The European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com

e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2022.12.111

ISCKMC 2022
International Scientific Congress «KNOWLEDGE, MAN AND CIVILIZATION»

FORMATION OF THE ECOSYSTEM "EDUCATION-BUSINESS" IN THE CONTEXT OF DIGITALIZATION

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Abstract

Maintaining the quality of human capital, which would be adequate to the existing and potential requirements of business, is a significant problem for society. A promising approach to its solution is the creation of an ecosystem "education – business" through a close cooperation of educational institutions and business entities. The authors emphasize the importance of the cooperation between ecosystem actors, as a result of which synergistic effects are formed. The article presents empirical data reflecting the functioning of the "education – business" ecosystem on the basis of Moscow State University of Sports and Tourism. To determine the effectiveness of the "education – business" ecosystem, the theory of stakeholders was applied, the main subjects of the ecosystem assessed the results of its functioning. In the course of the survey, the stakeholders determined the level of significance and satisfaction with the knowledge and skills formed during the training. The results of the survey are reflected on the map of perception. It was revealed that the subjects of the ecosystem rate the practical skills formed in the course of training most highly. The analysis of the “education – business” ecosystem has demonstrated its effectiveness in solving the problem of the quality of human capital.

Keywords: Business, ecosystem, education, human capital

https://doi.org/10.15405/epsbs.2022.12.111
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eISSN: 2357-1330

1. Introduction

Digital transformation is an integral attribute of a new stage of scientific and technological progress, which is characterized by the fusion of technologies and the blurring of the lines between the physical, digital and biological spheres. Digital transformation often deals with the use of modern technology to dramatically improve the productivity and efficiency of enterprises (Westerman et al., 2014). Of course, the subjects of the real sector of the economy must be ready for digital transformation. In the new conditions, they will function successfully only if the quality of the involved human resources matches the current and future needs of their production process. In modern conditions of increasing intellectualization of production, added value is formed mainly by knowledge. Human capital is becoming the main factor in economic progress. At the same time, imposing high demands on human capital, digital transformation entails threats related to its development.

Firstly, this is the problem of digital inequality, i.e. differentiation of users by the level of access to information and digital technologies. The digital divide works on the principle of a feedback loop: people with little access to information and new technologies rarely use them, which limits their ability to obtain new information and knowledge. Thus, unlike other forms of inequality, the digital divide reproduces itself. However, some researchers note that digital inequality, unlike economic inequality, exacerbates other forms of inequality (Robinson et al., 2020).

Secondly, the use of digital technologies in education, along with their obvious advantages, expressed in providing wide access, enhancing adaptability and ensuring the continuity of education throughout life has disadvantages. Digital technologies can contribute to the formation of "clip" (fragmentary, mosaic) thinking among specialists, the lack of skills in comprehending and analyzing information (Volkodav & Semenovskikh, 2017).

The consequence of this is the loss of creativity and the formation of a style of behavior that consists in following the established procedures, which can also negatively affect the development of human capital.

Sustainable vocational and educational ecosystems, thanks to the mechanisms of self-development, are largely able to respond to these and other challenges of the formation and development of human capital.

Big business has developed its own ways of solving the problem of lack of personnel with the required qualifications. One of them is the establishment of their own corporate universities. Their number in Russia now exceeds three dozen (Bondarenko et al., 2021). In most cases, corporate universities implement only programs of additional professional education, thus forming exclusively professional competencies. At the same time, human capital is initially formed by the education system.

A partial solution to this problem is the cooperation of business and educational organizations. In this format of the cooperation, one of the common approaches is the creation of basic departments. Such departments implement educational programs based on dual practice-oriented teaching. This approach has already demonstrated its effectiveness throughout the world (Remington, 2017).

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A more progressive version of such cooperation is the creation of vocational and educational ecosystems. They are based on a continuous process of acquiring the required competencies based on the principle of lifelong learning.

Our work is aimed at identifying the specifics of creating an educational ecosystem as a factor in the development of the cooperation between education and business.

2. Problem Statement

In the context of the formation of a post-industrial society and the increasing intellectualization of the economy, the gap between the required quality of human resources and what the education system offers has become a significant problem for business. Today, business is in dire need of qualified young professionals with a set of specific knowledge. However, not all university graduates meet these requirements today. At the same time, graduates consider the main reason for this problem to be the lack of demand for knowledge acquired at the university. The solution to this problem is impossible without combining the efforts of educational organizations with business.

3. Research Questions

The research questions to be discussed in the work are as follows.

i. Disclosure of the essence of the professional and educational ecosystem of the university and its role in the formation of human capital.
ii. Analysis of the sources of formation and development of the professional and educational ecosystem.
iii. Description of the structure of the university's professional and educational ecosystem.

4. Purpose of the Study

The purpose of this work is to study the features of the formation and development of the university's professional and educational ecosystem as a driver for the development of the interaction between education and business.

5. Research Methods

The theory of neoclassical economics is not able to provide a qualitative study of the dynamics of economic development, to substantiate changes in technological structures (Schwab, 2017). This leads to a revision of a number of approaches in economic theory (Popov et al., 2021). The situation in which the modern economy functions determines the creation of a new methodology that provides an assessment of the effectiveness of the cooperation between stakeholders, the possibilities of such associations. Only within the framework of a systematic approach is it possible to form an integral research environment for the entire system of socio-economic phenomena. The paradigm is based on the concept of ecosystems. Initially, this concept appeared in biology, but now we consider it possible to apply it in other areas. The ecosystem is analyzed from the point of view of the interactions of its elements (Moore, 2018). The

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concept of ecosystems is increasingly used in the study of open systems consisting of many heterogeneous interconnected elements (Rinkinen & Harmaakorpi, 2018). Based on this, we propose using it in the study of the cooperation between business and educational organizations. The "education – business" ecosystem is a specific socio-economic ecosystem. It is based on a network of stakeholders, both cooperative and competing, and creating related products and services (Felipe-Lucia et al., 2015). The result of the functioning of the “education – business” ecosystem is human capital.

In our work, the method of situational analysis was used, which made it possible to study the processes of interest in real conditions. The empirical basis of the study was the results of a survey of groups of participants in the "education – business" ecosystem. The survey was conducted among teachers and students of Moscow State University of Sports and Tourism, employees and managers of tour operators of TUI Group and Solveks in June-August 2021. The quality level of the ecosystem's human capital was determined using perception maps based on the method of analysis of opportunities and needs (Needs & Gaps) (Galport & Azzam, 2017). On the coordinate plane of the map, the location of the projections of the respondents' perception of various objects and their attributes is reproduced. This method assumes that respondents rate the significance and satisfaction with the specified attributes using a 5-point scale. The main attributes in the presented study were general professional knowledge, special professional knowledge, general cultural knowledge and practical skills.

6. Findings

When considering the internal processes of socio-economic ecosystems, including ecosystems "education – business", the simultaneous existence of cooperation and rivalry becomes obvious. Until now, a unified approach to understanding socio-economic ecosystems has not been formed. In our opinion, a vocational and educational ecosystem is a system with a complex changeable structure, spatially defined, including subjects that synergistically cooperate and compete at the same time. Therefore, one should not reduce the vocational and educational ecosystem to a simple scheme of an educational organization and a partner business. It is a much more complex dynamic formation characterized by synergy effects. The term "ecological" testifies to the existence of an environment of the interaction between subjects on the basis of their horizontal connections, in which the conditions of synergy are formed.

Socio-economic ecosystems are a four-component tetrad: organizational, infrastructural, communication, logistics and innovation components (Kleiner, 2018). An organizational part is a group of organizations and independent individuals interacting within an ecosystem. The communication and logistics component supports the processes of the cooperation of the organizational elements of the system. The innovative component is represented by a system of measures defined in space and time, ensuring the adaptive capacity of the ecosystem in relation to changes in the external environment.

The effective operation of the "education – business" ecosystem is ensured by the work of all its components and their reproduction. The main goal of all components of the ecosystem is the joint formation of business human capital (Buevich et al., 2020).

An example of the education-business ecosystem of Moscow State University of Sport and Tourism (MSUST) reveals the specifics of creating human capital in business. In the course of solving the

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problem of matching the quality of business human capital with its current and future needs, the University and its industry partners have been creating an educational space for a decade, which has now transformed into a professional and educational ecosystem.

The main prerequisites for the formation of the educational space were:

- the need for continuous training of personnel. The volatility and dynamism of the business environment of the tourism and hospitality industry have generated the need for a system of continuing education and professional training of the industry's personnel;
- the need to take into account industry, corporate standards and attitudes in the training of qualified personnel;
- high staff turnover in the industry, which is already a traditional problem. For example, the number of vacancies in tourism and hospitality from Russia in 2021 has more than tripled compared that of the last year.

The educational space of Moscow State University of Sports and Tourism included the Institute of Tourism and Hospitality Industry, the Institute of Sports Technologies and Physical Education, the Institute of Secondary Professional Education, the Institute of Continuing Professional Education and Career Development, as well as Saimaa University of Applied Sciences (Finland). In the context of the business, it included Hilton Worldwide, tour operators of the TUI Group, Solveks.

Over time, the cooperation between the participants in the educational space grew stronger and deepened, and, thus, it was transformed into a professional and educational cluster. The fundamental difference between a cluster and a space is that it is characterized by a local concentration of efforts, the presence of strong relationships between subjects, and clear structuring.

The activities of the vocational and educational cluster of Moscow State University of Sports and Tourism are aimed at creating an integrated system for training personnel of different levels for the tourism and hospitality industry in the sequence "secondary vocational education – higher education – additional vocational education / postgraduate education (postgraduate study)". Consequently, the training of a future specialist can start since adolescence.

The subsequent transformation of the vocational and educational cluster into an ecosystem is realized due to the extremely high turbulence of the tourism and hospitality business environment, deepening integration and global digitalization. Currently, the demand for ecosystems is due to the need to integrate the resources and competencies of several entities in the production of a product that meets all the necessary requirements. The ecosystem creates conditions for the transition to a higher level of the cooperation to create a product. In case of the education-business ecosystem, such product is human capital.

Initially, the educational space of Moscow State University of Sports and Tourism covered several educational non-interconnected subjects. A vocational and educational cluster is an organizational structure of subjects based on their cooperation. The “education – business” ecosystem, in addition, presupposes the presence of an internal environment, an integration mechanism that facilitates the interaction of subjects, and an adaptation mechanism that ensures stability and self-development of the ecosystem.

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The efficiency of the "education – business" ecosystem functioning is determined by the quality of the final product, that is, human capital. An approach to assessing the effectiveness of an ecosystem based on the theory of stakeholders is known (Freeman & Mcvea, 2001). With this approach, actors interested in the effective work of the ecosystem are identified, their interests and results of activity are determined. Evaluation of the effectiveness of the "education – business" ecosystem should, first of all, be based on satisfaction with knowledge and skills, which are the human capital of business.

The stakeholders in the education-to-business ecosystem can be grouped into four main categories: heads of business entities, teaching staff, personnel of business entities, and students within this ecosystem.

The quality of education and training of specialists in the vocational and educational ecosystem of Moscow State University of Sports was assessed based on the results of a survey conducted among the four groups of stakeholders mentioned above. The respondents were asked to rate on a five-point scale the importance and satisfaction with the learning they received in the ecosystem:

- general professional knowledge and skills,
- special professional knowledge and skills that are necessary to work in the field of tourist operating,
- general cultural knowledge,
- practical skills.

The results of the survey of four groups of respondents are presented in Table 1.

Table 1. Assessment of the level of importance and satisfaction with knowledge and skills formed in the learning process

Attributes	Importance				Satisfaction			
	managers	teachers	staff	students	managers	teachers	staff	students
General professional knowledge and skills (1)	4,56	4,21	4,13	3,95	4,51	3,86	3,18	3,59
Special professional knowledge and skills (2)	4,83	4.37	4,21	4,36	4,27	4,11	3,45	4,32
General cultural knowledge (3)	4,49	4,31	3,64	3,55	4,15	3,98	4,01	3,89
Practical skills (4)	4,68	4,46	4,27	4,42	4,52	4,02	3,67	3,86

The table contains the average values of the indicators of the surveyed stakeholders' assessment of the importance and satisfaction with knowledge and skills. For the assessment, a five-point scale was proposed: 5 – very important / completely satisfied, 1 – completely unimportant / completely dissatisfied). Managers assessed the importance and satisfaction with the skills and knowledge for company personnel; teachers – for students and listeners; company staff and students – their own knowledge and skills.

All the groups performed satisfactorily in both categories. The heads of companies and departments indicated the high importance of special professional knowledge (4.92), the level of

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satisfaction was 4.31. The personnel of the companies showed a relatively low level of satisfaction with both general professional and specialized knowledge (3.39 and 3.56, respectively). In addition, staff are not fully satisfied with the practical skills acquired during training (3.74). This phenomenon, in all likelihood, is explained by the fact that special knowledge quickly loses its relevance.

In order to characterize in more detail the assessment of the level of human capital of the "education – business" ecosystem, a perception map was constructed based on the method of analysing opportunities and needs [9]. The meaning of this method is quite simple: on the basis of a preliminary analysis, the attributes of the object under study are identified, and the respondents are asked to rate them on two 5-point scales in terms of importance and satisfaction. The respondents should rate how important this attribute is to them and to what degree they are satisfied. Then the average importance is calculated for each attribute separately and for all attributes.

Perception maps were built on the basis of the survey results presented in Table 1. When creating a perception map, a coordinate system was built for each group of irrigated stakeholders. The average values for the importance and satisfaction across the entire set of attributes serve as origin points (Table 01).

Perceptual maps were built on the basis of the survey results presented in Table 01. When creating a perceptual map, a coordinate system was built for each group of irrigated stakeholders. The average values for importance and satisfaction across the entire set of attributes serve as origin points (Table 02).

Table 2. Origin of coordinates for the perceptual map ecosystem stakeholder groups

Index	managers	teachers	staff	students
Importance	4,62	4,14	4,02	4,07
Satisfaction	4,31	4,01	3,57	3,87

Perceptual maps for four groups of respondents are shown in Figure 01.

The upper right quadrant is the quadrant of the main or baseline benefits of the attribute. The lower right quadrant (II) is the quadrant of secondary benefits or opportunities. The attributes of this quadrant require assistance and development. The upper left quadrant (III) reflects the underlying deficiency. The lower left quadrant (IV) is characterized by low importance and low satisfaction. Significant efforts are required to optimize the attributes, but the formation of high-quality human capital is impossible without them.

Interestingly, all stakeholder groups identified practical skills as the basic advantage of the education-business ecosystem with all stakeholder groups in the first quadrant.

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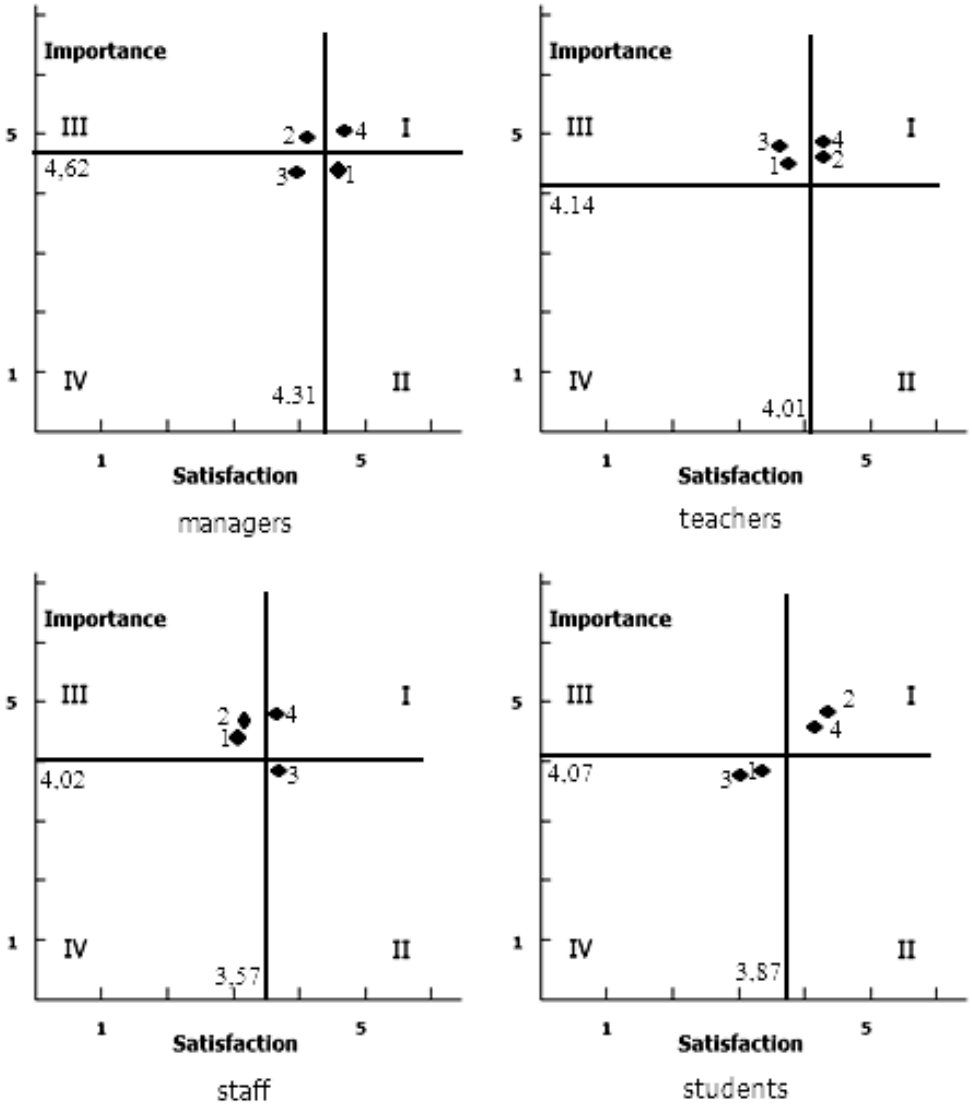

Figure 1. Stakeholder perception maps of the education-business ecosystem.

The analysis of the perceptual map shows that all actors in the ecosystem consider the acquisition of practical skills to be a basic benefit. The assessment of the secondary ecosystem benefits (second quadrant) was not so unanimous. The heads of companies and their structural divisions considered general professional knowledge and skills to be secondary advantages, while the personnel of the companies referred to general cultural knowledge as such. Teachers and students refrained from highlighting any attribute. Participants also had different assessments of the basic deficiency of the ecosystem (third quadrant). The managers and staff of the companies considered the acquisition of special professional knowledge to be the basic disadvantage; the teachers see in this role the acquisition of general professional and general cultural knowledge.

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7. Conclusion

The results confirm the importance of the ecosystem for business in terms of creating its human capital; nevertheless, the ways of forming professional and competencies in the ecosystem require reflection and improvement.

Obviously, the use of perception maps made it possible to visually demonstrate the most significant attributes reflecting the results of the education-business ecosystem in terms of the significance and satisfaction of stakeholders. Improving the functioning of the "education – business" ecosystem can be achieved provided that the three necessary elements are closely interconnected:

- formulation of specific requests for the competencies and skills of graduates in terms of business;
- completeness of competencies and skills formed by all educational institutions;
- effective teaching methods adequate to the conditions of the post-industrial society.

If the requirements for the competence of personnel are formulated by the business, then ensuring their completeness is entrusted to educational institutions. The development of effective approaches to training is the result of the cooperation between enterprises and educational institutions. In general, the result of the functioning of the vocational and educational ecosystem depends on the dynamics of complex relations that arise between its participants in the socio-economic environment in the process of forming human capital. The process of self-development of the vocational and educational ecosystem is based on the complication of its structure and increased adaptation to changing external conditions on the basis of constant updates.

The "education – business" ecosystem is a determining condition for the development of interaction between education and business. Its main task is the formation of high-quality human capital for business. A number of factors, such as a change in the technological order, the consequences of globalization, the rapid obsolescence of knowledge in many industries, determine the demands for the properties of human capital. We can say that the "education – business" ecosystem contributes to the harmonization of processes of change in productive forces and production relations. In the course of its own development, the "education – business" ecosystem is transformed through structural complication and an increase in the ability to adapt to a dynamic external environment, experiencing continuous updates.

The effectiveness of the education-business ecosystem is determined by the results of its functioning. An approach to assessing socio-economic ecosystems is the use of the theory of stakeholders, as well as a direct subjective methodology based on a survey of the actors of these ecosystems. The obtained assessment of the "education – business" ecosystem of Moscow State University of Sports and Tourism confirms its effectiveness. The ecosystem's stakeholders identify the formation of practical skills among representatives of the human capital of business as its main advantage. Further development of the "education – business" ecosystem will be implemented through strengthening the cooperation of its stakeholders and the entry of new participants into their composition.

Further research is promising in relation to the dynamics of the development of the "education – business" ecosystem and forecasts of its transformations.

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