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RESOURCE POTENTIAL OF A DIGITAL UNIVERSITY IN THE CONDITIONS OF GLOBAL CHALLENGES

РЕСУРСНИЙ ПОТЕНЦІАЛ ЦИФРОВОГО УНІВЕРСИТЕТУ В УМОВАХ ГЛОБАЛЬНИХ ВИКЛИКІВ

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The article is devoted to analyzing the transformation of the resource potential of a digital university in the conditions of global challenges and the development of digital technologies. It has been proven that the influence of artificial intelligence, big data analytics, virtual educational environments, and increased competition necessitate new models of functioning. The focus of the research is on the digital university as an institutional form that integrates classical resources (human, financial, material, infrastructural, and reputational) with digital assets, creating a multi-level system of sustainability and competitiveness. It has been shown that human and intellectual resources are enhanced by digital technologies, financial resources are diversified through online services, material resources are transformed into virtual infrastructure, and reputational resources are transformed into digital brands. Competition in such an environment manifests itself as a driver of efficiency and, at the same time, transforms into strategic cooperation. The combination of these processes creates conditions for the stability of the educational process, the development of partnership ecosystems, and the improvement of knowledge exchange efficiency. Recognition of the multi-stakeholder nature of educational services is seen as key to modernizing the resource base. Employers, research centers, industry partners, and international organizations are increasingly involved in their creation, leading to diversification of funding and integration into global networks. The practical significance of the results lies in their use for developing digital transformation strategies, modernizing management structures, and introducing innovative services that are useful for universities, educational projects, and government authorities.

Keywords: digital university, digitalization, resource potential, global challenges, competition, cooperation.

Статтю присвячено комплексному аналізу трансформації ресурсного потенціалу цифрового університету в умовах глобальних викликів та динамічного розвитку цифрових технологій. Обґрунтовано, що прискорення соціально-економічних змін, зростання впливу штучного інтелекту, аналітики великих даних і віртуальних освітніх середовищ, а також посилення конкуренції у світовому освітньому просторі визначають потребу у переосмисленні традиційних моделей функціонування університетів. У центрі дослідження – концепт цифрового університету як інституційної форми, здатної інтегрувати класичні ресурси (людські, фінансові, матеріально-інфраструктурні та репутаційні) з новими цифровими активами, утворюючи складну багаторівневу систему, що забезпечує стійкість і конкурентоспроможність. Особливу увагу приділено трансформації ресурсних груп у цифровому середовищі. Показано, що людські та інтелектуальні ресурси підсилюються за рахунок інноваційних технологій, які створюють умови для персоналізованого навчання й автоматизованого управління освітніми процесами. Фінансові ресурси диверсифікуються завдяки цифровим освітнім платформам і сервісам, що дозволяє університетам залучати нові канали фінансування. Матеріально-інфраструктурна база трансформується у віртуальну форму – хмарні сервіси, онлайн-кабінети, EdTech-екосистеми, які забезпечують масштабованість та гнучкість освітніх процесів. Аргументовано, що сучасна конкуренція у сфері вищої освіти набуває подвійного виміру: з одного боку, вона виступає драйвером підвищення ефективності, змушуючи університети оптимізувати управління ресурсами й впроваджувати інноваційні цифрові сервіси; з іншого – поступово трансформується у формат стратегічної кооперації. Підкреслено, що поєднання конкуренції й співпраці у цифровому університеті створює умови для збереження стабільності освітнього

процесу, підвищення ефективності обміну знаннями й формування довгострокових партнерських екосистем. Визнання мультисуб'єктного характеру освітніх послуг у цифровому університеті розглядається як ключовий чинник модернізації його ресурсної бази. До створення та використання освітніх продуктів долучаються не лише викладачі й студенти, а й роботодавці, науково-дослідні центри, індустріальні партнери, місцеві громади та міжнародні організації. Це зумовлює диверсифікацію джерел фінансування, інтеграцію до глобальних освітньо-наукових мереж та підвищення економічної стійкості університету. Практична значущість результатів дослідження полягає у можливості їх використання при формуванні стратегій цифрової трансформації університетів, розробці політик сталого розвитку, оптимізації управлінських процесів і впровадженні інноваційних освітніх сервісів. Отримані результати можуть бути корисними для адміністрацій університетів, керівників освітніх і наукових проєктів, цифрових архітекторів та органів державної влади, які відповідають за реалізацію політики цифровізації у сфері вищої освіти.

Ключові слова: цифровий університет, діджиталізація, ресурсний потенціал, глобальні виклики, конкуренція, кооперація.

Problem statement. The resource potential of a university today can no longer be interpreted as a static set of material, financial, or personnel components. It appears as a dynamic system that is constantly transforming under the influence of external and internal factors. The rapid growth of digital technologies, the emergence of new models of the knowledge economy, and the intensification of global competition make the classic university model insufficient to ensure long-term sustainability and development. In a turbulent global environment, universities are forced not only to compete for resources but also to learn how to integrate them into a multi-level system where human, intellectual, financial, material, and reputational components interact.

Another feature of the current stage is that competition is gradually losing its purely resource-based nature and turning into a systemic competition for the ability of universities to integrate, combine, and multiply resources in a synergistic format. The digitalization of higher education opens up opportunities for this through artificial intelligence, big data, cloud services, virtual educational environments, and EdTech ecosystems. In such a model, it is digital resources that become the integrating factor that allows the synchronization of the interaction of all participants in the educational process – students, teachers, researchers, employers, communities, and international organizations.

At the same time, the resource potential of a university is not limited to innovation infrastructure or technological capabilities. It encompasses values, academic culture, the ability to communicate globally, and respond quickly to challenges. That is why the problem of shaping the resource potential of a digital university goes beyond traditional economic or management models. It takes on a complex nature, combining institutional, organizational, cultural, and axiological dimensions.

Thus, the relevance of the research is determined by the need to develop new principles and mechanisms for shaping the resource potential of a digital university. It is necessary to understand how the combination of competition and cooperation, diversification of resource sources, integration of digital platforms, and the development of multi-stakeholder educational relationships can provide the university with competitive advantages and sustainable development in an era of global challenges.

Analysis of recent research and publications. The problematics of digital transformation of higher education, management of university resource potential, and introduction of innovative technologies are actively represented in contemporary research. Domestic and foreign scientists, in particular N. Chala, O. Voropai, K. Pichyk, L. Pomytkina, A. Kozynets, H. Lopuschnyak, S. Yahodzinskyi, as well as D. Soroko, G.L. Savino, N. Gray, J. Schöning, and others, have made a significant contribution to the development of the conceptual foundations of digitalization.

Recent studies have focused on the role of digitalization as a key factor in the modernization of the educational process, knowledge flow management, and the introduction of innovative practices in university activities [1; 3; 11]. In particular, N. Chala, O. Voropai, and K. Pichyk consider the possibilities of using data mining technologies to create educational innovations, emphasizing the importance of intellectual resources in the formation of sustainable development of educational systems [4]. The works of L. Pomytkina, A. Gudmanian, O. Kovtun, and S. Yahodzinskyi focus on the interconnection between strategic choice and resource provision, particularly in the field of decision-making and the development of the educational environment [5].

A separate area of research concerns the commercialization of higher education and the

challenges associated with the economization of educational processes. These aspects are explored in the works of M. Strigul, O. Khomeriki, S. Yahodzinskyi, and their colleagues, who analyze trends in the educational services market and the impact of commercial factors on the academic community [6]. The problems of academic integrity and the impact of digital tools on the quality of the educational environment are studied by V. Bilyk, V. Shpylova, and A. Kozynets [7; 8]. At the same time, H. Lopuschnyak and M. Skydan analyze the interdependence of transformations in the labor market and in higher education, which forms the context for assessing the resource base of universities [9].

Considerable attention is also paid to issues of digital trust, transparency, and the use of artificial intelligence in university and related environments. D. Soroko, G.L. Savino, N. Gray, and J. Schöning explore the role of social transparency and innovative AI solutions in improving the efficiency of digital systems, which can be extrapolated to the education sector [2; 10]. Of particular relevance are the works of N. Bobro, devoted to the use of digital avatars as factors of economic efficiency of educational systems and an important component of the resource potential of a digital university [11].

Despite a significant amount of research, a number of aspects remain insufficiently covered. First and foremost, this concerns the systematization of approaches to structuring the resource potential of a digital university, determining mechanisms for its integration into global scientific and educational networks, and analyzing the interaction of competition and cooperation in the digital economy.

Identification of previously unresolved parts of the general problem. Despite the intensification of research into the digital transformation of higher education, a number of issues related to the shaping of the resource potential of a digital university remain insufficiently developed. In particular, there is no comprehensive systematization of approaches to defining the structure of the resource potential of a digital university and mechanisms for its integration into the global educational environment. The impact of digital technologies on the transformation of traditional resources (financial, material, human, and reputational) into digital forms and their combination with intellectual assets has not been sufficiently studied. There is limited research analyzing the interaction between competition and cooperation in the digital environment, particularly in the context of creating consortia, educational platforms, and global research networks. Questions remain about the economic sustainability of digital universities, balancing the multi-stakeholder nature of educational relationships with managerial efficiency, and identifying the risks and barriers to the digitalization of resource bases.

Formulation of the article's objectives (task statement). The aim of the article is to identify and substantiate the peculiarities of shaping the resource potential of a digital university in the conditions of global challenges. To achieve this aim, it is planned to:

– conduct a theoretical analysis of the essence and structure of the university's resource potential;

– highlight the specifics of transforming classical resources into digital forms;

– investigate the role of competition and cooperation in the formation of competitive strategies for a digital university;

– analyze the multi-stakeholder nature of educational services in a digital environment;

– identify the prospects and risks of resource potential development in the context of sustainability and global integration.

Presentation of the main research material. The acceleration of changes in socio-economic processes and phenomena in the global economy, the rapid development of digital technologies, the intensification of environmental challenges, and geopolitical instability have become defining elements of the context in which universities around the world operate. Higher education, like other sectors and industries of the economy, is mastering the processes of independent strategic planning, developing and improving tools for responding quickly to external challenges.

The functioning of universities in modern conditions makes the struggle for resources inevitable, accompanied by increased competition [1; 3]. Competitiveness and the need to compete for resources have become the norm for the global educational space, where universities compete for financial, human, intellectual, infrastructural, and reputational resources. At the same time, unlike previous decades, when higher education in many countries operated in a relatively stable and regulated environment, today's situation is characterized by a high level of uncertainty and the need to adapt to rapid transformations.

From a historical perspective, over the past three decades, the higher education system has

undergone a number of significant changes due to economic development, digitalization, and socio-political transformations in society. Considering the dynamics of global transformations, the higher education system is gradually transitioning from a model of stable functioning to multi-level competition and cooperation (see Fig. 1).

The initial transition from a planned economic system with centralized funding and strict regulation to commercialization was characterized by a sharp intensification of competition amid declining real funding, a lack of investment, and weakened mechanisms for ensuring the quality of educational outcomes and service conditions [9, p. 8]. This stage became the starting point for the formation of a competitive environment in higher education.

The second transition was aimed at overcoming the negative consequences of commercialization: the lack of a strategic development policy, low levels of funding, competition that was reduced to a struggle for survival, and extrabudgetary income. During this period, the role of targeted university development increased, new institutional statuses appeared, higher education expanded and integrated, and mechanisms were introduced to equalize access to quality educational services. A characteristic feature of this stage was the strengthening of the positions of leading universities, which became centers of regional development, as well as a reduction in the number of low-capacity and ineffective institutions.

The third transition was characterized by practices of managed cooperative competition, where universities developed partnerships and consortia to achieve common strategic goals while maintaining competitiveness and differentiation. This stage reflects a growing trend toward coordination and collective interaction. Today, the system is entering a new phase, characterized by a focus on scientific and technological development, digital innovation, and open regulated competition, which is creating qualitatively new conditions

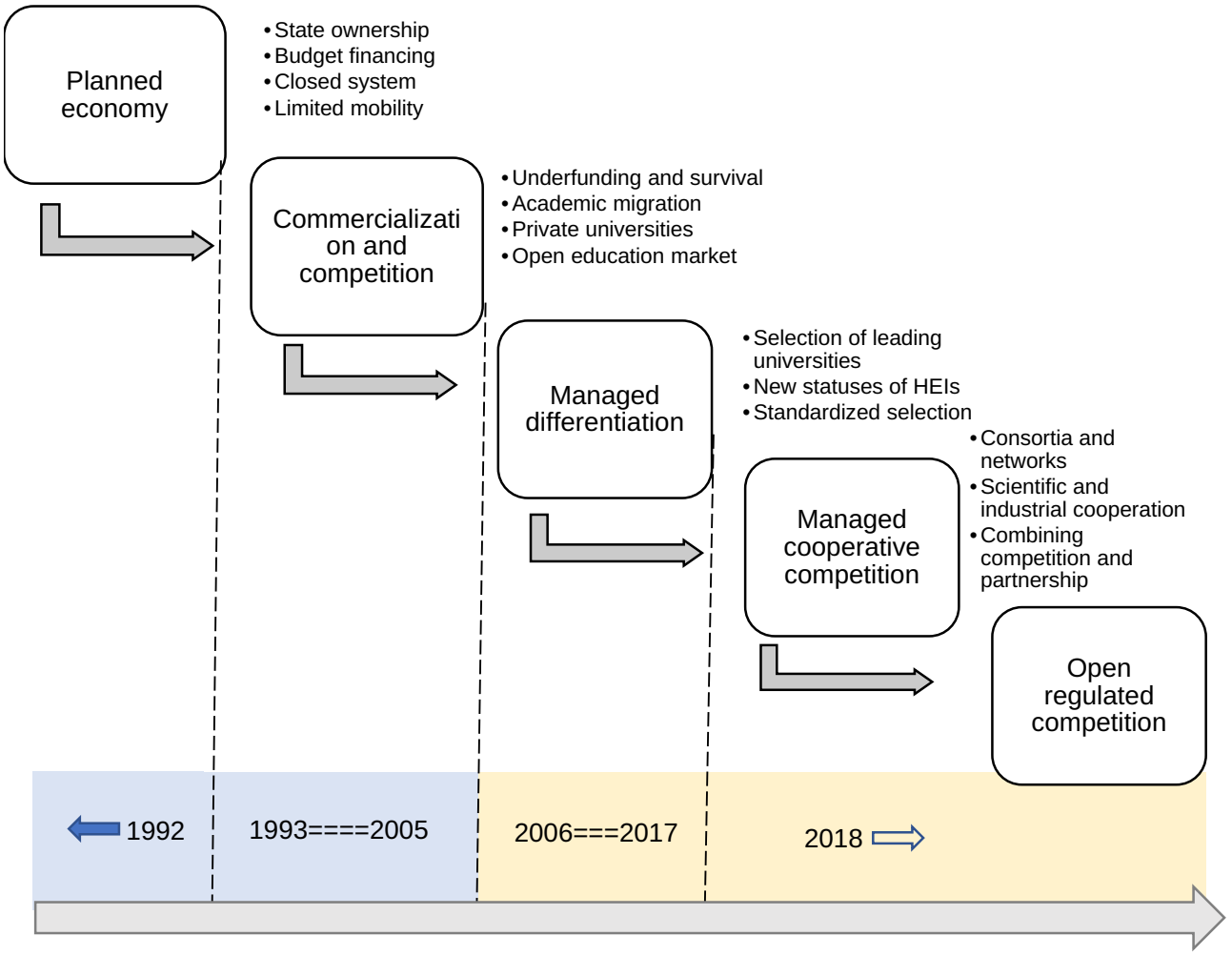

Figure 1. Specific features of the stages in the development of the higher education system [2; 4; 10]

for functioning and strengthening the resource potential of universities in a global environment.

The theoretical basis of our research is a wide range of conceptually different positions on the degree of market character of higher education, presented in scientific literature [8; 9]. Particular attention should be paid to the difference in assessments of the market behavior of universities, especially regarding the objective determination of a high proportion of competitive practices in their activities.

Scientific research has described the characteristics of market mechanisms in higher education in sufficient detail [2; 6; 7; 8]. In our opinion, the most adequate paradigm for defining competition in higher education is to interpret it as a struggle for key resources. The main resources for a university can be classified in different ways, but the most obvious is to group them into four types:

– human (students and applicants as a driver of income and human resources; scientific and pedagogical staff as a driver of the university's academic development);
– financial;
– material, primarily infrastructure;
– reputational, which in contemporary literature are considered intangible assets (status, social recognition).

Intellectual resources, which are an integral part of the university's potential, require separate consideration: knowledge, methodologies, patents, research results, etc. They are closely related to human capital, since their creation and use are ensured by the institution's employees. Therefore, within the framework of this research, it is advisable to consider human and intellectual resources in conjunction with each other.

Accordingly, competition in higher education can be defined as a contest to attract four key resource groups, on the basis of which the four "capitals" of a university are formed. These constitute the total resource potential of a university, which determines its competitive advantages and ability to ensure sustainable development in the conditions of global challenges (see Fig. 2).

Unlike a classical university, which focuses primarily on four basic resource groups – human and intellectual, financial, material and infrastructure, and reputational – a digital

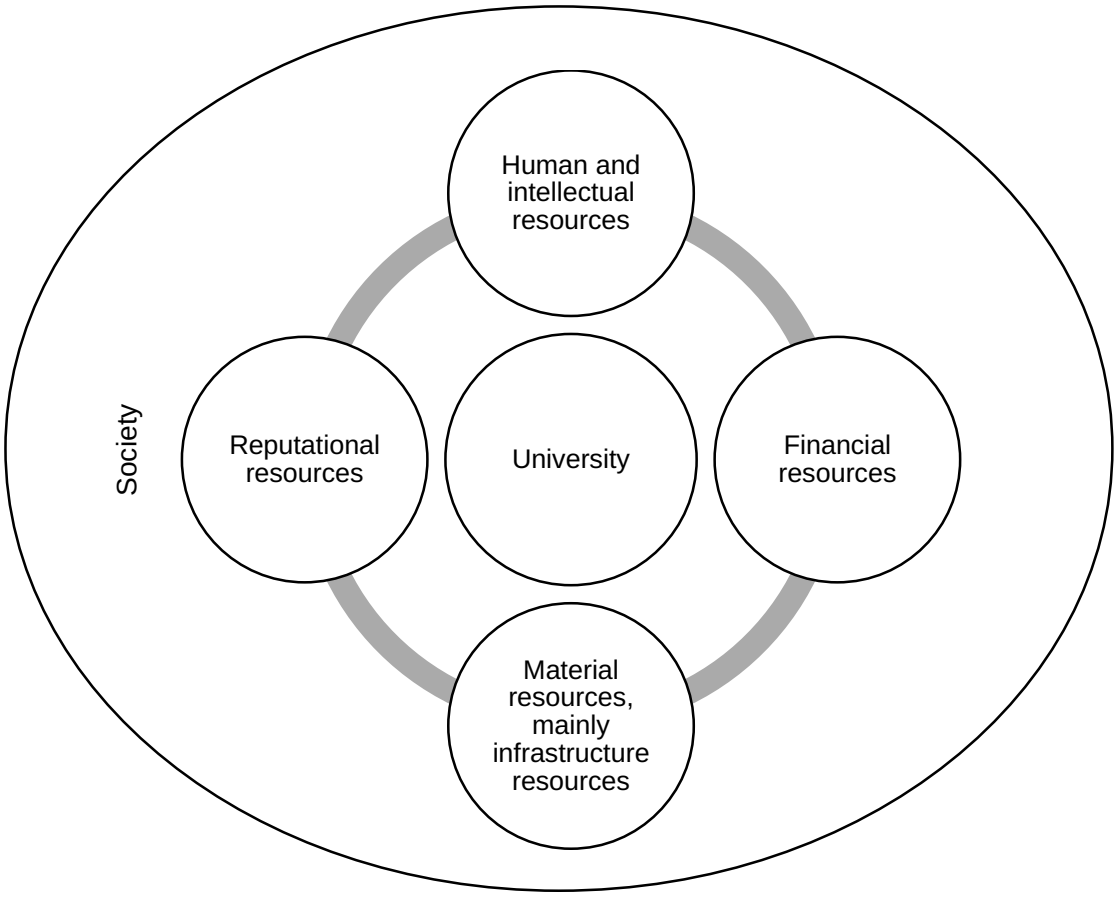

Figure 2. Resource groups of a classical university [6; 7]

university integrates them into a more complex, multi-level system (see Fig. 3).

In this model, human and intellectual resources are enhanced by digital technologies (artificial intelligence, big data, virtual educational environments), financial resources are diversified through digital educational services and global platforms, material resources are transformed into virtual infrastructure (online classrooms, cloud services, EdTech ecosystems), and reputational resources are expanded to include the university's digital brand in the global information space.

All these changes are shaping a new configuration of resource potential, which determines the competitive capabilities and strategies of a digital university. This is changing the very nature of competition, which is losing its purely resource-based dimension and taking on the character of a systemic competition for the ability to integrate resources, combine them, and ensure synergy.

In this context, the first global trend – using competition as a driver for improving efficiency – manifests itself in digital universities through their ability to quickly update educational programs, implement innovative digital services, and ensure high-quality learning processes. Competition encourages universities to invest in the development of digital infrastructure, create unique educational products, and develop flexible models of personalized learning. It also enhances the role of data analytics, which makes it possible to track the effectiveness of educational solutions in real time and adapt them to the needs of students and the labor market in a timely manner. Thus, competition in the digital environment becomes a catalyst for continuous improvement and a guarantee of growing trust on the part of stakeholders.

The second global trend is the transformation of competition into a strategic cooperation format, where interaction between universities is based not on direct opposition, but on integration of efforts. In the digital environment, this manifests itself in the creation of open scientific repositories, shared use of cloud-based educational infrastructures, standardization of digital platforms, and compatible training modules. Such cooperation does not reduce competition,

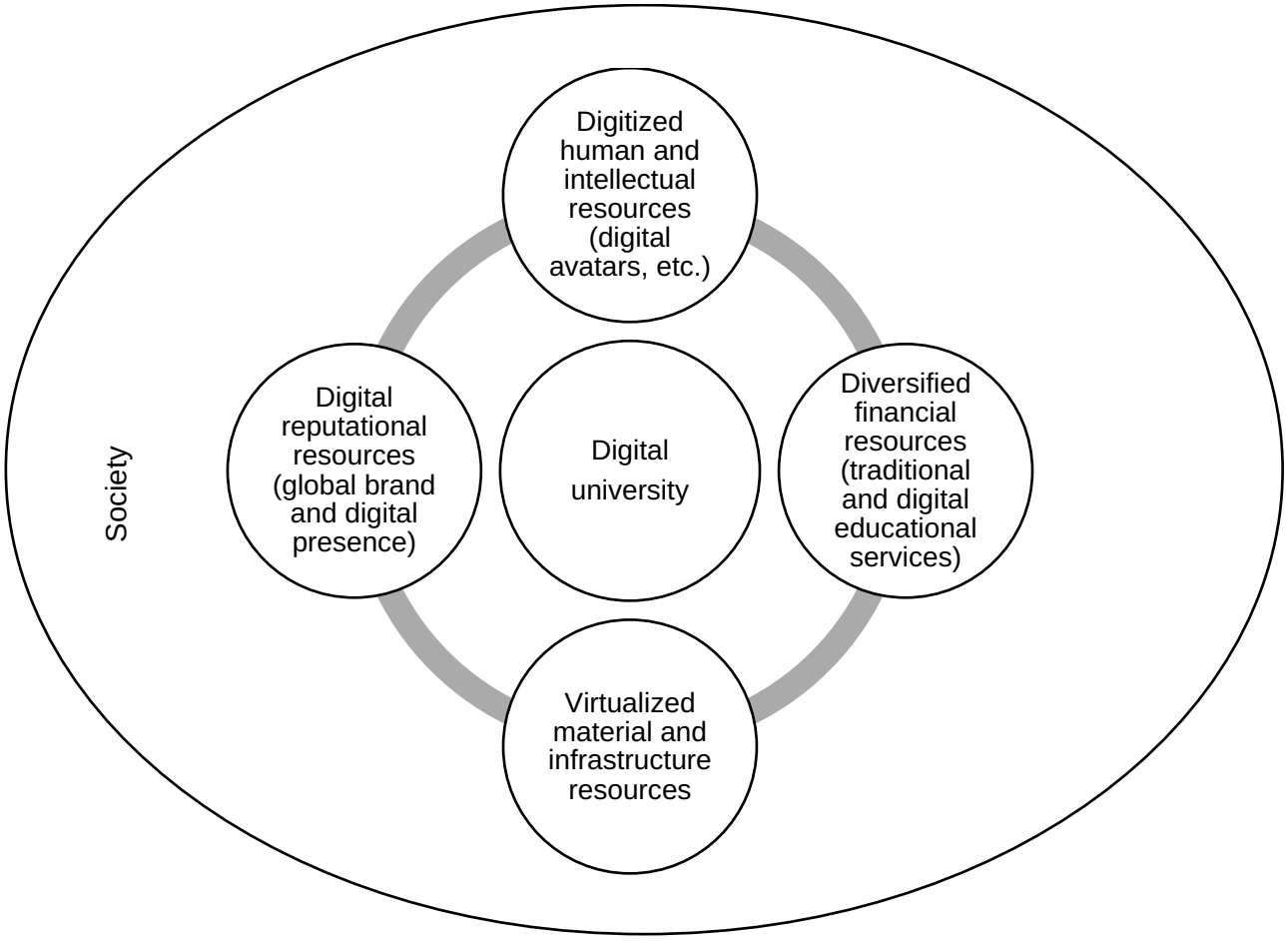

Figure 3. Digital university resource groups [11]

but rather takes it to a new level – universities compete for the quality of digital solutions and the speed of their implementation, while taking advantage of collective resources. It is through this combination that a digital university can expand its presence in the global educational and scientific space, increase the efficiency of knowledge exchange, and form long-term partnership ecosystems.

An additional impetus for this was provided by the challenges of recent years, which have exacerbated the need to rethink the competitive environment. Universities had to shift to mass online courses and expand the use of cloud services and digital platforms, which led to the realization that competition for resources must be complemented by cooperation for a more rational use of the potential of the higher education system as a whole. This integration has enabled universities to maintain the sustainability of the educational process, reduce infrastructure maintenance costs, and open new channels of access to knowledge. In this context, the digital university is seen as an open ecosystem where a combination of competition and cooperation not only ensures survival in the conditions of global challenges but also forms the basis for innovative development and long-term sustainability.

As a result, competition and cooperation in a digital university are integrated processes that ensure not only increased efficiency but also the development of innovative models of educational services. The latter are no longer considered a one-dimensional educational product, but a complex system that includes the learning process itself, related services, digital solutions for management and communication, as well as products of intellectual activity – patents, educational platforms, etc. [7, p. 12]. An important feature is the active involvement of the student in the process of shaping educational services, as digital tools allow not only acquiring knowledge but also influencing its structure and presentation [8]. This creates a new quality of interaction, where the result is measured not only by the increase in knowledge or improvement in qualifications but also by the university's ability to create added value for society, the economy, and the global academic community.

Recognition of the multi-stakeholder nature of educational services in the digital environment opens up qualitatively new opportunities for shaping the resource potential of universities. Not only teachers and students, but also employers, research centers, industrial partners, local communities, and international organizations are increasingly involved in their creation and consumption. This contributes to the diversification of funding sources, integration into global scientific and educational networks, and the development of innovative forms of cooperation.

Conclusions. The conducted research showed that the resource potential of a digital university is not limited to traditional material or financial components, but is shaped as a multi-level system in which human, intellectual, infrastructural, and reputational resources interact with digital technologies. It is the integration of these elements that creates a new quality of educational environment capable of ensuring the university's sustainability and competitiveness in the global space.

A digital university is distinguished by the fact that its strategic advantages are determined not only by the availability of resources, but also by the ability to quickly combine, scale, and adapt them to the challenges of today. Competition in such a model loses its narrow resource-based nature and transforms into a systemic competition for the ability to innovate, create synergies, and generate added value for stakeholders. At the same time, cooperation between universities, the sharing of digital platforms, and global educational networks are becoming key factors in effectiveness.

The theoretical significance of the research lies in the formation of a conceptual vision of the resource potential of a digital university as an open ecosystem that combines competition and cooperation. The practical significance lies in the possibility of applying these provisions to develop strategies for the digital development of universities, modernize their infrastructure, diversify funding, and form a global digital brand.

As a result, the digital university emerges not as a modernized analogue of the classical institution, but as a qualitatively new model, where resource potential performs an integrating function and becomes the main factor of sustainable development in the conditions of global challenges.

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