

MANAGING SUSTAINABILITY IN HIGHER EDUCATION: THE IMPACT OF INTERNATIONAL ECONOMIC RELATIONS ON INSTITUTIONAL STRATEGIES

УПРАВЛІННЯ СТАЛІСТЮ У ВИЩІЙ ОСВІТІ: ВПЛИВ МІЖНАРОДНИХ ЕКОНОМІЧНИХ ВІДНОСИН НА ІНСТИТУЦІЙНІ СТРАТЕГІЇ

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Abstract. *This article investigates the transformation of institutional strategies in higher education institutions (HEIs) under the influence of international economic relations, with a focus on achieving sustainable development. The purpose of the study is to develop conceptual approaches to managing sustainability in higher education through the integration of global practices and sustainability indicators. The objectives include: systematizing the theoretical foundations of HEI sustainability; analyzing the dynamics of key sustainability indicators in an international context; examining best practices from leading universities; and modeling strategic scenarios using cooperative game theory. The research methodology combines systems and comparative analysis, content analysis of global rankings (QS, THE, ARWU), an indicator-based approach, case studies, and a game-theoretic simulation of strategic decision-making. Particular attention is given to the analysis of universities that have successfully integrated sustainability principles into their governance and educational models—namely, the University of Cambridge, Aalto University, and the University of Amsterdam. The findings demonstrate that the implementation of ESG principles, strategic alliances, and adaptation to international financial and economic trends significantly enhance HEI performance in global rankings. The developed game-theoretic payoff matrix allows for the simulation of rational university behavior regarding investments in sustainability from both short- and long-term perspectives. The scientific novelty lies in building a theoretical and practical basis for the transformation of management approaches in higher education institutions, which combines strategic forecasting, simulation modeling, and institutional structuring of policies. The proposed recommendations can be used to formulate national and institutional strategies for transforming Ukraine's higher education system within the global context.*

Key words: *sustainability governance, sustainable development, higher education institutions, international economic relations, institutional strategies, ESG, digital transformation, strategic alliances, digitalization, management.*

Анотація. У статті досліджено трансформацію інституційних стратегій закладів

вищої освіти (ЗВО) під впливом міжнародних економічних відносин із фокусом на забезпечення сталого розвитку. Метою дослідження є розробка концептуальних підходів до управління сталістю у вищій освіті шляхом інтеграції глобальних практик та індикаторів сталого розвитку. Завданням роботи є: систематизація теоретичних основ сталого розвитку ЗВО; аналіз динаміки ключових показників сталості в міжнародному розрізі; вивчення практик провідних університетів світу; моделювання сценаріїв управлінських стратегій із використанням кооперативної теорії ігор. У процесі дослідження застосовано методи системного та порівняльного аналізу, контент-аналіз міжнародних рейтингів (QS, THE, ARWU), індикаторний підхід, кейс-стаді, а також побудовано ігрову матрицю стратегічних рішень для ЗВО. Особливу увагу приділено аналізу університетів, які інтегрували принципи сталості в управлінські та освітні моделі — University of Cambridge, Aalto University, University of Amsterdam. Результати дослідження демонструють, що впровадження ESG-принципів, стратегічних альянсів та адаптація до міжнародних фінансово-економічних трендів сприяє підвищенню позицій ЗВО у глобальних рейтингах. Розроблена матриця виграшів на основі теорії ігор дозволила змодельовати раціональну поведінку університетів щодо інвестування в сталість у коротко- та довгостроковій перспективі. Наукова новизна полягає у побудові теоретико-практичної основи трансформації управлінських підходів ЗВО, що поєднує стратегічне прогнозування, симуляційне моделювання та інституційне структурування політик. Запропоновані рекомендації можуть бути використані для розробки національних та локальних стратегій трансформації системи вищої освіти в Україні з урахуванням глобального контексту.

Ключові слова: *стале управління, сталий розвиток, заклади вищої освіти, міжнародні економічні відносини, інституційні стратегії, ESG, цифрова трансформація, стратегічні альянси, цифровізація, управління.*

Introduction. In the 21st century, higher education institutions (HEIs) are increasingly viewed not only as educational and scientific institutions, but as strategic agents of sustainable development, capable of shaping innovative, economic and socio-cultural transformations at the national and global levels. In this context, there is a need to rethink traditional university management models taking into account multi-vector challenges - from environmental responsibility and digital transformation to ethical governance and resilience to crises. The task of forming institutional strategies that correspond to the concept of sustainability in a broad interdisciplinary sense, including ESG (Environmental, Social, Governance) components, is becoming particularly relevant. In the modern globalized environment, international economic relations have a significant impact on the strategic dynamics of universities, which determine access to funding, participation in international academic networks, positioning in rankings, quality standards and indicators of sustainable development. Higher education institutions operate in a space of transnational competition, where the ability to integrate into international initiatives, adapt management models to external challenges and ensure institutional sustainability becomes a determining factor in their success.

Despite the existence of separate studies devoted to ESG components in university management or transformations of educational systems under the influence of international trends, there is still no holistic approach to analyzing the relationship between international economic processes and institutional strategies for sustainable development of higher education institutions, in particular in conditions of crisis uncertainty. This gap is especially noticeable for post-socialist countries, such as Ukraine, which are in a situation of multidimensional transformation and seek to integrate into the European Higher Education Area.

The purpose of the article. The aim of the article is to scientifically substantiate the role of international economic factors in the formation of sustainable development strategies of higher education institutions, taking into account global challenges, ESG standards, the dynamics of key indicators and the international experience of leading universities. Within the framework of this aim, the authors: systematize the theoretical foundations of sustainable development of HEIs; analyze empirical data on the dynamics of international integration and positions in rankings; carry out a comparative analysis of university cases; model scenarios of management decisions using game

theory; formulate practical recommendations for Ukrainian universities in conditions of crisis transformation.

This approach allows not only to identify key external impulses of sustainability, but also to offer a theoretical and practical basis for the transformation of HEI management approaches.

Literature review. The research used a number of interdisciplinary sources that allow comprehensively revealing the theoretical, methodological and applied aspects of sustainable development management of higher education institutions in the context of international economic relations. The article by Boichenko E., Martynovych and Shevchenko I. (*Boichenko, 2021*) is one of the key ones for understanding the cognitive modeling of sustainable development concepts, which is the theoretical basis for building institutional models of HEI transformation. The authors propose an interdisciplinary approach, where sustainable development is considered as the result of the interaction of social, economic and technological factors, which is fully correlated with the logic of ESG strategies. In his work, Shevchenko I. (*Shevchenko, 2024*) focuses on the issues of digital inclusion and digitalization of public administration. Although the study is focused on telemedicine, it contains relevant approaches to digital transformation in conditions of instability, which can be applied to the HEI system, in particular during a military conflict. In the study of Lytvynov O. et al. (*Lytvynov, 2025*), the authors develop a model of sustainable development of universities, based on the principles of integration and efficiency. The article proposes mechanisms for managing institutional sustainability that can be adapted to domestic HEIs, taking into account international experience.

The study of Kaplia et al. (*Kaplia, 2024*) presents a multidisciplinary approach to assessing educational processes in conditions of military conflict, emphasizing flexibility, transformation of strategies and adaptation to external threats. This study is valuable for analyzing the factors of crisis resilience of the HEI system. The information and analytical base of the study was built on the basis of leading international rankings: QS World University Rankings, Academic Ranking of World Universities (ShanghaiRanking), Times Higher Education Impact Rankings, U.S. News Best Global Universities Rankings. These sources allowed for a comparative analysis of the positions of universities, which achieved significant results due to the integration of sustainability principles. They also became the basis for constructing tables of the dynamics of the ratings for 2021–2024. The analysis of the sources allowed for the formation of a holistic picture of the influence of international economic relations on the transformation of institutional strategies of higher education institutions towards sustainability.

Main results of the research. Sustainable development in higher education is interpreted as the systemic ability of a university to ensure a balance between educational, scientific, social and environmental functions in the long term, taking into account global challenges and local needs. In this context, “sustainability” in higher education institutions means not only environmental responsibility, but also economic efficiency, social justice, organizational flexibility and the ability to self-reproduce. This means that universities should not only respond to change, but also proactively shape an environment of innovation, ethical leadership and intersectoral interaction. The author’s vision of the strategy for sustainable management of higher education institutions is presented in Fig. 1.

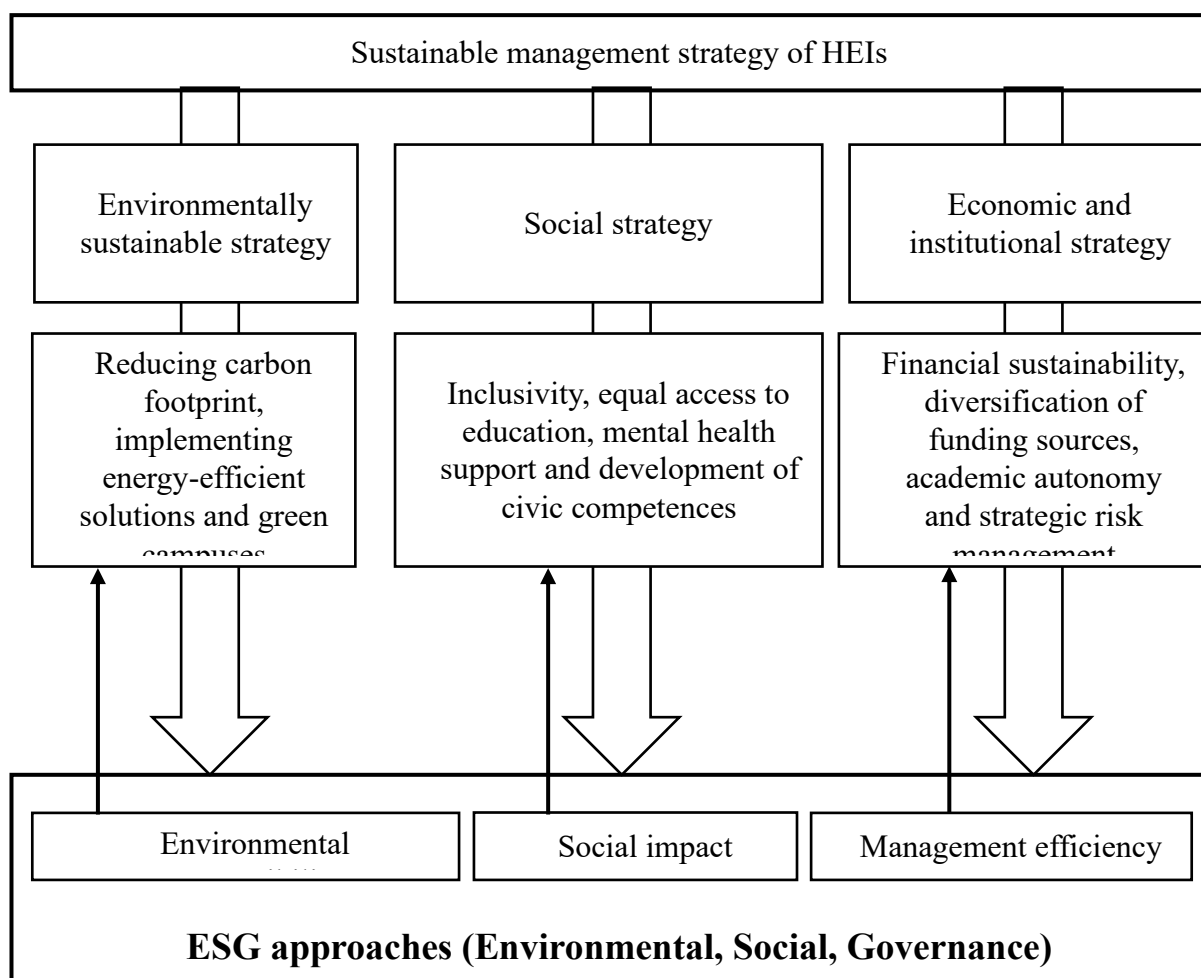


Fig. 1. Strategy for sustainable management of HEIs

Source: author's development

As can be seen from Fig. 1, ESG approaches form the basis for quantitative and qualitative assessment of the sustainable development of the university and its positioning at the global level.

In the context of globalization, international economic relations are one of the key factors in the transformation of HEI management strategies. The expansion of academic mobility, joint educational programs, double degrees, digital cooperation in research, as well as transnational educational platforms create a new architecture of the educational space. Higher education institutions included in such processes adapt their strategies not only to local realities, but also to the requirements of transnational educational markets.

Financial flows associated with international grants, sponsorship, investments in scientific infrastructure and educational innovations directly affect the financial capacity and strategic priorities of HEIs. In addition, the positions of universities in global rankings (QS, THE, ARWU) and participation in international accreditations (EQUIS, AACSB, ENQA ESG standards) form new institutional standards that must be met to ensure global reputation and competitiveness.

An important role in this context is played by international organizations, in particular OECD, UNESCO, European University Association (EUA), as well as Horizon Europe programs, which provide regulatory guidelines, analytical support and financial resources to stimulate sustainable transformations. In particular, the OECD strategic recommendations on “Resilient Education Systems” or EUA reports on ESG integration in higher education create an analytical platform for rethinking national and local educational policies.

Thus, the interaction of HEIs with the international environment serves not only as an external impetus for transformation, but also forms a new paradigm of a responsible university

capable of strategic self-reproduction based on the principles of sustainability, global ethics and institutional adaptability.

In this regard, it is advisable to empirically study the dynamics of key indicators that reflect the processes of adaptation of higher education to the challenges of sustainable development in the context of global interaction. Such an analysis is presented in Table 1.

Table 1. Dynamics of adaptation indicators of higher education in the context of sustainable development

Country/year	Year	Share of international students (%)	Volume of international financing (millions of dollars)	Position in THE Impact Rankings	Number of international agreements
Ukraine	2021	3.5	120	90	180
	2022	4.2	145	85	210
	2023	4.8	160	82	250
Germany	2021	12.0	450	22	850
	2022	12.5	490	20	900
	2023	13.1	520	18	920
Singapore	2021	10.8	600	33	500
	2022	11.6	650	30	530
	2023	12.0	690	28	560

Table 1 shows the dynamics of key indicators of higher education sustainability in Ukraine, Germany and Singapore for the period 2021–2023. The choice of these countries is due to their representativeness in various socio-economic and political contexts, which allows for a comparative analysis of models of higher education sustainability management. Ukraine is in a phase of deep transformation caused by foreign policy factors and armed aggression; Germany is a European leader in the implementation of sustainable development strategies in the field of education; Singapore is an example of a highly effective educational policy focused on innovation and international integration.

The identified dynamics indicate the growing role of international economic relations as a key determinant of the sustainability of higher education. The significant difference between countries is due to the structural features of their education systems, the level of political stability, the presence of long-term sustainable development strategies and the degree of involvement in the global educational space. The results obtained indicate the feasibility of implementing adapted strategies taking into account the best international practices, as well as the need for further quantitative modeling of the impact of external factors on the sustainability of HEIs.

Summarizing the results of the analysis of the dynamics of key indicators of sustainability in higher education, it can be stated that the international context plays a decisive role in the formation of long-term institutional strategies of universities. The experience of countries with a high level of integration into the global educational space shows that sustainability ceases to be a declarative element and is transformed into a structural component of the management policy of HEIs. On this basis, it is logical to move on to studying international experience, in particular through case studies of those universities that demonstrate the highest results in the implementation of the principles of sustainable development.

Among such institutions, it is appropriate to single out the University of Cambridge, Aalto University and the University of Amsterdam. The University of Cambridge has implemented a Sustainability Framework strategy, which not only covers environmental aspects, but also ensures the sustainability of financial and social processes. The university carries out a systematic assessment of its carbon footprint, develops renewable energy infrastructure and actively involves the student community in decision-making on environmental initiatives.

The Finnish Aalto University considers sustainability as an interdisciplinary value integrated into academic programs, research and entrepreneurial projects. A feature of the Aalto model is the combination of technical expertise, design thinking and eco-oriented management, which allows it to effectively adapt the educational process to the challenges of sustainable development. The university

implements open platforms for cooperation with industrial partners in order to implement solutions in the field of circular economy, energy efficiency and the urban environment.

The University of Amsterdam actively integrates the Sustainable Development Goals into its institutional strategy. Not only the implementation of “green” practices — such as energy-efficient buildings, zero-waste approaches, and environmentally responsible logistics — is crucial, but also the presence of an inclusive management strategy that takes into account the interests of different stakeholder groups. The university is also focused on open science and ensuring access to knowledge in a global context.

For Ukrainian HEIs, these cases can become a source of adaptive solutions. Given limited resources, high levels of turbulence, and security challenges, the strategic focus should be on:

1. institutionalizing sustainability as part of the university’s strategic planning (incorporating the SDGs into internal regulations);
2. forming an ecosystem of partnerships with business, the public sector, and international donors focused on sustainable infrastructure and innovation;
3. involving students as a co-management entity in transformation processes;
4. developing localized sustainability indicators that will allow monitoring the effectiveness of implementing relevant strategies even in wartime or post-war conditions.

Thus, international experience confirms the thesis that sustainability is not only the ultimate goal, but also a tool for increasing the competitiveness, reputation, and long-term viability of higher education institutions. For Ukrainian universities, the integration of these approaches is not only relevant, but also a critically necessary condition for effective functioning in a globalized educational environment. In this context, it is important to analyze how sustainability and strategic management approaches affect the positions of universities in international rankings (Table 2).

Table 2. Dynamics of university positions in international rankings as an indicator of adaptive sustainability (2021–2024)

University	Country	QS World Ranking 2021	QS World Ranking 2024	THE Impact Ranking 2021	THE Impact Ranking 2024	ARWU Ranking 2021	ARWU Ranking 2024	U.S. News Global 2021	U.S. News Global 2024
University of Cambridge	Great Britain	7	2	9	5	3	3	8	7
Aalto University	Finland	127	109	54	37	301	251	342	313
University of Amsterdam	Netherlands	61	53	39	24	101	82	40	33

The analysis of the presented table, which reflects the positions of three leading universities — University of Cambridge (Great Britain), Aalto University (Finland) and University of Amsterdam (Netherlands) — in four authoritative international rankings (QS World University Rankings, THE Impact Rankings, ARWU, U.S. News Global Ranking) in the period from 2021 to 2024, allows us to trace significant trends in the field of sustainability management and its impact on the global competitiveness of higher education institutions.

Thus, the results of the analysis show that the systematic implementation of the principles of sustainable development not only meets ethical standards and challenges of modernity, but also serves as an effective tool for increasing the global ranking of the university. The inclusion of ESG elements in management strategies allows higher education institutions not only to adapt to changes, but also to form competitive advantages in the transnational academic environment. High positions in

international rankings, in turn, provide universities with access to more grants, better human capital, and expanded partner networks, which forms a positive feedback loop of sustainable growth.

Moving on to the stage of modeling scenarios for sustainability management in higher education, it is advisable to use the tools of game theory, which allows formalizing the behavior of universities as strategic agents in an environment of limited resources, competitive pressure, and the need to achieve long-term sustainable development goals. The game-theoretic approach opens up the opportunity not only to analyze individual strategies of players, but also to identify conditions for the formation of coalitions in which the aggregate benefit exceeds the individual one, which is especially important in the context of inter-university cooperation.

One example of application is cooperative game theory, which involves the formation of strategic alliances between HEIs to achieve common sustainability goals. In particular, universities can join forces within regional or international consortia, jointly implement environmental initiatives, optimize infrastructure costs or develop integrated curricula that meet the Sustainable Development Goals. In such a configuration, the gain of each participant (for example, reducing the cost of implementing eco-technologies, accessing new sources of funding or improving the rating) increases due to synergies that cannot be achieved in isolation from the partnership.

Within the framework of a non-cooperative game, it is possible to model the dilemma that a university faces when choosing between short-term cost savings by ignoring sustainability measures and long-term benefits, including increasing positions in international rankings, increasing attractiveness for international students and grantmakers, and strengthening its reputation.

For illustration, a simplified payoff matrix of two universities (University A and University B) is proposed, each of which has a choice between two strategies:

	B: Invests in sustainability	B: Ignores constancy
A: Invests	(5; 5)	(2; 6)
A: Ignores	(6; 2)	(3; 3)

The values in the cells are conditional benefits (utilities), where the first number is for A, the second is for B.

The highest total benefit is achieved with a strategy of mutual investment in sustainability (5+5=10).

If one invests and the other does not, the investor receives a smaller gain due to the unfair distribution of reputational and financial benefits.

If both ignore, the benefit is limited (3; 3) - this is a short-term equilibrium with no long-term growth.

The Nash equilibrium in this model is a situation where both players invest in sustainability, since neither can improve their outcome by changing their strategy unilaterally unless the other changes theirs (Fig. 2).

A: Ignores	(5, 5)	(2, 6)
A: Invests	(6, 2)	(3, 3)
	B: Invests	B: Ignores

Fig. 2. Nash equilibrium in the model of HEI investment in sustainability

Visualization of the payoff matrix with the highlighted Nash equilibrium — a situation where both universities choose to invest in sustainability (strategy A: Invests, strategy B: Invests). This option gives payoffs (5; 5) and is stable, since neither player has an incentive to change their strategy unilaterally. The red frame indicates the Nash equilibrium point in this game.

Thus, in strategic planning of university sustainable development policy, it is important to create conditions under which a cooperative strategy becomes more profitable than an opportunistic one. This is possible if incentive mechanisms are introduced by the state, donor structures, or international partnerships.

In conclusion, modeling using game theory allows us to develop scenarios of HEI behavior in conditions of strategic uncertainty, helps to predict the consequences of management decisions, and forms a scientifically sound basis for optimizing institutional sustainable development strategies.

In the context of growing global competition, increasing interdependence of educational systems, and transformational challenges facing higher education in Ukraine, the formation of effective sustainable development strategies is of key importance. Practical recommendations, based on the analysis of international experience, quantitative data, and theoretical models, can serve as guidelines for improving the management practices of Ukrainian higher education institutions.

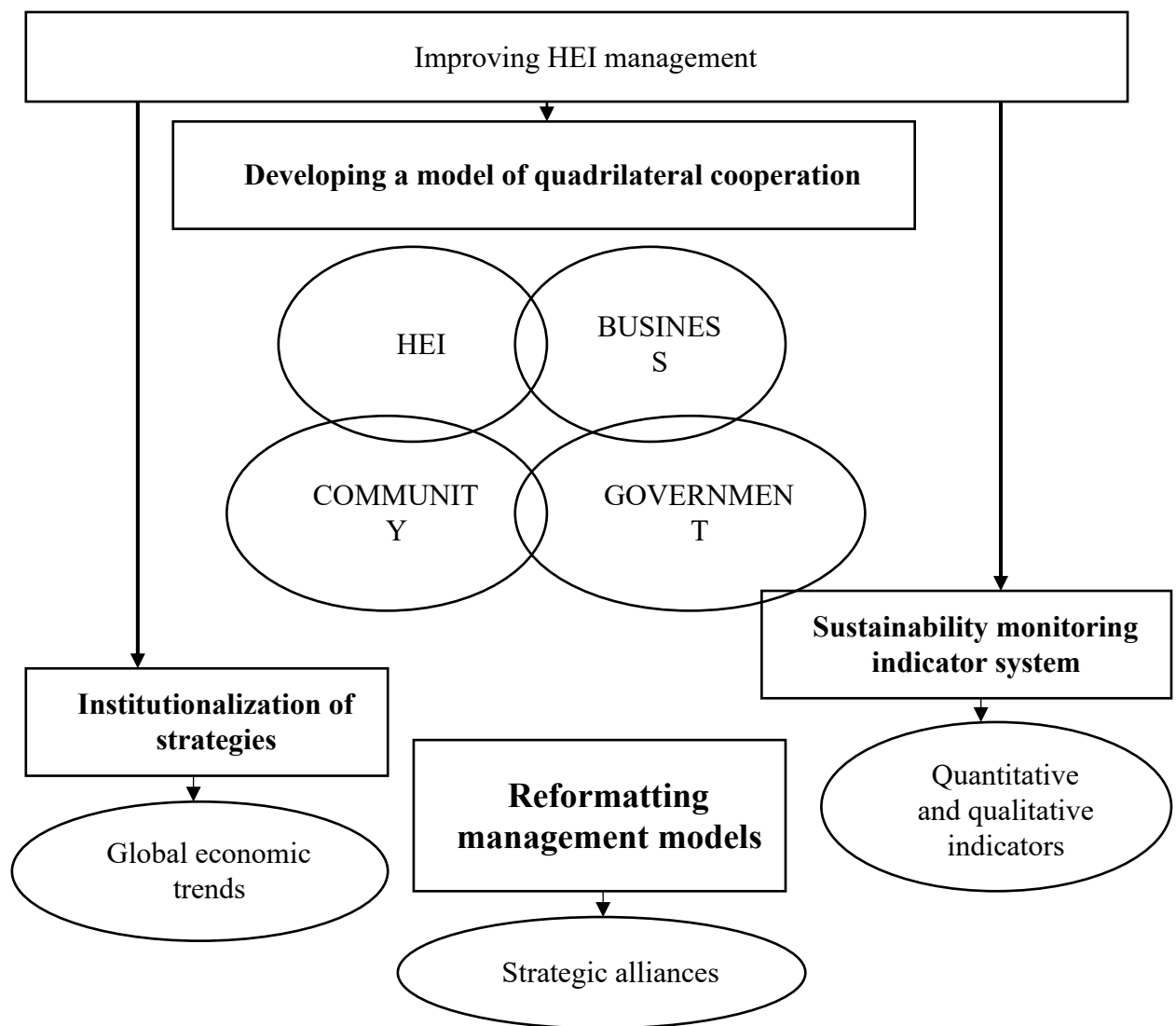


Fig. 3. Theoretical and practical basis for the transformation of management approaches in higher education institutions (author's vision)

Source: author's development

The primary task is to institutionalize strategies that take into account the impact of global economic trends. This involves developing adaptive policies focused on integrating the UN Sustainable Development Goals, including sustainability in the strategic plans of HEIs, and adjusting educational and research priorities in accordance with the new requirements of digital and green transformation. In this context, monitoring the dynamics of key sustainability indicators in terms of finance, social responsibility, environmental management, and academic mobility plays an important role. To ensure an objective assessment of achievements and identify areas for improvement, it is advisable to implement an indicator system for monitoring sustainability. Such a system should cover both quantitative (share of international students, volume of international funding, carbon footprint, number of international agreements concluded) and qualitative indicators (availability of sustainability policies, student participation in management, integration of ESG approaches into the educational process). Building such a system will allow universities not only to conduct internal audits, but also to report on progress to international partners, ratings, and donors. In addition, it is extremely necessary to reformat the management models of HEIs in the direction of openness and cooperation. The practice of strategic alliances — both between Ukrainian universities and with foreign partners — allows you to scale innovative initiatives, reduce the costs of implementing sustainable technologies, and strengthen joint competitiveness in the region. Participation in the

Horizon Europe, Erasmus+, DAAD, Marie Skłodowska-Curie programs are tools for attracting external funding, increasing academic mobility, and knowledge transfer. The formation of consortia on the basis of shared institutional responsibility is one of the key factors in the successful transformation of HEIs in the post-crisis period.

Finally, a promising direction is the development of models of four-way cooperation: university - business - government - community. Such a model provides multi-channel support for sustainable development projects, adaptation of research to the needs of the regional market, increasing the level of graduate employment and institutional legitimacy of HEIs in society. A sustainable university in such a configuration acts as a platform for multi-actor dialogue and implementation of pilot solutions that can be scaled up at the level of state educational policy. Thus, the formation of effective strategies for sustainable development management in Ukrainian universities should be based on a systematic combination of analytical tools, international experience, indicative monitoring and open intersectoral interaction. This will not only ensure sustainability in difficult conditions, but also bring Ukrainian higher education to a new level of global integration and leadership in the field of transformations.

Conclusions. The results of the study allowed us to form a holistic scientific vision of the role of international economic relations as a key exogenous factor in the transformation of institutional strategies for the sustainable development of higher education. The theoretical generalization of the concept of "sustainability" in the context of HEIs, the expanded inclusion of ESG components and the conceptual classification of management strategies became the basis for the formation of a new analytical approach to the assessment of university models in the global environment.

Based on a comparative analysis of countries with different economic and political contexts (Ukraine, Germany, Singapore), it was established that the sustainability of higher education is directly correlated with the depth of integration into international networks, the scale of external financing, the volume of mobility and participation in global rating and accreditation mechanisms. It was determined that even in conditions of crisis turbulence (as in the case of Ukraine), gradual progress is possible thanks to the flexibility of management decisions, digital adaptation and the involvement of external partnerships.

Further scenario modeling using game theory tools allowed us to identify sustainable strategies in which university cooperation provides synergy and increases collective ESG gains. The game-theoretic model clearly demonstrates that investing in sustainability – even in an environment of limited resources – is a rational choice if there is a long-term strategy and support from external stakeholders.

Thus, sustainable development management in higher education is transformed from a declarative norm into a strategic necessity, shaping a new paradigm of academic competitiveness in a globalized environment.

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