REVIEW OF LAW AND SOCIAL SCIENCES
ISSN (O): 3078-1574, ISSN (P): 3078-610X
Vol. 3, No. 1, 2025, 01-14
https://doi.org/10.71261/rlss/3.1.114

The Role of Universities in Building Strong Institutions as a Sustainable Development Goal

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Abstract

The aim of the research is to assess the impact of implementing sustainable development programmes in universities on their effectiveness in achieving sustainable development goals (SDGs). The research employed the following methods: SWOT analysis, case study, and impact assessment. The standard methods of descriptive statistics were used. Triangulation and internal consistency models were used to check the validity and reliability of research methods. Universities from Group 1 are significantly inferior to universities from Group 2 for all indicators. They have a smaller share of educational sustainable development programmes — 17.5% vs. 52.5%. The level of energy consumption per unit area is higher — 165 kWh/m² vs. 85 kWh/m², and the waste recycling rate is lower — 27.5% vs. 82.5%. Students' average environmental awareness score is also lower — 3.35 vs. 4.5, with significantly fewer student eco-initiatives — 4 vs. 16.67. Universities are critical to sustainable development, influencing through the integration of strategy, investment, and student engagement. Different universities have their own advantages and challenges, which require adapting strategies to the specific conditions of each of them. Further research may focus on partnerships between universities and businesses and on implementing innovative approaches in project-based learning to achieve the SDGs in Ukraine.

Keywords: Educational environment, professional competencies, skills, higher education, design training.

Introduction

The 2030 United Nations (UN) Agenda outlines the most important humanitarian, social, and environmental challenges (Udeagha & Muchapondwa, 2023). Universities are one of the main centres of sustainable socio-economic development and solving these problems all over the world. SDGs are aimed not only at solving specific social, environmental or economic problems, but also at achieving a general balance in human development in the long run (Schillaci et al., 2023).

One of the goals of sustainable development is the creation of peaceful and just societies through the construction of effective, transparent and accountable institutions at all levels of public authority. Its essence is to strengthen the rule of law, fight corruption, expand opportunities for citizens to participate in decision-making, ensure social justice and protect human rights (Goubran et al., 2023).

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Undoubtedly, institutions play a key role in ensuring stability and economic growth. They serve as the foundation upon which government, business and civil society activities are built, ensuring fair access to resources and adherence to the principles of good governance. Universities, as important educational institutions, have the potential to strengthen institutional sustainability by educating a new generation of citizens with an understanding of social responsibility and sustainable development (Mohamad Taghvaee et al., 2023).

Universities that have the enormous potential to become a driving force for change, promoting the implementation of the principles of sustainable development in their educational programs and scientific research. An effective educational environment helps to form students' environmental awareness, responsibility for social and economic processes. At the same time, universities ensure the creation of partnerships with other educational institutions, businesses and public organisations, contributing to building strong institutions at all levels.

Achieving the SDGs is a process that requires the involvement of all elements of modern society: from the individual to the largest sectors of the economy. The higher education system is assigned a special role in implementing these principles (Yin et al., 2023). The worldview of the young generation and the future intellectual capital are formed in higher education institutions (HEIs). They stimulate the country's socio-economic development and determine the key directions of its development in the medium term (Rashed & Shah, 2021). In addition, there is a need to create an effective system of interaction between all units, which will ensure the high-quality performance of the organisation's functions and the protection of university students and employees from changing conditions (Leal Filho et al., 2021). The activities of universities to ensure quality education directly or indirectly affect all the goals of sustainable development planned for 2015 to 2030 (Figure 1).

The key tasks of the university are listed below:

1. Become the centre of gravity and driver of the region's development, build constructive interaction with all interested parties.
2. Prepare professionals with the right set of competencies that contribute to achieving companies' effective growth goals under a new development paradigm.
3. Prepare graduates to understand, share new values, and manage various objects in a changing external environment (Velenturf & Purnell, 2021).

Leading world universities put their social and environmental responsibility first. Standards in the field of sustainable development affect the range of university education programmes and teaching methods. This forms a new educational paradigm, in which the modern university becomes a key element in creating a new educational ecosystem. Universities are not only carriers of academic tradition and system-wide efficiency but also have an incredible potential for innovation and non-standard initiatives (Chofreh et al., 2020).

The SDGs may remain unattainable due to insufficient integration into social processes and limited influence on the development of the institutional structure. The lack of a clear understanding of how universities can be included in this process emphasises the problem's importance, which requires more detailed study.

Attention is focused on studying the role of universities in strengthening institutional structures by integrating sustainable development principles into educational, scientific, and social processes. Special focus is the study of how

universities can contribute to building of strong institutions, ensuring their sustainability and effectiveness in the modern world.

The aim of this study is to assess the impact of implementing sustainable development programmes in universities on the effectiveness of achieving sustainable development goals. The aim involved the fulfilment of the following research objectives:

a. Assess the weaknesses and strengths of achieving SDGs using a SWOT analysis;
b. Analyse examples of successful implementation of sustainable development goals;
c. Assess the impact of sustainability programmes on the university environment, including changes in curricula, energy efficiency, waste management, and environmental awareness among students and faculty.

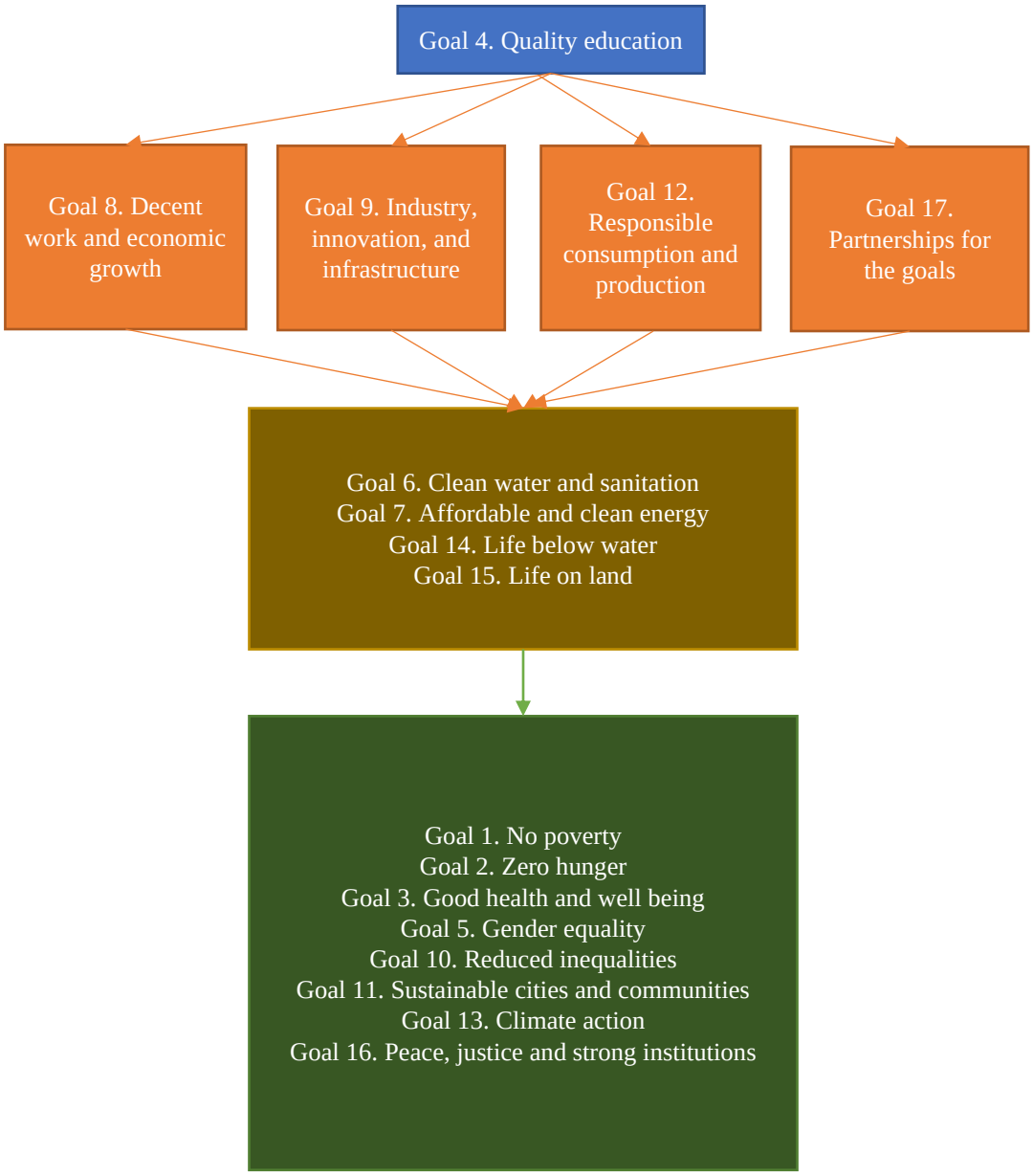

Figure 1: Direct and indirect influence of universities on achieving the sustainable development goals
Source: *Developed by the authors based on Becker (2023)*

Literature Review

The literature review focuses on the study of the role of universities in sustainable development, especially in the context of building strong institutions. The studies presented below examine the role of universities as key change agents capable of influencing social, economic, and environmental aspects of society.

Lozano (2024) offers an in-depth historical and conceptual overview of sustainable development, providing an extremely valuable theoretical foundation for this study. The work emphasises the complexity and multifaceted nature of the concept of sustainable development. For this study, the book provides a historical context that will help better understand how universities can contribute to implementing the concept of sustainable development in practice by promoting the building of strong socio-political institutions.

Sasongko et al. (2024) provide a strong theoretical and practical basis for this current study. Their work emphasises the integration of economic, social, and environmental aspects of sustainable development in the context of rapid urbanisation. The article explores a unique approach to preserving cultural heritage through the development of tourism in urban campaigns, which is impossible without creating developed local self-government institutions capable of maintaining long-term sustainability.

A case study from the USA conducted by Işık et al. (2024) emphasises the importance of considering time series characteristics in the development of UN sustainable development programmes. Analysing the interaction between the 17 US SDGs for 1960–2022, the study uses the FWADF, FWKSS, and Baye-Perron tests to determine these characteristics. So, this work provides methodological material for conducting empirical calculations on the issue under research.

The UN Summit held during the 70th session of the UN General Assembly back in 2015 defined the main priorities for sustainable development. The participants of the Summit defined 17 goals and 169 targets of sustainable development. The resulting document Transforming our world: the 2030 Agenda for Sustainable Development (United Nations, 2015) laid the foundation for implementing the sustainable development concept in life. As part of this document, in 2019, the President of Ukraine issued a Decree on achieving sustainable development goals (President of Ukraine, 2019). The main theses outlined in the Decree were reflected in the national report Sustainable Development Goals: Ukraine. The document contains an outline of the SDGs and the results of their adaptation, considering the specifics of Ukraine's development. To implement this Decree, the Cabinet of Ministers of Ukraine made appropriate changes to the Resolution "On Approval of the Regulations of the Cabinet of Ministers of Ukraine". It is established that the need to achieve the SDGs is taken into account in the process of forming and implementing the state policy of Ukraine (Cabinet of Ministers of Ukraine, 2007). So, the principles of sustainable development in Ukraine have been adopted at the highest state level.

Sharma et al. (2024) reveal how university support, environmental awareness, and knowledge of the SDGs influence student intention formation. The study is based on the Theory of Planned Behaviour (TPB) and the Social Cognitive Career Theory (SCCT), which provides new insights into the mechanisms that drive students toward sustainable entrepreneurship. In the context of the impact on this current study, the article by Leal Filho et al. (2024) emphasises the central role of partnerships in implementing the UN SDGs. The authors emphasise the importance of open and transparent communication, which contributes to strengthening trust and increasing the effectiveness of partnerships.

Shishakly et al. (2024) reveal the key role of students in promoting sustainable development in the higher education system, particularly in the context of integrating educational technologies. The study investigates the extent to which higher school students in the United Arab Emirates (UAE) are familiar with sustainable development initiatives and the introduction of technology into educational processes. An important contribution of this study is the implementation of the Technology Integration Framework for Education in Sustainable Development (TIFESD), which is used to assess the level of students' awareness.

A study by Podgórska and Zdonek (2024) presents how innovation in project-based learning can contribute to achieving the SDGs in a university environment. According to the authors, universities have long been considered as key actors in promoting the SDGs, but there are still not enough practical solutions for their integration into the educational process.

Despite the support of the concept of sustainable development at the UN level and the government and a large number of studies on this issue, a number of issues still require special attention. Attention should be paid to the degree of integration of the SDGs into the curricula of Ukrainian HEIs and how this affected the training of personnel in various fields. There is also a lack of research in Ukraine that would evaluate the role of interdisciplinary courses in the context of achieving the SDGs.

Methods

Design

The research was conducted during the first half of 2024. The work itself was carried out in several stages. These stages are presented in Table 1.

Table 1: *Research stages*

Stage	Period	Content
1	January-February 2024	During this period, the topic, aim, and objectives of the research were determined, as well as aspects of the impact of universities on sustainable development were specified. The analysis of the latest research was carried out to identify the main trends and little-studied issues. The research methods were selected and the sample was made.
2	March-June 2024	At this stage, a SWOT analysis was conducted to assess the implementation of SDGs in universities. It helps to identify available resources, problems, prospects, and potential risks affecting the success or failure of such programmes. Next, examples of successful implementation of SDGs in other universities are analysed. This includes analysing particular case studies, documents, reports and publications demonstrating successful implementation of sustainable practices. It evaluates how these programmes have influenced changes in curricula, energy efficiency, waste management, and environmental awareness among students and teachers.
3	July - August 2024	This stage involved a statistical analysis and summary of the results

Source: developed by the authors of the research

The research involves both quantitative and qualitative analysis. Combining these two approaches will provide a more complete and objective picture of the state of affairs. The analysis conducted is cross-sectional, as the research data are collected at a certain point in time for different groups of universities.

Participants

The general population of the study consisted of universities from different countries of the world. The sample of this study included such universities as Massachusetts Institute of Technology (MIT, USA), University of Oxford (GB), National University of Singapore (NUS, Singapore), and Peking University (China). Two Ukrainian universities were also included — Kharkiv National University of Radio Electronics (KhNURE) and Sumy National Agrarian University (SNAU). A total of 6 universities. The inclusion criterion for Ukrainian universities was participation in the UNICOM project of the European Commission (EC). The inclusion criterion for other HEIs was entering the QS World University Rankings – Top 50 in 2023 (QS Quacquarelli Symonds, 2023). Such a sample will make it possible to track the main trends of the role of universities in building of strong institutions under the concept of sustainable development and to compare the achievements of Ukrainian HEIs with the world-famous ones. The universities included in the sample were divided into 2 groups to make it easier to understand the material and focus on the purpose of the study. Group 1 included Ukrainian universities to follow the general trend and identify problems of the higher education system in Ukraine. In addition, these universities cooperate in implementing the EC UNICOM project. The second group includes foreign universities from the top 10 of the QS World University Rankings. The universities represent three macro-regions: North America, Europe, and Asia, to get closer to identifying global trends.

Instruments

The SAS (Statistical Analysis System) package was used. This software is used for data analysis, which supports complex statistical methods and models. The built-in visualisation components of the MS Word processor were also used.

Data Collection

a. SWOT (Drastichová, 2024). The method was used to assess the strengths and weaknesses, opportunities, and threats associated with the implementation of sustainable development programmes. The method identifies the key factors that influence the success or failure of such initiatives.

b. *Case-study* (Martínez et al., 2023). The method involves an in-depth analysis of examples of successful or unsuccessful implementation of sustainable development programmes in universities. The research includes the analysis of documents and statistical data from open sources, including those presented in open analytics and on university websites.

c. *Impact Assessment* (Whittingham et al., 2023). The method assesses the impact of sustainable development programmes on the university environment. This includes changes in curricula, energy efficiency, waste management, and environmental awareness among students and faculty that help to build sustainable institutions.

Analysis of Data

The reliability and validity of the research methods were checked by using the following approaches:

a. *Triangulation*, which is the use of multiple methods or data sources to test the same hypothesis. Three methods were used in this current study.

b. *Internal consistency* shows the correlations between different parts of a technique or questionnaire (using Cronbach's α) to ensure that all items measure the same concept.

c. A summary of the main characteristics of the data was used for statistical data processing, including mean values, medians, standard deviations, and frequencies.

Results

A SWOT Analysis of the Universities

The first stage involved a SWOT analysis of the universities included in the sample. The aim of the analysis was to assess the potential of four leading world universities (MIT, Oxford, NUS, Peking) in promoting sustainable development through building of strong institutions. The analysis was carried out according to the above criteria, considering open data and current trends. The results are presented in Table 2.

Table 2: SWOT analysis of universities (MIT, Oxford, NUS, Peking) in promoting sustainable development through building of strong institutions

Assessment criteria	MIT	University of Oxford	NUS	Peking University
Strengths	A leading position in scientific research, especially in the field of technology. Significant financial resources that allow implementing large-scale initiatives. Strong international reputation and network of partnerships.	A long history that contributes to the preservation of traditions and the formation of a strong academic community.	Rapid development and innovation. Strong ties to the Asian region and its needs.	A large number of students and teachers, creating a large-scale impact.
Weaknesses	Excessive concentration on technological solutions is possible, which can limit the view of other aspects of sustainable development.	Bureaucratic processes can slow down the implementation of innovations. Excessive focus on traditional teaching methods is possible.	The relatively young age of the university may limit its historical influence.	Strong dependence on state policy. Possible restrictions on academic freedom.
Opportunities	Leadership in the development of new technologies for sustainable development. Impact on policy-making in the field of education and sustainable development.	Preservation and promotion of cultural heritage. Cooperation with various sectors of society to create innovative solutions.	To become a leader in education for sustainable development in the Asia-Pacific region.	Using big data to analyse social problems and develop effective solutions.

Threats	Rapid technological and market changes can make investments in sustainable development less attractive.	Reduction of state funding of education. Competition with other universities for the best students and teachers.	Economic instability in the region.	Growing competition with other Chinese universities.

Source: Developed by the authors based on research results

According to the results presented in Table 2, MIT is noted for its scientific research and financial resources that allow the implementation of large projects. However, too much focus on technology can sometimes limit the broader view of sustainable development. Table 3 presents a SWOT analysis of Ukrainian universities (KhNURE and SNAU).

Table 3: SWOT analysis of Ukrainian universities (KhNURE and SNAU)

Assessment criteria	KhNURE	SNAU
Strengths	Strong traditions in engineering education. Close ties with industry. Experience in conducting scientific research in the field of electronics and information technologies.	Deep knowledge in the agricultural industry. Close ties with agricultural enterprises of the region.
Weaknesses	Insufficient funding. Depreciation of the material and technical resources. Lack of sufficient experience in implementing sustainable development programmes.	Insufficient funding. Lack of modern equipment for scientific research.
Opportunities	Development of digital technologies and innovations. Involvement of students in scientific research. Cooperation with international universities and organisations.	Transition to organic farming and clean production. Development of rural tourism.
Threats	Competition with private universities. The outflow of young specialists abroad. Changes in the state policy regarding higher education.	Climate change and natural disasters. Decrease in demand for agricultural products on the world market.

Source: Developed by the authors based on research results

The comparison of the data in Table 2 and Table 3 makes it clear that the main differences are in financial resources, research capabilities, and global influence. World-renowned universities such as MIT, Oxford, NUS and Peking University have greater opportunities. Their success depends on how innovative, interdisciplinary researchers and policy influencers they are. On the other hand, Ukrainian universities, such as KhNURE and SNAU, are facing problems because of insufficient funding and the destruction of material and technical resources.

Analysis of Experience in Implementing Sustainable Development Goals

A case-study aimed at analysing the experience of two groups of universities in implementing sustainable development programmes was conducted. The research is based on the analysis of open data and identifies general trends and specific features of each group. The results are presented in Table 4.

Table 4: Case-study of the implementation of sustainable development programs in accordance with the 17 SDGs

Indicator	KhNURE	SNAU	MIT	University of Oxford	NUS	Peking University
Investments in sustainable development	Limited	Limited	Significant, including funding for research and innovation	Significant, aimed at the development of infrastructure and social programmes	Significant, including financing start-ups and social enterprises	Significant, aimed at the development of international cooperation
Number of sustainable development projects	A limited number, mostly of a local scale	A limited number related to the agricultural sector	A large number, international scale	A large number, interdisciplinary	A large number focused on the Asia-Pacific region	A large number related to national priorities
Students engagement	Limited, mainly in the training sessions	Limited, within student organisations	Broad, through student initiatives and research projects	Broad, through participation in volunteer programs and social projects	Broad, through start-up incubators and social entrepreneurship centres	Broad, through participation in international exchange programmes

Source: Developed by the authors based on research results

In connection with limited investments and a small number of local projects, the sustainable development strategies of Ukrainian universities need clarification and updating. Instead, the sustainable development strategy is backed by significant investments in leading foreign universities such as MIT, University of Oxford, NUS, and Peking University. The strategy is also integrated into all spheres of activity. These universities are actively involved in international and interdisciplinary projects, where the wide range of opportunities to participate in research, volunteering, and start-ups contribute to student engagement. Table 5 presents the Impact Assessment of two groups of universities.

Table 5: Impact Assessment of two groups of universities

Indicator	KhNURE	SNAU	MIT	Oxford	NUS	Peking University	Mean (Group 1)	Mean (Group 2)
Share of educational sustainable development programmes (%)	20	15	50	45	60	55	17.5	52.5
Energy consumption per unit	150	180	80	90	75	85	165	85

area (kWh/m²)								
Share of recycled waste (%)	30	25	80	75	90	85	27.5	82.5
Average score of students' environmental awareness (5-point scale)	3.2	3.5	4.2	4.5	4.8	4.5	3.35	4.5
Number of student eco-initiatives	5	3	20	15	25	20	4	16.67

According to the Impact Assessment, foreign universities are significantly ahead of Ukrainian universities. The average share of educational sustainable development programmes in MIT, Oxford, NUS, and Peking University is 52.5%, while only 17.5% in KhNURE and SNAU. Energy consumption per unit area is more efficient in foreign universities. Foreign universities recycle more waste and demonstrate a higher average score of students' environmental awareness. The number of student eco-initiatives is also significantly higher in foreign universities.

Discussion

Analysis of the obtained data on the impact of universities on achieving the SDGs gives grounds to identify significant differences between Ukrainian and foreign HEIs. The data show that world leaders in the ranking, such as MIT, Oxford, NUS, and Peking University, have made significant progress in integrating the principles of sustainable development into their activities. The great influence of universities from the QS World University Rankings - Top rating is discussed in Bublyk et al. (2023) and Shih (2024) studies.

The share of educational sustainable development programmes in foreign universities significantly exceeds Ukrainian ones. For example, MIT, Oxford, NUS, and Peking University have high percentages of programmes emphasising sustainability, while Ukrainian universities, such as KhNURE and SNAU have only a partial integration of such topics so far. Such results indicate the need to strengthen the implementation of sustainable development programmes in Ukrainian universities to achieve similar results, as indicated in the works of Belyaninova and Titov (2023) and Grishko et al. (2024). Energy consumption per unit area in foreign universities is also significantly lower, which indicates a more effective implementation of energy-saving technologies and practices.

The study found that the share of recycled waste in foreign universities is also higher than in Ukrainian ones. This reflects more developed waste management systems and greater attention to environmental practices. The works of Sirobaba (2023) and Podgórska and Zdonek (2024) show that this is a signal for Ukrainian universities to develop and implement more efficient recycling and waste reduction systems. Integrating sustainable development principles into the curriculum contributes to the formation of conscious citizens and specialists who are ready to actively participate in implementing environmental, economic, and social initiatives. As evidenced by the findings of Weiland et al. (2021) and Rashed and Shah (2021), this supports the

development of institutions that can ensure long-term sustainability and adaptation to changing conditions.

The obtained data also indicate that universities actively promote scientific research and innovation, which can significantly improve the sustainability and functionality of institutions. According to Leal Filho (2020) and Lu et al. (2021), such innovations can be put into practice both at the level of individual institutions and in a wider socio-economic context.

The study's theoretical significance is to improve understanding of the role of universities in building strong institutions in the context of the SDGs. This allows to generalise and systematise knowledge about how HEIs can influence the achievement of SDGs. Incorporating the principles of sustainable development into university strategy and practice is a key aspect of this impact. The practical significance is that the study provides a particular advice for universities to improve their sustainability strategies. The study revealed the key elements that influence the success of implementing sustainable development programmes.

The study revealed the key elements that influence the success of implementing sustainable development programmes. University administrations can use these findings to develop and implement new projects. The study has some limitations because of the use of data from only selected universities, which may not fully reflect the overall picture. The limited use of quantitative indicators may miss the qualitative aspects of sustainable development.

Conclusions

The obtained results demonstrate the role of universities in achieving sustainable development through building of strong institutions. The analysis shows how different universities can influence the achievement of SDGs by adapting their strategies and resources. They provide a better understanding of what factors contribute to the successful implementation of sustainable development initiatives and can be the basis for improving practices in the field of higher education. The study found that universities play a key role in implementing sustainable development by building strong institutions and achieving the SDGs. The results of the study confirm that the successful implementation of sustainable initiatives depends on integrating the sustainable development strategy in all aspects of university activities, significant investment, and active students' engagement. At the same time, different universities have their own strengths and weaknesses that affect their ability to achieve sustainable development. The results of the study revealed the main areas of work that Ukrainian universities can use to improve the implementation of sustainable development goals. This will make it possible to increase the influence of universities on the process of forming strong public institutions. The research results contribute to the development of new theoretical models and concepts that consider the specifics of university institutions in the context of global and local challenges of sustainable development. Further research may focus on partnerships between universities and businesses to achieve the SDGs. Attention should also be paid to studying the development and implementation of innovative approaches in project-oriented education to achieve the SDGs in Ukraine.

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