector from the very beginning of their studies. This allows them to better understand current challenges, e.g. related to the deteriorating economic situation or human resources management in logistics centers or transport companies (due to staff shortages related to the war in Ukraine).

Training in the field of soft skills, offered to a narrow group of students (mainly members of the LOGIN scientific club) and employees of the Department and carried out by the employees of the HR departments of the entities cooperating with the Department comprises the next step in the development of this form of cooperation²⁴.

Open research and economic seminars comprise yet another form of the APL lectures evolution²⁵ prepared by the Department's employees in cooperation with representatives of the economic environment.

²⁰ There was a one-month long internship at Indesit Company SpA in Łódź, two six-month long industrial internships at BROWIN in Łódź and a three-month long internship at Dachser sp. z o. o. will begin in October 2023 in Sosnowiec near Stryków.

²¹ Mainly TSL industry entities, but also motivational speakers, representatives of HR departments, and even the hospital, Police and Prison Service.

²² Sample meeting topics: 1) Practical aspects of transport management for an e-commerce warehouse; 2) Kaizen – practical methods and techniques supporting the development of the organization; 3) Trends in e-commerce logistics, off-line and on-line e-commerce; 4) Logistics - mobility - COVID-19 - change in thinking and action; 5) Logistically functional product. Design supporting logistics; 6) Organization of a modern purchasing department in global corporations and market trends; 7) Secrets of recruitment in logistics (support for young people in preparing to look for a job); 8) Every generation wants to change the world, i.e., age management in the organization; 9) Trans.eu and TransEDU platform: a digital response to the challenges of the TSL industry; 10) Customer relationship management in the international supply chain.

²³ Sample meeting topics during the pandemic: 1) Logistics - mobility - COVID-19 - change in thinking and action; 2) Challenges and opportunities of the distribution for the e-commerce in the era of the pandemic; 3) Distribution challenges and opportunities for e-commerce in the era of the pandemic; 4) Distribution in pharmacy.

²⁴ Sample training topics: 1) Memory and speed-reading techniques; 2) Self-presentation – public speaking; 3) Modern recruitment and selection tools and techniques in the TFL industry.

²⁵ Titles of scientific and economic seminars: 1) Responsible supply chains – transformation in the face of contemporary challenges; 2) Logistics 4.0 and supply chains; 3) Adaptability of supply chains in the contemporary economy.

During the debate, guests answer questions not only from the academic leading the meeting, but also from students obliged to prepare for the meeting and actively participate in it.

The above-mentioned forms of cooperation provide students (including employees) with the opportunity to acquire practical knowledge and develop skills, and to establish contacts for internships or future employment as well as the opportunity to prepare for the requirements of the labor market and the expectations of enterprises.

A common form of cooperation between the Department and business are study visits by logistics students in a specific enterprise, e.g. visit to the Group Wastewater Treatment Plant of the Łódź Urban Agglomeration (GOŚ ŁAM) within the framework of the 'Reverse Logistics' program, visit to the logistics center of Transfer Multisort Elektronik sp. z o.o.²⁶ in Łódź as a part of the 'Distribution Logistics' program based on which they prepare a short report on the essence of distribution logistics implemented by TME sp. z o.o. SKN Login members take part in a larger number of visits to enterprises which are often combined with workshops²⁷. Lecturers also participate in study visits²⁸.

The previously mentioned university-wide Science Hub project has become a special form of cooperation with business, in which students, under the supervision of an academic lecturer, solve the problem of an external partner. As a result of the competition procedure, two teams of logistics students were qualified for the project pursuing the following research topics:

- Analysis and identification of opportunities and threats for an e-commerce warehouse in the fashion industry – potential directions of the development – in cooperation with Arvato Polska sp. z o.o.;
- Optimization of the selected areas of internal logistics of Dradura Polska Sp. z o.o.

While working on the project, students obtain knowledge and support from experts, starting from the idea of the topic through searching for solutions to the presentation of the achieved results. Supervising a student project is a new experience for the mentor from the enterprise as well (sharing knowledge with young people and influencing their development). Projects are in progress.

From the Department's perspective, the project implemented in 2021 for ARVATO Polska Sp. z o.o. (an operator of comprehensive services for the e-commerce sector in Poland and worldwide) represents an important example of cooperation. It was entitled 'Development of the ecological and reusable packaging for use in e-commerce logistics services' and included research and development work and conducting workshops for students which ended with a competition with a prize pool of PLN 10,000 (funded by a business partner). Research has contributed significantly to the transfer of knowledge in an interregional system between the business, academic and scientific research sectors.

Another form of cooperation with business was the donation of elements of warehouse equipment by several entities – shelves, scanners, transport packaging, protective clothing, etc. to the logistics workshop. The classrooms use computer software provided free of charge (educational versions) or for a small fee by commercial entities that have trained or provided training materials to employees so that they can conduct classes. Courses ending with an external certificate increase the attractiveness of classes for students who, on the one hand, complete the subject during their studies, and on the other hand, obtain an industry certificate confirming the skills they have acquired and increasing their attractiveness on the labor market²⁹.

²⁶ It is a global entity that offers approximately 600,000 product items and handles over 5,000 shipments a day.

²⁷ For example: 1) in 2022 members of the scientific club visited: Geis logistics center in Stryków and Decathlon distribution center in Łódź, 2) in 2023 – ID Logistics logistics center in Wola Rakowa and GXO distribution center in Natolin and Łódź.

²⁸ For example: 1) in 2018 - PKP dry transshipment port in Małaszewicze; 2) in 2021 – Frigologistics warehouse-freezer distribution center in Žnin; 3) 2022 – PGF distribution center in Łódź.

²⁹ Sample classes: 1) 'Enterprise infrastructure management' where students can obtain a TransEdu Virtual Academy certificate, 2) 'Certified course in data analysis using the PS IMAGO package'; 3) 'Dashboarding at PS IMAGO - certified course'.

Conclusions

Academic entrepreneurship is aimed at the practical use of scientific achievements in business. Therefore, the need for cooperation between universities and business should be linked to the exchange of opinions between all participants and beneficiaries of pro-innovation activities. Therefore, the need for research on the relations between enterprises and universities results from both practical and cognitive reasons.

Thanks to the university's cooperation with an industry partner, a wide range of opportunities appear beyond the lecture hall. Science-business cooperation can take various forms that enable the involvement of employees and students. The work reviews the forms of possible cooperation and presents specific activities carried out at the Department of Logistics and Innovations.

Despite so many opportunities for cooperation and student involvement, which bring benefits to all parties, it turns out that many enterprises are not interested in establishing such relationships with universities. This is due to various barriers, among which cultural differences between university researchers and external partners should be considered particularly important. Moreover, it can also be noticed that the expectations of students and entrepreneurs, especially when implementing the first joint projects, may be different. Difficulties that may arise in such cooperation also concern the ability to work in a team, as the parties have different experiences in this area. A positive assessment of cooperation is often associated with a good personal contact between the scientist and the business representative.

The state should create an ecosystem in which business will really cooperate with universities in order to induce innovation in the economy (macro effect), develop universities (meso effect) and to help students to use knowledge in a more practical way (micro effect).

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