

Sustainability Opportunities and Barriers at Universities, Development of a Sustainable University Environment

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Nowadays, one of the most crucial environmental, social, and economic questions is how to build a sustainable future for the following generations. This is a vital challenge because we live in a historical age due to the over-utilization of CO₂-intensive technologies. Thanks to this practice, greenhouse gas emission is increasing yearly; biodiversity is decreasing dramatically. It is essential for our environment that universities play a leading role in the actions that can eliminate these adverse effects. This paper introduces the status of the uptake of sustainability-related issues and targets in the Higher Education (HE) sector. It emphasizes the necessity of the comparable evaluation of these activities by introducing current sustainability ranking systems. Some barriers disable the transition to a sustainable working model for universities. The paper identifies these barriers and makes suggestions for eliminating them through the example of Széchenyi István University's practice and sustainability action plan. The main obstacles to sustainability in the HE sector incorporate budget constraints, resistance to change, lack of planning and focus, lack of applicability, and continuity of actions. The suggested sixteen action points in this paper could support the immediate change in the attitude to sustainability-related topics at operational levels. These suggestions support the attitude formation at each level of the decision-making process.

1. Introduction

The United Nations (1987) formulated the definition of sustainable development and defined 17 Sustainable Development Goals (SDGs) in 2015, which are intended to highlight the necessity of actions to end poverty, protect our planet, and ensure peace and prosperity for every people by 2030 (United Nations, 2015). These goals are the basement of all environmental protective and sustainable activities. The fields of sustainability can be grouped into five main categories: environmental, economic, social, governmental, and institutional sustainability. Environmental sustainability refers to maintaining biodiversity, preserving natural resources, and reducing emissions to ensure a healthy environment for future generations (Theis and Tomkin, 2015). Society must utilize natural resources (e.g., energy, raw materials, and water) to minimize waste and depletion (McKinnon et al., 2010). Economic sustainability focuses on fostering long-term economic growth and stability without compromising environmental and social goals (Baumgärtner and Quaas, 2010). The research, development, and innovation (R&D&I) activities must be utilized by all the players in the industry to adopt new technologies and services to reduce their environmental impact. Governmental incentives and industry contributions have to support universities and research institutes to lead this process. Inequality arises with the increasing efficiency due to R&D&I, so the sustainable economy must also aim to reduce disparities (Spangenberg, 2005). The economy has to shift towards environmentally friendly and low-carbon industries, products, and services. Social sustainability focuses on creating an equitable society where everyone has the same access to resources and opportunities to improve their well-being (Orlitzky et al., 2011). Everyone deserves a decent standard of living that incorporates the sustainability of health and well-being. There is a significant correlation between healthcare expenditures and labor productivity, personal spending, and GDP (Raghupathi and Raghupathi, 2020). A highlighted mission of social sustainability is the elimination of any disadvantageous diversification of humans from different genders, races, economic statuses, or religions

(Matten and Moon, 2004). Social innovation is also a competitive partial mediator between sustainable leadership and sustainable performance (Iqbal and Piwowar-Sulej, 2022). All the abovementioned sustainability aspects can be delivered by a sustainable governance and institutional system that supports and enforces sustainable practices (Niesten et al., 2017). Adapting state-of-the-art technologies also means flexibility in policymaking and developed monitoring practices. In every situation, it is necessary to consider the opinions of all the available stakeholders to ensure the safety of personal interests and laws (Vaughter et al., 2016). The dialogue between the partners can indicate newer innovations that can support the challenges in sustainability. Based on the connecting scientific literature, it is revealed that the ways to implement sustainability actions are well described, although its realization in everyday actions is less discussed. This paper aims to identify current activities connecting to SD at SZE and suggest the following steps that can operatively support our goal to reach a sustainable HE.

2. Sustainable Higher Education

The implementation of sustainability cannot be limited to the industrial sectors. The HE has an outstanding role regarding the attitude formation and multiplication of scientific knowledge, so the assessment of the status of sustainability in HE, investigation of its metric systems, and the introduction of the current SD-related activities at Széchenyi István University (SZE) support these efforts.

2.1 Status of Sustainability in Higher Education

COVID-19 had a strong impact on the HE sector (Pintarič and Kravanja, 2020) and forced it into a more digital environment. Besides digitalization, the willingness for sustainable development is also a megatrend in HE, which has become one of the most urgent issues in society. Universities must lead the process through all their activities. Fonseca et al. conducted a comprehensive overview of the status of sustainability reporting at seven Canadian universities (Fonseca et al., 2011). Their analysis reveals that most reports contain details about green buildings and procurement processes, although human rights and society issues are less incorporated topics. Environmental issues regarding sustainability come to mind for most universities, followed by governance and administration-related content. Education and research are in the mid-field; human rights and society-related issues are the least frequently discussed. Zamora-Polo and Sánchez-Martín conducted a study on how to teach sustainability in HE (Zamora-Polo and Sánchez-Martín, 2019). They found that students must stand in the gravity center of their tetrahedron concept. Their concept considers students' competencies, teaching methodology, professors, and alliances as the further components of their framework, which ensures the teaching of sustainability considering incorporating the SDG methodology. According to Van Weenen, universities have three general ways to intervene in sustainable development (van Weenen, 2000). Play an evolutionary approach due to their nature; have the necessary experts and discipline, and a pioneering approach ensures the realization of sustainable activities through a new organizational context. Ribalaygua Batalla and García Sánchez (2016) highlight the necessity of universities' sustainability stakeholders. Their participation makes it possible to synthesize the university's and municipality's sustainable actions. Velazquez et al. support the attitude that implementing sustainability is a continuous improvement in the universities' environmental, social, and economic (Velazquez et al., 2006). Regarding the pace of the transition toward sustainability, Lozano emphasizes the importance of small steps that enable step-by-step development (Lozano, 2006).

2.2 Evaluation of sustainable actions at Universities

Sustainability incorporates, besides environmental activities, social ones and feasible institutional development planning. The question arises: how can sustainability be measurable in universities? Shriberg (2002) analyzed different cross-institutional sustainability assessment tools, comparing their strengths and weaknesses. He highlighted their possibility of contributing to management decision-making. Although the comparability of institutions through the investigated tools is impossible because of the applied simplifications in the methodologies, their broad utilization and development will significantly contribute to their applicability. The UI GreenMetric World University Ranking ranks universities based on green campuses and environmental sustainability (Suwartha and Sari, 2013). It considers six indicator categories (Setting and Infrastructure; Energy and Climate Change; Waste; Water, Transportation; Education and Research) connecting to SDGs during their ranking process and considered with different weighting. Puertas and Marti suggest an alternative index based on UI GreenMetric variables applying data envelopment analysis (DEA), resulting in a university ranking based on their contribution to sustainability (Puertas and Marti, 2019). They clustered the investigated 719 universities evaluated by UI GreenMetric into four levels based on Ward's Method (high, medium-high, medium-low, low). They found that the majority of the HE institutions were located in the medium-low-level sustainability cluster. The two low levels contain nearly two-thirds of the total investigated institutions. Other rankings, like Times Higher Education (THE) consider the SDGs as a basis of its evaluations, ranking the universities based on

individual and overall SDG scores. Quacquarelli Symonds (QS) World University Ranking has a dedicated Sustainability ranking category investigating the university's contribution to environmental, social, and governance (ESG) challenges. It evaluates sustainability through documentation and, similar to THE, verifies publications related to specific SDGs in the Scopus database.

2.3 Széchenyi István University

Sustainability has strategic importance in the activity field of SZE, and senior management of the university highlighted sustainability as a strategic way of future activities. Széchenyi István University has become one of the leading HE institutions in Hungary, with a significant number of students, infrastructure investments, and stable management. To create efficient, competitive HE in Hungary, the Government approved the modernization of the University's operating model, which encourages the institutions to improve entrepreneurial skills and education through industry-related considerations. Further strengthening the university's corporate partnerships, internationalization, and service provider capabilities supports long-term institutional sustainability. With the increasing number of internships, English-language courses, and foreign instructors, internationalization also aids the university's sustainability goals. SZE dedicated the sustainability discipline to the Department of Applied Sustainability. The Competence Center of Sustainability was established to support sustainable related scientific activities in all the disciplines of the University. Széchenyi István University, in accordance with the above, considers its presence on the QS and THE sustainability rankings to be of strategic priority. The latter two higher education ranking organizations publish world rankings, primarily based on scientific performance, which international students take into consideration when choosing universities. The uniqueness of THE lies in its evaluation of how institutions are contributing to each Sustainable Development Goal (SDG) through implemented programs and action plans. It also assesses how universities teach the various SDGs as part of their curriculum and whether the keywords associated with the SDGs appear in scientific publications present in the Scopus database, which is used as a source by both THE and QS. For this reason, Széchenyi István University has aligned the structure of its sustainability website with THE's Impact Ranking system (Széchenyi István University, 2023). In 2020, Széchenyi István University developed a comprehensive 10 y sustainability action plan represented by Figure 1.

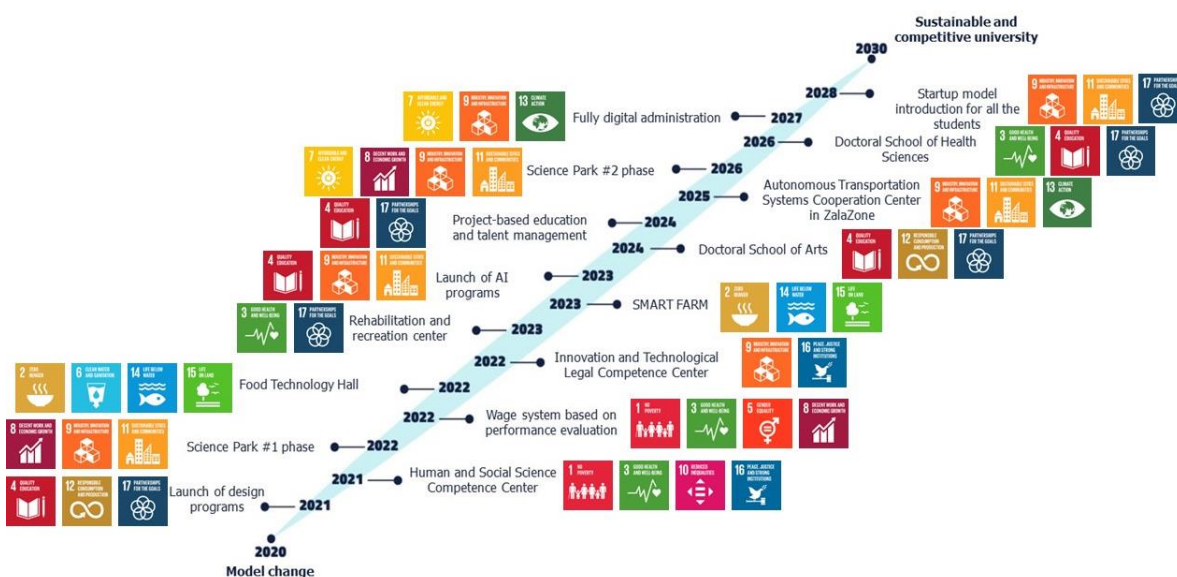


Figure 1: Ten-year strategic plan of SZE and connections to SDGs

This plan was accompanied by specific projects supporting the set objectives, some of which were initiated and/or completed. Among these projects, the most prominent one is the "Insula Magna" or "Szigetköz-Csallóköz" project. It is a sustainability initiative realized in collaboration with Slovak and German partners, encompassing the Danube region from the city hosting the University to the Austrian border, taking into consideration economic, social, and ecological aspects. Similar projects focus on waste recycling and reducing vehicle emissions using hydrogen technology. These projects aim to contribute to sustainability goals by leveraging the University's knowledge base. The University's Mosonmagyaróvár campus features the "Smart Farm" and greenhouse projects, which employ cutting-edge technologies to support sustainability objectives. By 2027, the institution aims to achieve the status of a paperless University. Széchenyi István University

welcomes international students from 77 countries, actively involving them in specially designed sustainability projects and start-up ventures. The goal is for these students to return to their home countries and contribute to the implementation of sustainability strategies devised by their home nations.

Considering the 10 y long institutional development time, the stations in Figure 1 play key roles in the University's life, and each can be associated with SDGs. This paper identifies the most relevant connecting SDGs to each strategic point in which methodology can be utilized in representation and strategy-making in the future and will ensure the formation of a sustainable and competitive university. Based on the coverage of all SDGs by the strategic plan, SZE can maintain the current sustainable activities and support further environmental, social, economic, and governmental sustainability improvement. The exact sustainability performance evaluation is under construction based on the methodology highlighted in Sections 2.1 and 2.2 to make comparability available with other HE institutions. Although the final set of indicators is not fully defined and the values are not evaluated, the main sustainability burdens can be identified based on the already realized measurement steps.

3. Challenges of the sustainable actions

3.1 Barriers to Sustainability

Some barriers disable the transition to a sustainable working model for universities. Ávila et al. identified the links between sustainability and innovation in universities (Ávila et al., 2017). They also investigated the barriers to innovation and sustainability worldwide in the HE sector (Ávila et al., 2019). They found that the main barriers are lack of planning and focus, lack of environmental committee, lack of applicability and continuity of actions, and resistance to change. Based on their evaluation, Africa and Oceania reached the highest scores in the rank. At the start of the century, Dahle and Neumayer (2001) explored the greening steps of higher educational institutions. They found that budget constraints are the most significant barriers that disable environmental awareness in campus communities. Elliott and Wright (2013) approached the issue from the student's viewpoint. Through the involvement of 27 Canadian university student union presidents, they identified the university finances as a barrier and incentive to sustainability. The authors emphasized the students' significant stakeholder role in supporting sustainability. Ávila et al. (2017) comprehensively reviewed the literature dealing with barriers to sustainability in the HE segments. They highlighted that the majority of these objects are well-known, but they are not addressed. Waas et al. (2012) examined the contemporary literature on key barriers to sustainability and innovation in universities and determined the key barriers to sustainability in the Flemish HE system. Ávila et al. created a questionnaire of 25 questions and got 283 respondents from around the world (Ávila et al., 2019). Based on their study, the main barrier is the lack of support from the university administration. Besides the poor administrative support, the lack of appropriate technology and environmental committees are the most significant obstacles. The less impedimental factors are the lack of dialogue and lack of applicability and continuity.

3.2 Ways forward at SZE in sustainability actions

In order to protect our environment from society's harmful intervention, it is essential to jump through the abovementioned barriers to sustainability. Education is the basis for fulfilling all the SDGs, and it has an outstanding contribution to the formation of society (Žalėnienė and Pereira, 2021). During the investigation of major barriers in HE to sustainable actions, Waas et al. (2012) also suggest ways forward in sixteen steps, which will ensure the green transition at universities. Based on these points, this study highlights the ways forward in the case of SZE. Table 1 contains the existing practices for promoting the green transition at Széchenyi István University and proposals to further the development of processes.

Table 1 Ways forward to support sustainable development in the HE

Ways forward	Existing practice at SZE	Suggested next step
Assess and Measure	Sustainability goals set up, monitoring in publications	Widespread monitoring, assessing at predefined milestones, re-fining KPI-set
Communicate	The sustainability report is published, sustainability.sze.hu is up-to-date	Continuous refreshment of the documents, excessive communication to the main SHs
Engage Stakeholders	Contribution to the elaboration of the municipal and regional climate strategy	Involving the stakeholders in sustainable activities more frequently
Make Concrete	Selective waste collecting, cost-effective lightning, and thermal management systems are applied	Integrating awareness regarding all SDGs into the routine, optimizing the selective waste collection system

Table 1 Ways forward to support sustainable development in the HE (continued)

Ways forward	Existing practice at SZE	Suggested next step
Multiply the knowledge about SD	All subjects contain sustainability elements at SZE	Emphasizing its connection to all disciplines, involving students into sustainability projects
Meet Needs	Focusing on the uniqueness of the HE sector	Involving the stakeholders in sustainable activities more frequently
Promote Understanding	Socialization activities for publicizing the significance of sustainability	Improved sensitization of students and all SHs within the "Knowledge Pentagon"
Incorporates Quality Education	All subjects contain sustainability elements at SZE	Assessing the teacher's attitude to sustainability, establishing a sustainability knowledge expert group
Reward	Leaders define sustainability indicators during the goal definition of employees	Increased emphasis on delivering sustainability indicators in variable wage
Educate University Wide	All subjects contain sustainability elements at SZE	Launching academic programs and project-oriented activities about sustainability
Promote Empowering	Application of project and experiential learning in top education programs	Extending this attitude to all programs
Create Management Positions	Competence Center of Sustainability	Integrating sustainability tasks at higher management positions (supervisory board)
Develop and Participate in Networks	Publishing papers regarding sustainability in the international research network	Application to EU grants with SD-related topics, strengthening local/regional network
Engage in Regional SD Initiatives	Outstanding participation in regional socialization activities	Cooperation with UN's Regional Centers of Expertise
Develop Research Priorities	The common topic is the sustainability of all research activities at the SZE	Prioritizing SD-related research with increased incentives
(Re)orient Public Higher Education Policy and Funding	Governmental indicator system for model changed universities in Hungary	Make suggestions to supplement the indicators with SD goals

4. Conclusion

This paper introduced the different approaches to sustainability from environmental, economic, social, and governmental viewpoints. Through the representation of Széchenyi István University, the connection between SGDs and strategic points of the university's strategy was introduced. The sustainability goals of SZE cover four main areas: quality, ethical education, protection and innovation, zero carbon emissions, and partnerships. The challenges of the higher education sector regarding sustainable actions were investigated. This work contributes to the transformation of the higher education sector to a more sustainable and environmentally friendly future. The methodology applied to examine the sustainability actions of SZE can be directly utilized in the case of any higher education institution. The key barriers to sustainability at universities must be evaluated to ensure the transformation of the higher education sector. The SDG-driven strategy-making process is crucial, and utilizing this methodology for all universities is recommended. Assigning current activities and future recommendations to ways forward enables us to overcome the barriers, and these steps provide the most promising realization of sustainable development for the future. Universities have a unique mission to provide for the well-being of society, so they have to operate as hot spots for SDG-related activities. With the application of the previously discussed ways forward, the HE can strengthen its outstanding role, and through the teaching and coaching of future generations, it outstandingly supports a sustainable and liveable future.

References

- Ávila L.V., Leal Filho W., Brandli L., Macgregor C.J., Molthan-Hill P., Özuyar P.G., Moreira R.M., 2017, Barriers to Innovation and Sustainability at Universities around the World. *Journal of Cleaner Production*, 164, 1268–1278.

- Ávila L.V., Lucas T.A.B., Brandli L.L., Damke L.I., Pereira R.S., Klein L.L., 2019, Barriers to Innovation and Sustainability in Universities: An International Comparison. *International Journal of Sustainability in Higher Education*, 20(5), 805–821.
- Baumgärtner S., Quaas M., 2010, What Is Sustainability Economics? *Ecological Economics*, 69(3), 445–450.
- Dahle M., Neumayer E., 2001, Overcoming Barriers to Campus Greening: A Survey among Higher Educational Institutions in London, UK. *International Journal of Sustainability in Higher Education*, 2(2), 139–160.
- Elliott H., Wright T., 2013, Barriers to Sustainable Universities and Ways Forward: A Canadian Students' Perspective. *Proceedings of the 3rd World Sustainability Forum*, Basel, Switzerland, 1-19.
- Fonseca A., Macdonald A., Dandy A., Valenti P., 2011, The State of Sustainability Reporting at Canadian Universities. *International Journal of Sustainability in Higher Education*, 12(1), 22–40.
- Iqbal Q., Piwowar-Sulej K., 2022, Sustainable Leadership in Higher Education Institutions: Social Innovation as a Mechanism. *International Journal of Sustainability in Higher Education*, 23(8), 1–20.
- Lozano R., 2006, Incorporation and Institutionalization of SD into Universities: Breaking through Barriers to Change. *Journal of Cleaner Production*, 14(9–11), 787–796.
- Matten D., Moon J., 2004, Corporate Social Responsibility. *Journal of Business Ethics*, 54, 323–337.
- McKinnon A., Cullinane S., Browne M., Whiteing A., 2010, Environmental Sustainability: a new priority for logistics managers, Chapter in: McKinnon, A. (Ed.) *Green Logistics: Improving the Environmental Sustainability of Logistics*, Kogan Page Limited, London, UK.
- Nielsen E., Jolink A., Jabbour A.B.L.S., Chappin M., Lozano R., 2017, Sustainable Collaboration: The Impact of Governance and Institutions on Sustainable Performance. *Journal of Cleaner Production*, 155, 1–6.
- Orlitzky M., Siegel D.S., Waldman D.A., 2011, Strategic Corporate Social Responsibility and Environmental Sustainability. *Business & Society*, 50(1), 6–27.
- Pintarič Z. N., Kravanja Z., 2020, The Impact of the COVID-19 Pandemic in 2020 on the Quality of STEM Higher Education. *Chemical Engineering Transactions*, 81, 1315-1320.
- Puertas R., Marti L., 2019, Sustainability in Universities: DEA-GreenMetric. *Sustainability*, 11(14), 3766.
- Raghupathi V., Raghupathi W., 2020, Healthcare Expenditure and Economic Performance: Insights From the United States Data. *Frontiers in Public Health*, 8, 156.
- Ribalaygua Batalla C., García Sánchez F., 2016, Creating a Sustainable Learning District by Integrating Different Stakeholders' Needs. Methodology and Results from the University of Cantabria Campus Master Plan, Chapter in: Leal Filho W., Brandli L.L. (Ed.), *Engaging Stakeholders in Education for Sustainable Development at University Level*, Springer International Publishing, Cham, Switzerland, 3-20.
- Shriberg M., 2002, Institutional Assessment Tools for Sustainability in Higher Education: Strengths, Weaknesses, and Implications for Practice and Theory. *Higher Education Policy*, 15, 153–167.
- Spangenberg J.H., 2005, Economic Sustainability of the Economy: Concepts and Indicators. *International Journal of Sustainable Development*, 8(1–2), 47–64.
- Suwartha N., Sari R.F., 2013, Evaluating UI GreenMetric as a Tool to Support Green Universities Development: Assessment of the Year 2011 Ranking. *Journal of Cleaner Production*, 61, 46–53.
- Széchenyi István University, 2023, Sustainable Development Goals in Széchenyi István University, <sustainability.sze.hu/en_GB/home>, accessed 31.07.2023.
- Theis T., Tomkin J., 2015, Sustainability: A Comprehensive Foundation, University of Illinois: Urbana-Champaign, IL, USA, <<https://archive.org/details/cnx-org-col11325>>, accessed: 18.07.2023.
- United Nations, 1987, Our Common Future: Report of the World Commission on Environment and Development: Our Common Future. <sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>, accessed: 08.10.2023.
- United Nations, 2015, Transforming Our World: The 2030 Agenda for Sustainable Development. <sdgs.un.org/2030agenda>, accessed: 08.10.2023.
- van Weenen, H., 2000, Towards a Vision of a Sustainable University. *International Journal of Sustainability in Higher Education*, 1(1), 20–34.
- Vaughter P., McKenzie M., Lidstone L., Wright T., 2016, Campus Sustainability Governance in Canada: A Content Analysis of Post-Secondary Institutions' Sustainability Policies. *International Journal of Sustainability in Higher Education*, 17(1), 16-39.
- Velazquez L., Munguia N., Platt A., Taddei J., 2006, Sustainable University: What Can Be the Matter? *Journal of Cleaner Production*, 14(9–11), 810–819.
- Waas T., Hugé J., Ceulemans K., Lambrechts W., Vandenabeele J., Lozano R., Wright T., 2012, Sustainable Higher Education. *Understanding and Moving Forward*, Brussels, Belgium.
- Žalėnienė I., Pereira P., 2021, Higher Education For Sustainability: A Global Perspective. *Geography and Sustainability* 2(2), 99–106.
- Zamora-Polo F., Sánchez-Martín J., 2019, Teaching for a Better World. Sustainability and Sustainable Development Goals in the Construction of a Change-Maker University. *Sustainability* 2019, 11(15), 4224.