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**IMPLEMENTATION OF LOCAL DIGITALIZATION PROJECTS AS THE MAIN  
DIRECTION OF ACTIVATION OF EDUCATIONAL PROCESSES, SERVICES AND  
PRODUCTS OF DIGITAL TRANSFORMATION**

**Abstract.** The article is devoted to the study of problems related to the introduction and use of digital technologies in education. The relevance of the chosen topic is primarily due to the need of transformation in higher education in accordance with the new conditions of social development, which is characterized by high rates of technological change, the predominant role of intellectual capital, availability of productive resources in the form of human knowledge and skills. The main task of higher education institutions should be to train professionals who are able to create and use technologies in various fields, think critically, flexibly adapt to change, generate new ideas and create the conditions for personal and social well-being. Achieving such results will be possible under the condition of dynamic and current changes in the higher education system itself. First of all, it concerns the methods, approaches, technologies, tools with which knowledge is transferred, skills are improved, and human experience is formed.

In order to substantiate the need to create an innovative environment in the field of higher education, the modern basis of which is formed by digital technologies, the article focuses on the characteristics of the specialist innovator. Their formation is not possible without the use of tools that allow the most effective organization and implementation of the educational process, provide quality educational services, to form a proposal for innovative educational products.

The article draws attention to the Memorandum of Lifelong Learning adopted in 2000 by the Lisbon Summit of the Council of Europe. Based on the analysis of Memorandum principles, the authors proved their close connection with current trends in education, among which digitalization plays a key role. In particular, the implementation of the declared principle of “bringing education closer to home” in the context of the Covid-19 pandemic is an extremely urgent task, and its practical implementation requires intensification of actions related to the digitalization of educational services and products.

The article provides an overview of the main results in the field of digitalization of education in Ukraine and the problems that need to be addressed. Attention is drawn to the fact that at the level of formation of concepts and recommendations the prospects for digital transformation of higher education are presented properly. However, the issue of practical implementation of digitization tools, as well as their financial support, remains relevant for domestic free economic zones.

In order to find practical solutions in the field of digitalization of educational processes, services and products, the authors of the article proposed an algorithm and descriptive model that will allow free economic transformation to transform digital transformations by establishing cooperation in partnership and implementing local digitization projects. The effectiveness and prospects of this approach are based on the example of Ivano-Frankivsk National Technical University of Oil and Gas (IFNTUOG), where in 2020 the implementation of the project of local digital transformation began.

**Key words:** educational service, educational product, digitalization, digital transformation, digital technologies.

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**РЕАЛІЗАЦІЯ ПРОЄКТІВ ЛОКАЛЬНОЇ ЦИФРОВІЗАЦІЇ ЯК ОСНОВНИЙ  
НАПРЯМ АКТИВІЗАЦІЇ ЦИФРОВОЇ ТРАНСФОРМАЦІЇ ОСВІТНІХ ПРОЦЕСІВ,  
ПОСЛУГ ТА ПРОДУКТІВ**

**Анотація.** Стаття присвячена дослідженню проблем, пов'язаних з впровадженням та використанням цифрових технологій в освіті. Актуальність обраної тематики зумовлена, в першу чергу, необхідністю трансформацій у сфері вищої освіти відповідно до нових умов суспільного розвитку, для якого характерні високі темпи технологічних змін, переважаюча роль інтелектуального капіталу, наявність виробничих ресурсів у вигляді знань, умінь та навичок людини. Головним завданням закладів вищої освіти має стати підготовка фахівців, які здатні створювати та використовувати технології у різних галузях, критично мислити, гнучко адаптуватись до змін, генерувати нові ідеї та формувати передумови особистого та суспільного добробуту. Досягнення таких результатів стане можливим за умови динамічних та актуальних змін у самій системі вищої освіти. Насамперед, це стосується методів, підходів, технологій, інструментарію, за допомогою яких відбувається передача знань, удосконалюються уміння та навички, а також формується досвід людини.

З метою обґрунтування необхідності створення у сфері вищої освіти інноваційного середовища, сучасну основу якого формують цифрові технології, в статті акцентовано увагу на характеристиках фахівця-інноватора. Їх формування неможливе без використання інструментів, які дозволяють максимально ефективно організувати та реалізувати освітній процес, надати якісні освітні послуги, сформувати пропозицію інноваційних освітніх продуктів.

В статті звернуто увагу на прийнятий у 2000 році Лісабонським самітом Ради Європи Меморандум про освіту впродовж життя (A Memorandum of Lifelong Learning). На основі проведеного аналізу принципів Меморандуму авторами доведено їх тісний зв'язок з сучасними трендами розвитку освіти, серед яких ключову роль відіграє цифровізація. Зокрема, реалізація задекларованого принципу "наближення освіти до місця проживання" в умовах пандемії Covid-19 є надзвичайно актуальним завданням, а його практичне втілення вимагає активізації дій, пов'язаних з цифровізацією освітніх послуг та продуктів.

Стаття містить огляд основних результатів у сфері цифровізації освіти в Україні та проблем, які потребують вирішення. Звернуто увагу на те, що на рівні формування концепцій та рекомендацій перспективи цифрової трансформації вищої освіти представлені належним чином. Проте, для вітчизняних ЗВО актуальним залишається питання практичного впровадження інструментів цифровізації, а також їх фінансового забезпечення.

З метою пошуку практичних рішень у сфері цифровізації освітніх процесів, послуг та продуктів авторами статті запропоновано алгоритм дій та описову модель, які дозволять ЗВО активізувати цифрові трансформації шляхом налагодження співпраці у форматі партнерства та реалізовувати проєкти локальної цифровізації. Ефективність та перспективність такого підходу обґрунтовано на прикладі Івано-Франківського національного технічного університету нафти і газу (ІФНТУНГ), де у 2020 році розпочато реалізацію проєкту локальної цифрової трансформації.

**Ключові слова:** освітня послуга, освітній продукт, цифровізація, цифрова трансформація, цифрові технології.

**Introduction.** A characteristic feature of the modern era is the rapid and dynamic growth of technological development, which has a significant impact on all, without exception, areas of socio-economic life. Science, technology and technology are developing rapidly, and the result of such changes should be an accelerated transformation of approaches, methods, mechanisms, tools used to meet the needs of society in a variety of areas and spheres.

Technological transformations in the field of economy are, first of all, the results of intellectual work, which, on the one hand, require the availability of human resources capable of generating them, and on the other – people who will actively and effectively use these results. In this sense, the key role is played by the education system, in particular higher education, the main task of which is not just the transfer of knowledge and skills, but, above all, training professionals capable of creating and using innovative products, making non-standard decisions to ensure effective business results and society in general.

**Literary sources analysis and problem statement.** The need to reorient education to the training of “innovators”, i.e. professionals who, on the one hand, are well aware that they will have to learn all their lives, relearn and be creative in their professional activities, and, on the other hand, able to do so Permanent creativity draws attention to the author of the publication [1], noting that the steady increase in technological development – is a real and extremely important problem to which the education system must respond immediately, and systematically and consistently [1, p.132]. In today's conditions, the key production resource is human knowledge, abilities and skills, as well as the ability to flexibly adapt to changing conditions of internal and external environment. In this context, the higher education system should be aimed at forming a “human innovator” in the “education-business-innovation” chain. That is, the result of training is to enable the graduate to solve real problems and meet current business needs, mainly with the use of new ideas and solutions. One of the main conditions for ensuring this result should be the support of educational institutions as suppliers of innovators to the market of the concept of “innovation triangle”, the essence of which is the rapid and successful implementation of breakthrough innovations and requires cooperation of three different actors: consumer, developer, and inventor. Only under such conditions it is possible to ensure further innovative activities of graduates.

According to the authors of [2], the institutions of education and intellectual capital are the foundation of the innovative economy, while the institution of human capital is its core. And a country whose government “relies” on quality, good education and skilled people is a country with an innovative economy and a high-tech future. Researchers noted that the options for training innovators can be: selection of entrants on the basis of scientific and technical circles and centers, competitions and Olympiads with the subsequent development of talents and training in their innovation and research activities; training courses; exchange of experience within university clusters. Agreeing with the effectiveness of the proposed approaches, we consider it appropriate to draw attention to the need not only to identify and support innovative students (students), but above all, to train them, using modern technologies in educational processes, services and product development will be of high value to their consumers.

The author of the publication, researching the problem of creativity in business [3], identifies the characteristics of a specialist innovator, including: creativity, with developed intuition, ability to take risks; purposefulness in achieving goals, diligence, sociability, with a desire for knowledge; ability to present the results of work performed and defend them; the ability to highlight the key benefits of an innovative project that is moving to market; ability to effectively solve emerging scientific and technical problems; possession of modern forms of organization and management of innovation, etc. We believe that a prerequisite for the formation of the list of necessary innovative characteristics of a learner should be his stay in an innovative educational environment, the essence of which in no way levels the educational process as a

sociocultural, value-semantic process of interpersonal communication, multilevel process human activity.

**Formulation of the problem and the purposes.** The purpose of the study is to reveal the role of cooperation in the format of partnership between higher education institutions and business structures and joint implementation of local digitization projects to intensify the procedures of digital transformation of educational processes, services and products. In order to substantiate the need to create an innovative environment in the field of higher education, the modern basis of which is formed by digital technologies, the study will focus on the characteristics of the specialist innovator. Their formation is impossible without the use of tools that allow the most effective organization and implementation of the educational process, provide quality educational services, to form a proposal for innovative educational products.

Achieving the purpose of the study will contribute to the important tasks of higher education institutions, including training professionals who are able to create and use technology in various fields, think critically, flexibly adapt to change, generate new ideas and create conditions for personal and social well-being.

**Presentation of the main research material.** In March 2000, the Lisbon Summit of the Council of Europe adopted a Memorandum of Lifelong Learning [4], the main theses (principles) of which, in our opinion, confirm that modern educational processes, services and products should not be not only as close as possible to human needs and interests, but also to be developed, implemented and provided on the basis of the use of approaches and technologies that meet the conditions of information society development. At the same time, digitalization processes, which are accompanied by the introduction and active use of digital technologies, are the main for a society where the production and consumption of information products and services are dominated. We believe that education, as a basic social institution, should first of all undergo transformations related to the transition to new opportunities for communication in the implementation of educational processes, provision of services and product creation.

Thus, the connection between the principles of the Memorandum and trends in the development of education in the digital age can be traced as follows:

1. The aim of the principle of “new basic knowledge and skills for all” is to ensure universal continuing access to education in order to acquire and renew the skills needed to integrate a person into the information society. In this sense, education should play, on the one hand, the role of consumer of digitized products, and on the other – to create opportunities for their widespread use in society, by disseminating knowledge, skills and abilities among potential users.

2. The principle of “increasing investment in human resources” is to increase the priority of human resources and increase investment in human development. Digitalization expands opportunities and encourages human resource development.

3. “Innovative methods of teaching and learning” is a principle, the essence of which is to reorient educational institutions to provide educational services using technologies that are as user-oriented as possible. Teaching methods in both formal and non-formal education systems should be as convenient and accessible as possible. A person who learns tries to productively use the time and expenses allocated for the acquisition of new knowledge, skills, and abilities. Therefore, educational institutions as providers of educational services need to innovate methods using digitization technology, which allows you to create unique products adapted to the needs and preferences of the client [5].

4. Radical change of approaches to understanding and recognition of educational activity and its results is the essence of the principle “new system of evaluation of received education”, which, first of all, allows changing approaches in recognition of results of non-formal and informal education. A person with the help of modern digital technologies learns independently or through informal providers, having previously monitored the existing offer of educational services and products. First of all, the result of training is the acquisition of new knowledge, skills and abilities that allow diversifying opportunities in the labor market. Digitization creates

better management mechanisms for both the learning process and the procedures for its recognition (confirmation) through the formation of a publicly available digital document (diploma, certificate, certificate, etc.).

5. The goal of ensuring that everyone has free access to information on educational opportunities and to the necessary advice and recommendations throughout their lives is realized through the principle of “development of mentoring and counseling”. With the help of digital technologies, the traditional role of the teacher is transformed, who moves from the format of direct knowledge transfer to the format of mentoring, i.e. provides advisory support to students, making maximum use of digital communication technologies.

6. “Bringing education closer to the place of residence” is one of the most relevant principles of digitalization trends, which aims to bring educational opportunities closer to the place of residence of consumers through the use of information technology. The use of this principle has become extremely relevant in the context of the COVID-19 pandemic, when educational institutions and other entities providing educational services are actively switching to distance learning. It is clear that this format has both advantages and disadvantages, but it is obvious that all participants in the learning process must have the technical capabilities and be able to use the available tools for digitization.

It should be noted that in Ukraine at the national level enough attention is paid to issues related to the digitalization of education. In particular, the Ministry of Education and Science of Ukraine recently established the Directorate for Digital Transformation of Education and Science, responsible for policy making in this area [6], whose main task is to implement projects and initiatives in the field of digital transformation of education and science. We believe that today a significant achievement of the team of the newly created unit at the Ministry of Education and Science is the development, completion of public discussion and submission for approval by the Cabinet of Ministers of Ukraine Concept of digital transformation of education and science until 2026. In our opinion, the presented project fully reflects both the problems in the field of digitalization of education that need to be solved, and outlines ways and means to solve them [7]. The efforts of the Ukrainian authorities in the field of digitalization of higher education are supported by the World Bank, which in May 2021 approved the project “Improving higher education in Ukraine for results”. It contains components with recommendations for the development of digital infrastructure [8, 9]. However, despite the widespread perception, the issue of digitalization at the level of educational institutions requires not only the development and adoption of conceptual frameworks and regulatory support, but above all – real measures and mechanisms to promote their gradual transformation into competitive educational services.

The need for changes related to digital transformations is pointed out by domestic scientists, whose research interests are related to the issues of effective development of education, including higher education. Thus, the author of the publication [10] justifies the need for “immediate” actions aimed at adapting Ukrainian universities to the conditions of digital development by presenting arguments that confirm the possibility of free economic benefits from the introduction of new approaches to organizing educational processes, providing services and creating educational proposals. products. First, digital literacy needs to be raised. According to the Ministry of Digital Transformation, less than half of Ukrainians aged 18-70, most of whom are young, consider digital skills relevant, 53% do not have a basic level of digital skills, more than 15% aged 60-70 do not have them at all [11]. In our opinion, for universities, such statistics should be a signal to intensify the processes associated with increasing the level of digital literacy of both research and teaching staff and support staff. At the same time, it is necessary to take into account that certain categories of freelance staff must have not only basic digital competencies at the level of users of software technologies and products, but also be able to create them independently.

Of particular note is the study “Ukraine 2030” of the independent analytical center “Ukrainian Institute of the Future (UIM)”, in which a separate section (Chapter 6) is devoted to

the prospects of the domestic education system, and in paragraph 6.9.4 “Digitalization of education and digital competencies”) presents not the concept, but the directions and practical tools of changes that need to be implemented in the education system, in particular higher education, to bring processes, services and products in line with global trends and customer requirements. The authors believe that the digital transformation in the higher education sector is taking place (rather, it should happen – ed.) In three directions: interaction with the client (student, entrant), process optimization, business model change, and goals of educational institutions and students should coincide. In addition, experts recommend that universities move not only to digital tools in the traditional learning process, but also to completely new digital learning models; develop digital transformation programs to ensure the competitiveness of educational, research and economic activities at the national and global levels [8]. The main consequences of the digitalization of university education, which are also noted by UIM experts, will be:

- transformation of the university from physical to digital space, which will be dominated not by lecture courses, practical classes in laboratories, and the interaction of teacher and student on online platforms;
- the use of artificial intelligence in the perception and processes of assimilation of information, through which there will be individual analysis and adjustment of educational materials for students, in order to increase the effectiveness of mastering the subject of educational programs;
- introduction of virtual and augmented reality tools that will create opportunities for better assimilation of information with minimal time and financial costs;
- organization of mass short-term training in the format of online courses, in particular for persons whose professional activities do not provide opportunities for even short-term absence from the workplace;
- Improving the administrative and economic activities of the university and the management of the educational process through the use of the Internet of Things and digitized approaches to the implementation of the functions of organization, planning, control and motivation.

Thus, the above theoretical justifications developed and adopted at various levels of conceptual provisions that prove the importance and necessity of digitalization of education – this is a significant enough for domestic educational institutions, which guides all participants in the educational process in what approaches, models, mechanisms and tools should be used to provide and receive quality educational services. However, for Ukrainian universities, which are currently going through difficult times related to higher education reforms, the issues of finding and implementing practical solutions in the field of digitalization of educational processes, services and products are more relevant. First of all, it is necessary to pay attention to the fact that the main problem that slows down the digital transformation is the lack of financial resources for the modernization of material and technical base – the main component in the digitization process. We agree that financial autonomy allows the educational institution to independently and responsibly decide on the use of part of the available financial resources [12]. At the same time, when choosing a problem that requires financial investment, the management of educational institutions in conditions of insufficient budget funding is forced to give preference to projects aimed at maintaining or upgrading the existing physical infrastructure. Thus, funds for the purchase of modern computer equipment, software, platforms for online learning and virtualized educational products, training of digital literacy workers, are usually allocated on a residual basis as a result of savings. Therefore, it is important for educational institutions to look for additional sources of financial resources to support digital transformation projects. Among the possible options, in our opinion, the priorities are external – raising funds from international and national grant programs and internal – increasing revenues to the special fund of the budget of the educational institution through the sale of educational services to customers, proposals for a competitive educational product. The third, no less effective, in our

opinion, option for intensifying digital transformations may be to establish mutually beneficial partnerships with potential and financially viable consumers of educational services – enterprises, institutions, organizations of various forms of ownership, whose scope is as close as possible to educational and scientific activities of educational institution. The algorithm of actions of the educational institution and the descriptive model of such cooperation can look like this:

1. First of all, the educational institution forms a proposal for cooperation for the business entity with the justification of the feasibility and cost-effectiveness of investing in the development of digital infrastructure. It is important to emphasize that the company as a customer of educational services and consumer of educational products will receive financial and economic benefits – special value of educational services and products, as well as social effect – the possibility of continuous training and professionalism of employees using modern digital technologies.

2. At the second stage, the agreement on cooperation is agreed and signed, which determines the organizational and legal aspects of the relationship. In this document, it is important to pay attention to the approximate topics of training programs for employees in terms of services in the field of both formal and non-formal education.

3. The third step is the joint formation of a list of hardware and software products required for the implementation of the digital transformation project. It is important that the technical means or rights to use digital technologies received by the educational institution correspond to the current trends in the field of digitalization, as well as be adapted to the possibilities of their use by the parties.

4. The fourth stage should be the harmonization and signing of contractual provisions on the mechanism of transfer and use of digitalization of educational institutions. According to the current legislation, such a mechanism may be a contract of donation, donation, storage and sharing.

5. The fifth, final stage is the presentation of the new digital capabilities of the educational institution, obtained as a result of partnership.

Despite the relative difficulty of implementing the above procedures due to the imperfection of domestic legislation, Ivano-Frankivsk National Technical University of Oil and Gas (IFNTUOG) in 2020 began work on implementing the idea of local digital transformation in partnership with the domestic oil and gas industry. The initiative, supported by the Free Economic Zone Administration, belongs to the Institute of Postgraduate Education (IPE), on the basis of which it is planned to create an audience of virtualization of educational products (AVEP). To date, with the involvement of sponsorship funds in the IPO auditorium equipped space, visual and technical characteristics of which fully meet the requirements for the location and use of relevant equipment and technical means. The implementation of the project as of the end of 2021 and the beginning of 2022 is in the fourth stage, ie there are formal procedures for the transfer of property acquired by the company. Among the agreed list of technical means, in addition to modern computer technology, it is planned to install an interactive panel, video cameras, studio backgrounds, equipment for lighting, recording and sound reproduction. The layout of technical devices is shown in Fig. 1.

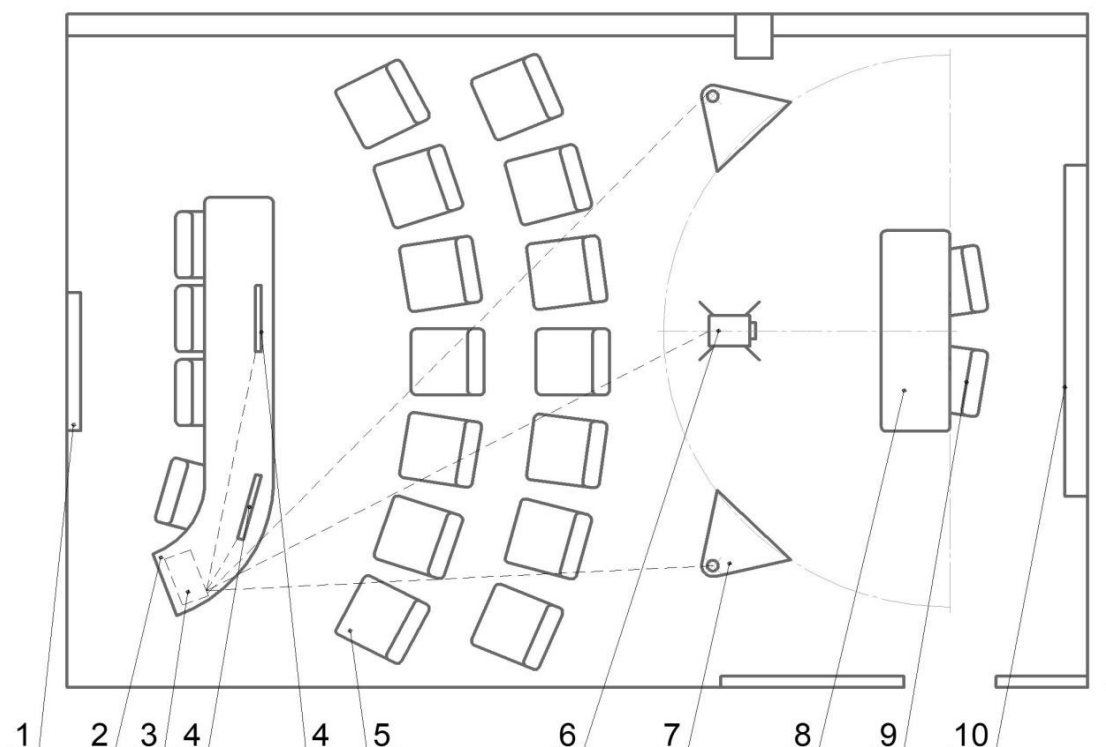
The general view of shooting educational video area, which is planned to be implemented in the AVEP of IPE, is shown in Fig. 2.

The general view of the area of educational, scientific and other activities in a mixed format (both online and offline), which is planned to be implemented in the AVEP of IPE is shown in Fig. 3.

In the near future plans to create:

- a series of video lectures by recording on the video camera of the teacher (lecturer), with a combined demonstration of presentation materials on the screen of the interactive video panel;





1 – interactive panel (55"); 2 – table; 3 – PC; 4 – monitor; 5 – chair with folding table; 6 – video cameras; 7 – soft box (lighting); 8 – table; 9 – soft chair; 10 – background

**Figure 1 – Plan for the location of technical devices in the framework of the project of educational services and products local digitization**



**Figure 2 – General planned view of shooting educational video area in the AVEP of IPE IFNTUOG**



**Figure 3 – General planned view of the area of educational, scientific and other activities in a mixed format in the AVEP of IPE IFNTUOG**

- video presentations of training programs for employees of the partner company and other business entities of the oil and gas industry;
- video materials demonstrating the work of modern laboratory and training equipment;
- video annotations of professionally-oriented primary disciplines, which are contained in the curriculum for the preparation of masters in the second higher education.

**Conclusions.** Regarding the prospects of active digitalization of educational processes, services and products, with the help of the created space of virtualization it is planned: conducting seminars, trainings, master classes, short-term training of employees in the format of webinars; organization of offline meetings with video and audio support, their subsequent placement on platforms on the Internet; creation of a virtual product to practice skills in working with modern oil and gas equipment; formation of the offer of video materials for increase of efficiency of the further certification of workers of oil and gas branch according to the international and national standards; combining classroom teaching with distance learning, given that distance learning and online learning are becoming a common component of education [13].

Thus, in today's environment, higher education institutions as producers of educational and scientific products and services must be maximally adapted to the requirements of today's market, which has changed due to the COVID-19 pandemic and continues to change. It is difficult to disagree with the fact that most domestic universities have already undergone changes related to the transition from natural methods of distance learning to harmonized approaches, which involve the use of convenient and understandable communication tools. However, one of the main prospects for increasing the pace of development and strengthening the competitiveness of higher education institutions is the digital transformation and the related reformatting of methods and forms of education. Undoubtedly, external challenges require the improvement of theoretically sound approaches and models of digitalization of higher education, but more important, in our opinion, the task for scientists and practitioners is to continue finding and analyzing effective practical solutions that will effectively implement digital transformation measures.

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