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SCENARIOS FOR THE DEVELOPMENT OF A DIGITAL UNIVERSITY IN THE CONTEXT OF EDUCATIONAL TRANSFORMATION

СЦЕНАРІЇ РОЗВИТКУ ЦИФРОВОГО УНІВЕРСИТЕТУ В КОНТЕКСТІ ОСВІТНЬОЇ ТРАНСФОРМАЦІЇ

Bobro Natalia

Ph.D., Doctor of Philosophy,
Director of the Digital Department European University,
Director of the "NooLab & AI" Scientific Laboratory of the European University,
Private Higher Education Establishment "European University"
ORCID: <https://orcid.org/0009-0003-5316-0809>

Бобро Наталія Сергіївна

Приватний вищий навчальний заклад "Європейський університет"

The article is devoted to the topical issues of the development of a digital university in the context of educational transformation and the digitalization of society. The author determines that one of the promising ways to modernize the system of professional education is to create and develop digital educational platforms, which are integrated information system focused on the implementation of mutually beneficial interactions of independent participants in the educational process using modern digital technologies. Based on the analysis of the component structure of digital platforms – education, digitalization, and platform – the key features and economic nature of each element are identified. The author substantiates and systematizes six main scenarios for the development of digital universities depending on the type of initial resource provision: based on companies that do not belong to the educational or IT industries; companies from the IT sphere; specialized companies that initially position themselves in the field of EdTech; companies that transform digital services into an educational platform; based on network educational organizations and through the creation of consortia of educational institutions.

Keywords: digital university, digital educational platform, educational transformation, digitalization, EdTech, educational technologies, information systems.

Статтю присвячено актуальним питанням розвитку цифрового університету в умовах освітньої трансформації та цифровізації суспільства. Автором визначено, що одним із перспективних шляхів модернізації системи професійної освіти є створення та розвиток цифрових освітніх платформ, які являють собою інтегровану інформаційну систему, орієнтовану на реалізацію взаємовигідних взаємодій незалежних учасників освітнього процесу із застосуванням сучасних цифрових технологій. У статті запропоновано концептуальне визначення цифрової освітньої платформи як системи алгоритмізованих відносин учасників освітньої діяльності, що здійснюються в єдиному цифровому інформаційному середовищі та забезпечують скорочення транзакційних витрат завдяки використанню цифрових технологій. На основі аналізу компонентної структури цифрових платформ – освіти, цифровізації та платформи – визначено ключові особливості та економічну природу кожного елемента. Автором обґрунтовано та систематизовано шість основних сценаріїв розвитку цифрових університетів залежно від типу початкового ресурсного забезпечення: на базі компаній, що не належать до освітньої чи IT-галузей; компаній з IT-сфери; спеціалізованих компаній, які від початку позиціонують себе в галузі EdTech; компаній, що трансформують цифрові сервіси в освітню платформу; на базі мережевих освітніх організацій та шляхом створення консорціумів освітніх закладів. Виокремлено переваги й ризики кожного зі сценаріїв, зокрема питання відкритості платформи, маркетингової стратегії, концентрації ресурсів, організаційної інерції та складності внутрішніх взаємодій між учасниками. Результати дослідження мають практичну значущість для керівників освітніх установ, управлінських команд корпоративних університетів, фахівців HR-служб великих компаній та представників органів державної влади, які займаються питаннями цифрової трансформації професійної освіти.

Ключові слова: цифровий університет, цифрова освітня платформа, освітня трансформація, цифровізація, EdTech, освітні технології, інформаційні системи.

Problem statement. Current trends in the digital transformation of society and the economy are causing significant changes in higher education, raising the issue of creating and developing digital universities. With the rapid development of information technology and increased global competition between higher education institutions, traditional learning models no longer meet the needs of modern students and labor market requirements. On the one hand, society expects universities to be highly flexible, to provide accessible educational services, and to offer a personalized approach to learning, while on the other hand, higher education institutions face the problem of limited resources and inefficient management and educational processes. This creates a need to rethink university development strategies, especially taking into account the opportunities provided by digital platforms.

The problem of determining effective scenarios for the formation and development of digital universities that combine modern technological solutions, innovative approaches to the organization of the educational process, and economic efficiency is particularly acute. Insufficiently researched is the issue of how different types of resources affect the prospects for the development of digital universities, what risks and benefits are characteristic of each scenario, and what organizational and economic conditions contribute to the successful implementation of digital educational platforms. Therefore, there is a need for a scientific analysis of scenarios for the development of digital universities to determine the best ways to implement them.

Analysis of recent research and publications. Such domestic and foreign scholars as P. V. Huk, O. V. Skliarenko, Ya. O. Kolodinska, O. Yu. Nikolaievskiy, S. M. Yahodzinskyi, O. O. Khomenko, M. V. Paustovska, I. A. Onyshchuk, and others paid attention to the problems of digital universities' development, implementation of digital technologies in educational processes, and research of the impact of interactive technologies on the quality of higher education. In the works of these authors, considerable attention is paid to the economic feasibility of using automated systems in the process of modernizing enterprises, in particular in the field of education [1], developing innovative business ideas using digital services [2], as well as implementing digital interactive technologies as an integral part of the modern educational process [3; 4].

In his work, researcher S.M. Yahodzinskyi focuses on the transformation of the information architecture of higher education institutions in the context of digitalization, emphasizing the need to rethink approaches to managing educational processes and creating open information systems [5]. However, N. Kadoić, V. Đurek, and Ž. Dobrović analyze the digital maturity of higher education institutions, proposing appropriate analytical models for assessing and developing the digital capabilities of universities [6].

At the same time, works of such authors as N. Lopuschnyak, H. Chala, and O. Poplavska are devoted to the analysis of socio-economic factors of sustainable development that affect the formation of the ecosystem of modern universities [7]. Despite considerable attention to the digitalization of education and the use of interactive technologies, the scenarios for the development of digital universities remain insufficiently researched, especially in terms of resource provision and economic models that can function effectively in the context of educational transformation. These aspects determine the need for further research in this area.

Identification of previously unresolved parts of the overall problem. Despite the considerable interest of researchers in the digitalization of higher education, issues related to the systematic classification of scenarios for the development of digital universities, taking into account the initial conditions and resource constraints of educational institutions, remain insufficiently covered. In particular, the features of integrating the three key components of digital education (education, digitalization, and platform) into a single model of a digital university have not been fully studied. Organizational and economic risks that arise during the transition of universities to digital platform solutions and ways to minimize them also require additional analysis.

Formulation of the objectives of the article (task statement). The aim of the article is to identify and systematize scenarios for the development of a digital university in the context of modern educational transformation, as well as to analyze the benefits, risks, and resource conditions characteristic of each of the proposed scenarios. To achieve this aim, the objectives are as follows: to carry out a theoretical analysis of the components of the digital educational platform as the basis of a digital university; to identify and characterize possible scenarios for the development of digital universities; to determine the economic and organizational conditions

that ensure the successful implementation of these scenarios in the practical activity of higher education institutions.

Presentation of the main research material.

Since the beginning of the twenty-first century, there has been an intensification of interest in platform education. The analysis of trends in educational transformation recorded in various scientific sources shows an increase in the use of concepts that describe the phenomenon of digital educational platforms since the end of the twentieth century.

There are several approaches to defining and identifying digital platforms created for the educational sphere. The first approach is based on the system and information component, focusing on digital solutions and user interaction algorithms [8, p. 57]. The second approach focuses on the system of economic relations and business model embedded in the platform [9, p. 31].

In this research, a digital educational platform is understood as a system of algorithmized mutually beneficial relations of independent participants in educational activity, implemented in a single information environment, ensuring a reduction in transaction costs through the use of digital technologies. This definition most fully reflects the purpose of the platform and the structure of its basic elements that create value in the context of a digital university: platform, education, and digitalization.

Let us consider in more detail the main elements that form the model of a digital university in the context of modern educational transformation:

1. Digitalization is a component that includes the latest technologies and algorithmic solutions aimed at reducing transaction costs with the help of digital tools. In the structure of a digital university, digitalization is a technological component characterized by high resource intensity. This element makes up a significant portion of capital expenditures and a relatively smaller portion of operating costs. Digitalization includes the costs of creating, developing, and maintaining the university's digital infrastructure, as well as implementing and modernizing digital services and information systems [10, p. 257].

2. Education is a component that ensures mutually beneficial interaction of independent participants in the educational process. It is an economic component of a digital university, representing the basic service of educational activity. In the economic model of a digital university, this component is formed mainly by

variable costs, which form the basis of operating costs. The educational component includes the costs of developing and implementing educational programs, creating training courses and modules, preparing educational content, and paying teachers and other participants in the educational process.

3. Platform is a component that ensures the functioning of an open information system of a digital university. This is the technical component that includes software as the basis of the digital ecosystem, as well as defines the list of user roles, access protocols, and system functionality. In the economic aspect, it is the platform that determines the main capital expenditures associated with its development and implementation. The chosen information architecture and model of user interaction significantly affect the efficiency of functioning, promotion, and positioning of a digital university in the modern educational space [2, p. 57].

Let us synthesize the elements presented above, considering them in a mutual combination in the context of forming a digital university model.

Education and platform are an information educational system available today in most modern higher education institutions and mandatory for universities implementing higher education programs. However, such a system by itself, even with certain digitalization mechanisms, does not create sufficient value in the form of a significant reduction in transaction costs. The lack of tangible benefit in reducing costs hinders the growth of independent users of the platform. Modern information educational systems are most often used by universities as an alternative or additional mechanism for implementing educational programs, especially during periods of forced restrictions on contact work (pandemic, seasonal diseases, distance learning, etc.) [4, p. 1230].

Digitalization and platform are technical and technological solution that does not provide value in the form of an educational service at this stage. In the context of a digital university, such a platform is only a digital ecosystem that has not yet been launched on the market, does not have a sufficient number of users, or is not filled with quality educational content. In this form, it is unprofitable and does not bring economic benefits due to the absence or insufficient number of active participants in the educational process.

Digitalization and education are digital educational technologies that create some value

by reducing costs but remain closed to a wide range of independent participants. This format is not platform-based in nature. It is used by digital universities as an additional mechanism within the framework of blended learning (a combination of contact forms of classes with independent work of students in the digital environment) or as the main form of educational interaction - distance learning in internal systems closed to external users.

Digitalization, education, and platform are a complete model of a digital university that includes all these components: mutually beneficial economic relations between independent participants, the use of digital technologies, and an open information platform. It is this model of a digital university that creates the greatest value for users, offering openness, freedom of choice, and accessibility [3; 5]. At the same time, the openness of the platform makes developers look for additional competitive advantages, which can be manifested not only in reducing transaction costs, but also in quality educational content, flexibility of educational programs, resource support, usability of the user interface, and other aspects that enhance the attractiveness of a digital university in the context of modern educational transformation.

There are different approaches to market segmentation of educational technology companies (EdTech). Most classifications are based on two main criteria: the types of services provided and the model of economic interaction [6, p. 229]. According to the types of services, companies can be represented as online libraries, online schools, professional education platforms, etc. As for the models of economic interaction, there are three main areas:

- "business to business";
- "business to customer";
- "business to governance" [2; 10].

Today, the highest growth dynamics is demonstrated by companies in the field of educational technologies that operate on a business-to-customer model and provide services in the field of professional training [3, p. 53]. This group includes digital educational platforms and companies that have the potential to develop in this direction.

In this research, the analysis of scenarios for the development of digital university platforms is based on the nature of their creation, i.e., the environment that becomes the basis for the emergence of such platforms. This makes it possible to assess the benefits of the platform in terms of access to various resources. This

approach allowed us to identify six main scenarios for the origin of digital educational platforms.

The first scenario involves the development of a platform based on a company that is neither in the education nor in the IT sphere. It is typical for corporate training centers that create their own digital educational products [1; 7]. This scenario is characterized by a strong starting position due to access to resources: financial, human, and infrastructure. The weakness of this scenario is the insufficient level of openness of the platform, which is explained by the focus on internal corporate use. The entry of such a platform into the open market requires additional strategic efforts and may be accompanied by certain difficulties.

If there are competitive advantages, a platform created on the basis of a corporation from another industry can grow significantly. An example of such competitive advantages is the industry uniqueness of educational products due to the specifics of the company's activity (e.g., logistics, medicine, quantum technologies, etc.).

The second scenario involves the creation of a platform based on a company from the IT sector. It is typical for young, dynamic companies that diversify their activities, looking for new markets and areas of development [2; 3; 7]. In this case, the education market is a promising area, considering the significant resources of such companies and the availability of a wide customer base. At the same time, the weakness of this scenario is attracting platform users, as an unsuccessful marketing strategy can quickly neutralize the benefits of the resource potential.

The third scenario is to create a company that is initially focused on the EdTech sphere. This scenario allows for the optimal architecture of the educational platform to be formed from the very beginning and is typical for fast-growing companies that rely on digital education and platform solutions [1; 4]. The main advantage here is the concentration of resources, and the key task of management is to create an efficient configuration of these resources. The disadvantage of the scenario is high risks during the launch of the platform associated with the narrow specialization of the business.

The fourth scenario involves the transformation of a system of digital services into an educational platform. It is typical for companies that initially developed related digital products: digital libraries, learning management systems (LMS), and other digital services [10, p. 260]. Significant experience in the

educational space and the availability of proper resources create prerequisites for active development. However, the biggest risk here is insufficiently effective user engagement, and mistakes in marketing policy can significantly reduce the benefits achieved.

The fifth scenario is the formation of a platform based on a network educational organization. This option is typical for large universities that have chosen platform and network forms of education as key areas of their development. The period of restrictions on contact learning in 2020–2021 contributed to the active use of the developed digital products, which led to the formation of a network of clients represented by other educational institutions [1, p. 111]. This allowed for the creation of quality platform solutions. At the same time, the risk is the internal inertia of traditional educational structures, which can slow down the pace of development of digital platforms.

The sixth scenario is the creation of a platform based on a consortium of educational organizations. In Ukraine, there are attempts to integrate educational and scientific resources at the level of regions or individual industries [1; 2]. The initiators of such integration are most often regional structures or specialized public authorities. In case of success, a scientific and educational environment is formed that demonstrates positive development dynamics. A by-product of such a consortium may be an educational platform that acts as an environment for disseminating new knowledge created within the framework of research and innovation activity. However, the weak point here is the organizational relationship between the participants, whose conflicts or inconsistencies can significantly reduce the effectiveness of the consortium platform.

Therefore, the analysis of scenarios for the formation of digital universities shows that the successful development of platform education depends on many factors: the type of basic organization, the level of access to resources, the openness and adaptability of the platform, the quality of digital solutions, the effectiveness of the marketing strategy, and the organizational structure of interaction between participants. The prospects of a digital university in the context of educational transformation

directly depend on the integration of all basic components – digitalization, education, and platform – into a single system that can offer the end user significant benefits, such as flexibility, accessibility, cost reduction, and high quality of educational services. Understanding the features and risks of each scenario allows for more effective management of digital transformation processes in higher education, opening up new opportunities for the development of universities in the digital economy.

Conclusions. The results of the research suggest that the digital educational platform is a promising model for the further development of the professional education system through the integration of digitalization, economic efficiency, and open interaction of participants in the educational process. The key advantage of the digital platform is the reduction of transaction costs due to the algorithmization of processes and the use of digital technologies. The scenarios for the development of digital platforms proposed in the research make it possible to reasonably plan strategies for entering the educational services market and ensure their competitiveness.

The theoretical significance of the analysis is to systematize the components of digital educational platforms as a resource, which allowed us to identify and describe the stages of their development in the form of a product life cycle curve. In addition, the work identifies six scenarios for the development of digital platforms depending on the initial resource provision, which creates a methodological basis for further research in the field of the digital transformation of educational institutions.

The practical significance of the results is the possibility of applying the proposed scenarios in the real conditions of educational organizations, corporate training centers, and HR structures of large corporations. The data obtained can serve as a guide for the formation of strategic and program documents in the field of digitalization of professional education. The recommendations presented will be useful not only for heads of educational institutions but also for specialists of public authorities regulating the development of education, which will contribute to the more effective implementation of digital technologies and platform solutions in national educational policy.

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