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Strategic Sustainability Action Plan at Unicamp

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Abstract. The Strategic Sustainability Action Plan (PAESUS) at Universidade Estadual de Campinas (Unicamp) ensures a structured and predictable approach to sustainability investments, in line with the university's 2021-2025 Strategic Plan and the Sustainable Development Goals (SDGs). The initiative integrates sustainability into academic, operational, and governance practices, promoting long-term environmental impact. In its Year Zero, PAESUS implemented pilot projects across Unicamp's campuses, focusing on energy efficiency, water conservation, waste management, and climate resilience. In 2024, the first public call for projects attracted 17 proposals, with 10 selected for development in 2025, based on a prioritization matrix evaluating impact and feasibility. The program secured R$3 million in additional and immediate investments, reinforcing initiatives in climate action, sustainable mobility, and resource optimization. With integrated governance and interdisciplinary collaboration, PAESUS fosters innovation and strengthens Unicamp's sustainable management culture. Progress is monitored using global sustainability indicators, such as UI GreenMetric and THE Impact, ensuring accountability and continuous improvement. By advancing strategic sustainability actions, PAESUS positions Unicamp as a leader in sustainable development within higher education, offering a model for other institutions to follow.

Keywords:

Institutional Sustainability Governance; Strategic Planning in Higher Education; Sustainable Campus Transformation

1. Introduction

The Universidade Estadual de Campinas (Unicamp), founded in 1966, is a major Brazilian public academic institution, recognized for its excellence in research, teaching, and

innovation. Located in the state of São Paulo, its main campus - Zeferino Vaz - encompasses a large ecological footprint that includes preserved native forest, reforested green areas, and extensive built infrastructure. Unicamp currently hosts more than 37,000 students, nearly 2,000 faculty members, and over 7,000 technical staff, distributed across six campi [1], and has positioned itself as a national leader not only in scientific production but also in progressive institutional management.

The university's engagement with environmental sustainability evolved from grassroots movements within the academic community to formalized institutional programs. In the 1990s, initial efforts focused on issues such as solid waste mismanagement and pollution in the campus drainage system. These concerns gave rise to the Environmental Planning Group and later, in 1999, to participatory mapping activities using the “Green Map” methodology — an early attempt to engage campus users in environmental awareness and diagnostics.

Throughout the 2000s, Unicamp consolidated its commitment to sustainability through the creation of interdisciplinary working groups and policy instruments. The adoption of a formal Environmental Policy in 2010 marked a turning point, paving the way for more structured governance. In 2014, the establishment of the Sustainable University Management Group (GGUS) expanded the university’s scope of action to include energy efficiency, biodiversity conservation, water resource management, and environmental education. GGUS was soon supported by the creation of thematic Technical Chambers (CTGs), which brought together academics and technical staff to design and implement sustainable solutions across multiple dimensions [2]. This multi-dimensional structure allowed Unicamp to consolidate a comprehensive agenda across water, energy, mobility, and biodiversity, in line with broader Latin American models for energy transition and campus sustainability [3].

In recent years, Unicamp has strengthened its sustainability architecture by embedding it into strategic and long-term planning. The 2021–2031 Integrated Master Plan [4] elevated sustainability to a core institutional value, while the Office of Integrated Planning (DEPI) assumed a central role in coordinating cross-cutting initiatives. Within DEPI, the Sustainability Coordination Office (CSUS) was created to articulate policy, technical knowledge, and community engagement. This unit now leads Unicamp’s participation in international sustainability platforms such as UI GreenMetric, ISCN, SDSN, and Nature Positive Universities, while promoting internal integration between infrastructure planning and academic research. The application of the ‘eco-campus’ model, as explored by Finlay and Massey [5], has informed Unicamp’s perspective of its physical environment as a site for ecological transition and sustainability literacy. Higher education institutions play a critical role in shaping sustainable futures, not only through education and research but also by modelling sustainable practices themselves [6].

This reflects a global trend among higher education institutions to increasingly recognize the need for dedicated governance structures to coordinate sustainability efforts. As observed by Leal Filho et al. [7], Sustainability Offices serve as institutional anchors that support the integration of sustainability into operations, teaching, research, and outreach. The establishment of the CSUS at Unicamp echoes this rationale, providing a formal structure to coordinate cross-cutting sustainability actions and enable systemic change.

Amid growing global and local demands for action on climate change, resource efficiency, and environmental justice, Unicamp launched the Strategic Sustainability Action Plan (PAESUS). Rather than a project-funding mechanism, PAESUS is a governance instrument that institutionalizes sustainability within university operations. It introduces a participatory

and recurring process for the submission, evaluation, and implementation of sustainability initiatives proposed by members of the university community.

This understanding echoes the findings of Baker-Shelley et al. [8], who argue that universities must not only contribute externally to sustainable development through education and research, but also undergo internal organisational transformation. Their analysis of leading institutions reveals that lasting systemic change is enabled when universities invest in self-reflection, develop sustainability competencies, and align their internal governance with long-term transformation goals. In this sense, by framing sustainability as a strategic axis, Unicamp seeks to move beyond isolated actions and toward a systemic, long-term transformation. This paper explores the development, methodology, and early results of PAESUS, providing insights into how universities can build internal capacity for sustainable transitions and become active contributors to the United Nations 2030 Agenda [9]. This initiative also responds to calls in the literature for structured sustainability assessment frameworks within higher education institutions [10], particularly those that balance strategic goals with community engagement.

2. Theoretical Approach and Methodology

The Strategic Sustainability Action Plan (PAESUS) was designed as a permanent mechanism to systematize sustainability investments at Unicamp. Its methodology reflects a hybrid approach that combines strategic planning, participatory governance, and technical evaluation. The plan is grounded in Unicamp's 2021–2025 institutional strategy (Planes Unicamp), which establishes "ensuring sustainability in infrastructure, operations, and finance" as a core strategic objective. The prioritization framework is also informed by Unicamp's territorial planning logic and governance diagnostics outlined in prior institutional studies [4]. Additionally, it aligns with international frameworks such as the United Nations Sustainable Development Goals (SDGs) and sustainability performance indicators from global university rankings like UI GreenMetric and THE Impact.

2.1. Governance and Participatory Structure

The implementation of PAESUS is coordinated by the Sustainability Coordination Office (CSUS), a technical unit within the Office of Integrated Planning (DEPI). CSUS oversees the entire planning cycle, from project collection to monitoring and dissemination of results. It works in close collaboration with the Sustainable University Management Group (GGUS) and its Technical Management Chambers (CTGs), which include thematic areas such as energy, water, biodiversity, mobility, waste, and environmental education.

To ensure transparency and inclusivity, PAESUS incorporates a Consultative Committee composed of representatives from across the university's governance ecosystem:

- DEPI: CSUS, Integrated Master Plan, Geoprocessing
- CGU: University Data Office
- GR: International Hub for Sustainable Development (HIDS)
- Campus Infrastructure: Divisions of Water, Energy, and Environment
- PRDU: Institutional Indicators Unit
- Satellite campuses: Limeira and Piracicaba
- Pro-Rectorate of Outreach and Culture (ProEC)
- Office for Human Rights and Diversity (DEDH)

This multi-stakeholder structure facilitates a transversal review of proposals and ensures that projects are contextually aligned with university operations and strategic goals.

The decision to house PAESUS within the CSUS — a centralized and technically qualified unit — reflects international best practices on the role of Sustainability Offices. According to Leal Filho et al. [7], such offices improve internal coordination, foster sustainability awareness, and create accountability mechanisms for long-term transformation.

2.2. Annual Public Call and Proposal Flow

PAESUS operates through an annual public call for proposals, open to faculty, staff, and students across all campuses. The process includes:

- Proposal Collection – A standardized form is distributed to all academic units and administrative bodies. Proposals must outline goals, beneficiaries, estimated costs, implementation phases, and alignment with sustainability themes.
- Technical Validation – Initial screening is performed by CSUS staff, followed by review from the appropriate CTG or a specialized unit. Feedback is provided to proponents as needed.
- Prioritization Matrix – Eligible proposals are scored using a structured multifactor matrix that computes an impact/challenge ratio, which is filled in independently by each member of the Consultative Committee. After elimination of upper and lower outliers, an average ratio is obtained as a preliminary priority indicator.
- Collective Synthesis – The Consultative Committee gathers to discuss the preliminary prioritized list, in view of the call's budget ceiling, possible synergies or overlaps between proposals and qualified expert assessment of technical challenges within proposals; subject to a consensus verdict, this may lead to the exclusion of some proposals or to a minor reordering of the list for greater total utility.
- Final Approval – The prioritized list is submitted to the Institutional Strategic Planning Committee (COPEI) for approval and budget allocation.

Implementation and Monitoring – CSUS supports project execution through technical assistance and oversight. Progress is tracked and reported in annual public seminars.

2.3. Prioritization Matrix: Impact and Challenges Metrics

A core feature of PAESUS is its use of a Prioritization Matrix designed to guide the selection of sustainability projects based on two major dimensions: their potential impact and the level of implementation challenge. This matrix provides a systematic and transparent framework for evaluating proposals and determining their relevance within the university's strategic sustainability agenda.

The impact dimension reflects the strategic relevance and institutional benefits of each proposal. It incorporates three components: the degree to which a proposal aligns with the 2021–2025 Strategic Plan (Planes Unicamp), the contribution it makes to improving Unicamp's performance in the UI GreenMetric indicators, and the extent to which it advances Unicamp's position in the Times Higher Education (THE) Impact Rankings. Strategic alignment is determined by the number of institutional objectives addressed by the proposal. Projects addressing five or more strategic goals are considered high-impact, while those addressing fewer goals receive lower scores. Contributions to the GreenMetric and THE Impact indicators are assessed based on the potential for measurable improvement. Proposals targeting underperforming indicators are considered to have greater potential impact, since incremental gains are more likely and beneficial.

The challenge dimension captures the complexity, resource intensity, and organizational coordination required for successful implementation. It evaluates technical

complexity by considering whether a project requires high-level structural changes, multidisciplinary integration, or advanced technical knowledge. Resource demand is assessed based on the budget requested relative to the total funds available in the annual call, with higher-cost projects receiving higher challenge scores. The degree of stakeholder uncertainty is evaluated by analyzing how many internal and external actors need to be involved. Projects requiring coordination across multiple departments or partnerships with external organizations are considered more challenging due to governance and execution uncertainties.

By calculating a final prioritization score as a ratio between impact and challenge, PAESUS identifies projects that deliver the greatest strategic and environmental return on investment while remaining feasible within the institutional context. This methodology allows Unicamp to transparently select projects that are both meaningful and achievable, fostering credibility and engagement across the academic community. This methodological approach is consistent with international practices for sustainability assessment and prioritization in higher education [3, 10].

2.4. Budgetary Planning

PAESUS currently allocates a fixed annual budget of R$1,000,000.00 for selected projects. Projects not prioritized each year may be recommended for revision or considered for future editions. This iterative process allows for continuous improvement of project quality and alignment with institutional priorities.

Through this structured and participatory methodology, PAESUS ensures that sustainability initiatives at Unicamp are scalable, replicable, and aligned with measurable institutional and global goals. It also promotes internal capacity-building and community engagement, reinforcing sustainability as a shared responsibility.

3. Results and Discussions

The first full implementation cycle of PAESUS was executed in 2024 with the aim of allocating sustainability investments through an open, participatory, and data-driven decision process. The public call for proposals, disseminated across Unicamp's academic community through official communication channels and technical advisors, resulted in the submission of 17 project proposals totalling R$4.7 million in requested funding. The CSUS technical team, together with the PAESUS Consultative Committee, applied the prioritization matrix to score and rank the proposals based on their potential impact and implementation challenges.

From this process, ten projects were finally selected for funding, aligning with PAESUS's annual budget of R$1,000,000.00. The projects represented a diversity of themes and institutional actors, showcasing the interdisciplinary and collaborative nature of Unicamp's sustainability ecosystem. The selected proposals addressed strategic areas such as biodiversity conservation, water resources, sustainable materials management, data transparency, and climate science infrastructure. Below, we present a summary of the five highest-ranked projects.

3.1. Mitigation of Bird Collisions at Casa do Lago

This project focuses on reducing bird mortality caused by collisions with the large glass façade of the Casa do Lago Cultural Center, located on the main campus. The mirrored architecture, while visually appealing, poses a serious threat to avian species, especially

during migratory and breeding seasons. The proposal involves the application of patterned transparent films to create visual cues that alert birds to the presence of glass surfaces. The initiative combines biodiversity protection with aesthetic preservation and was prioritized for its immediate feasibility, relatively low cost, and significant ecological impact. It also engages students and staff in the monitoring and awareness process, amplifying its educational dimension.

3.2. Level of Commitment and Visibility of Sustainability Measures on Campus

This proposal aims to develop an integrated Water Resources Management Plan for Unicamp's 'Zeferino Vaz' main campus, combining conservation practices, pollution control, and sustainable infrastructure development. The project includes the adoption of recycling and reuse technologies, the implementation of nature-based solutions (such as infiltration systems and green areas), and the training of staff on efficient water use. It also plans to establish a monitoring network to collect and analyze water quality data in key points of the campus. Given Brazil's increasing vulnerability to climate-related droughts, this project was deemed critical for long-term climate resilience, aligning strongly with both the SDGs and Unicamp's Integrated Master Plan.

3.3. Participation in Sustainability-Related Events

This project supports the participation of Unicamp's researchers, students, and staff in national and international sustainability events, including conferences, workshops, and training programs. The proposal seeks to foster visibility for the university's sustainability projects, facilitate knowledge exchange, and strengthen international cooperation. While the project does not involve direct environmental interventions, it was highly valued for its role in expanding Unicamp's network of sustainability partners and disseminating successful practices. It also contributes to Unicamp's reputation in sustainability rankings, fulfilling strategic institutional objectives under the 2021–2025 Planes.

3.4. Integration of the 'Cepagri' Weather Station into the WMO Network

This action involves upgrading Unicamp's meteorological monitoring capacity by integrating the Cepagri Weather Station into the World Meteorological Organization (WMO) Network. The project proposes the standardization of data collection protocols, acquisition of new equipment, validation of historical data, and the production of high-quality datasets for academic research and public use. Once integrated, Cepagri's data will contribute to global climate databases and early warning systems. The project was considered highly strategic, both for reinforcing Unicamp's contribution to climate research and for fostering evidence-based decision-making in campus sustainability planning.

3.5. Sustainable Use of Printing Supplies and Disposable Plastics

This project targets the reduction of disposable plastic consumption and the promotion of sustainable practices in printing and office supply use. It includes awareness campaigns, audits on supply usage, the installation of signage, and pilot programs for reusable materials in administrative and academic units. While relatively low-cost and simple in design, the project was ranked highly for its behavioral change potential and scalability across campus. It also promotes a culture of environmental responsibility among the university's workforce, aligning with the broader goals of environmental education and waste reduction.

3.6. Analyses

These five projects illustrate the diverse and integrated nature of sustainability challenges and solutions within a university setting. From biodiversity to water conservation, data transparency to behavioral shifts, PAESUS promotes a comprehensive view of sustainability. The selection criteria ensured a balance between innovation, technical feasibility, cost-effectiveness, and alignment with institutional strategies.

Overall, the implementation of PAESUS in 2024 represents a milestone in Unicamp's sustainability governance, establishing a repeatable and inclusive process that links community engagement with long-term planning. The plan has proven effective in both mobilizing grassroots initiatives and connecting them to structural policy frameworks. The remaining five projects selected, as well as two honorable mentions, will be monitored through 2025 with technical assistance from CSUS and their results reported in the next institutional sustainability report.

The PAESUS experience aligns with international research on organisational transformation for sustainability. According to Baker-Shelley et al. [8], universities that successfully navigate systemic change tend to develop key competencies such as transformative agency, participatory governance, sustainability literacy, and organisational experimentalism. These traits are observable in Unicamp's approach, particularly in the design of its prioritization matrix, the inclusion of a broad consultative committee, and the use of the campus as a living lab for innovation and monitoring. Similar to the pathways identified in institutions like Leuphana University and Arizona State University, Unicamp is shaping its own transformation trajectory based on intrinsic organisational logic and local governance culture. As Baker-Shelley et al. [ibid.] emphasize, there is no universal blueprint for transformation; instead, the key lies in recognising systemic rubrics and fostering capacities for internal change – a concept that underpins the PAESUS model.

The experience of Unicamp reinforces findings from the international study by Leal Filho et al. [7], which identified that Sustainability Offices contribute significantly to mobilizing students and staff, enhancing institutional visibility, and centralizing sustainability efforts in a single, empowered unit. Unicamp's CSUS has demonstrated that a staff-led structure, with student engagement through consultative processes and implementation roles, can bridge the gap between operational efficiency and educational purpose. While many universities face challenges in establishing or sustaining such offices – notably due to lack of funding or administrative support – Unicamp has strategically embedded CSUS within its planning directorate (DEPI), ensuring it is aligned with decision-making processes and long-term infrastructure management.

In addition to advancing Unicamp's strategic objectives, the PAESUS projects were explicitly evaluated for their potential to improve the university's performance in global sustainability rankings. The Prioritization Matrix incorporated specific references to key indicators from both the UI GreenMetric World University Rankings and the Times Higher Education Impact Rankings, ensuring that selected actions would support measurable progress in these international benchmarks.

Within UI GreenMetric, projects were mapped to six indicator categories: setting and infrastructure, energy and climate change, waste, water, transportation, and education and research. For example, the water resources management plan and the bird collision mitigation initiative contribute directly to the "setting and infrastructure" and "biodiversity" sub-indicators, while the project focused on printing supply reduction impacts the "waste" category. The integration of the Cepagri weather station into global monitoring networks

supports the “education and research” dimension through expanded data availability and climate-related scientific output.

Regarding the THE Impact Rankings, proposals were also evaluated based on their alignment with specific Sustainable Development Goals (SDGs). The 2024 selected projects address multiple SDGs, including:

- SDG 6 (Clean Water and Sanitation): through improved water conservation and reuse strategies;
- SDG 11 (Sustainable Cities and Communities) and SDG 15 (Life on Land): via campus biodiversity protection and green area management;
- SDG 12 (Responsible Consumption and Production): by reducing plastic and paper consumption;
- SDG 13 (Climate Action): through monitoring infrastructure and early warning data systems;
- SDG 17 (Partnerships for the Goals): by promoting international cooperation and data exchange.

These projects address multiple SDGs, including SDG 6, 11, 12, and 13 – the latter loosely linked to inclusive and resilient urban planning as emphasized in the SDG 11 Synthesis Report [11]. By systematically linking funded projects to these performance indicators, PAESUS not only advances Unicamp’s internal sustainability goals but also contributes to its external visibility and positioning in the global higher education landscape. This alignment reinforces institutional accountability and demonstrates that sustainability investments are both strategically coherent and externally verifiable. This echoes the view of Kang and Xu [12], who argue that universities must adopt organizational pathways that reflect their own governance logic and context-specific drivers for sustainability.”

4. Conclusions and Future Perspectives

The Strategic Sustainability Action Plan (PAESUS) has proven to be a transformative initiative within Unicamp’s institutional sustainability strategy. By integrating participatory governance, technical evaluation, and long-term planning, PAESUS offers a replicable model for embedding sustainability into the core functions of a higher education institution. Its structured methodology — from open calls for proposals to matrix-based prioritization — has enabled the identification and implementation of impactful, feasible, and community-driven sustainability actions.

The 2024 cycle marked a significant milestone in this process, not only for the diversity and quality of the proposals submitted, but also for the program’s capacity to directly contribute to the improvement of Unicamp’s performance in key international sustainability benchmarks. The Prioritization Matrix explicitly linked project evaluation to the UI GreenMetric World University Rankings and the THE Impact Rankings, enabling the institution to align internal investments with external visibility. Projects selected in 2024 supported measurable progress in UI GreenMetric indicators such as waste reduction, biodiversity, water efficiency, and climate monitoring infrastructure, as well as key SDGs including SDG 6, 11, 12, 13, and 15 in the THE Impact framework. This strategic coherence reinforces the role of PAESUS as both an operational tool and a mechanism for institutional accountability.

Moreover, the development of PAESUS aligns with international research on sustainability transformation in higher education. Again, according to Baker-Shelley et al. [8], universities must cultivate organizational competencies such as participatory leadership, systems thinking, and adaptive governance to advance sustainability. Unicamp’s experience

with PAESUS reflects many of these dimensions, especially in the collaborative design of project selection tools and the distributed structure of technical evaluation. Likewise, the central role of the Sustainability Coordination Office (CSUS) reinforces the findings of Leal Filho et al. [7], who identify Sustainability Offices as critical hubs for operational coordination, institutional learning, and long-term strategy alignment.

Looking ahead, Unicamp will continue to consolidate PAESUS as a permanent and evolving platform. Future cycles will aim to increase campus-wide participation, expand the program to all satellite campuses, and integrate monitoring systems capable of generating real-time performance data. There are also opportunities to link PAESUS to regional and international sustainability networks, such as the International Hub for Sustainable Development (HIDS), reinforcing Unicamp's role as a reference institution in Latin America.

Such efforts resonate with recent debates about the evolving role of universities as 'circular campuses' [13], where sustainable practices are embedded into everyday operations and the campus itself becomes a 'living laboratory' for innovation and institutional transformation. Ultimately, PAESUS demonstrates that universities can be laboratories for sustainability transformation, where planning, engagement, and evaluation come together to produce scalable and systemic change. Through initiatives like PAESUS, Unicamp not only strengthens its environmental performance but also reaffirms its social and academic mission to lead by example in the transition toward a more sustainable future.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Authors Contribution

T.S.D. and **H.N.S.E.** led the conceptualization of the Strategic Sustainability Action Plan (PAESUS) and coordinated the development of its methodological framework. **T.S.D.**, **G.M.R**., **F.V.** and the broader team contributed to the design of the prioritization process and to the systematization of institutional inputs. **G.M.R.** also supported methodological refinement and the consolidation of the prioritization matrices. **F.C.V.** coordinated the first public call for PAESUS projects, contributing to data curation, validation, and monitoring of selected actions. **F.V.** (Filipe Vieira) supported project administration, operational follow-up, and the organization of prioritization records. **G.N.**, **V.B.**, **W.C.**, **M.A.** and **R.C.** participated in the prioritization process, contributing to formal evaluation, scoring, and expert validation of proposals. All authors contributed to the analysis and interpretation of results. **T.S.D.** and **G.M.R.** drafted the manuscript, with critical revisions provided by **H.N.S.E.**, **F.C.V.** and **F.V.** All authors reviewed and approved the final version of the manuscript.

References

1. Universidade Estadual de Campinas – Unicamp. Anuário estatístico [recurso eletrônico]. Campinas: Unicamp; 2025.
2. Silva LCP, organizador. Campus sustentável: um modelo de inovação em gestão energética para a América Latina e o Caribe. 1ª ed. Rio de Janeiro: Synergia; 2021.
3. Dalbelo TS, Galante AE, Romero GM, Dieguez A, Torniziello TM. Panorama do planejamento territorial da Universidade Estadual de Campinas. In: Silva LCP, organizador. Campus sustentável: um modelo de inovação em gestão energética para a América Latina e o Caribe. 1ª ed. Rio de Janeiro: Synergia; 2021. p. 3–57.
4. Dalbelo TS, Galante AE, Romero GM, Dieguez A, Torniziello TM. Plano Diretor Integrado da Unicamp 2021–2031: uma visão de futuro para os campi. 1ª ed. Campinas: Biblioteca Central Cesar Lattes – BBCL/Unicamp; 2021. p. 115
5. Finlay J, Massey J. Eco-campus: applying the ecocity model to develop green university and college campuses. Int J Sustain High Educ. 2012;13(2):150–165.
6. Cortese AD. The critical role of higher education in creating a sustainable future. Plan High Educ. 2003;31(3):15–22.
7. Leal Filho W, Will M, Salvia AL, Adomßent M, Grahl A, Spira F. The role of green and Sustainability Offices in fostering sustainability efforts at higher education institutions. J Clean Prod. 2019;232:1394–1401.
8. Baker-Shelley A, Van Zeijl-Rozema A, Martens P. Pathways of organisational transformation for sustainability: a university case-study synthesis presenting competencies for systemic change & rubrics of transformation. Int J Sustain Dev World Ecol. 2020;27(8):687–708.
9. Organização das Nações Unidas – ONU. Transformando nosso mundo: a Agenda 2030 para o desenvolvimento sustentável [Internet]; 2015 [citado em: insira a data de acesso]. Disponível em: http://www.br.undp.org/content/dam/brazil/docs/agenda2030/undp-br-Agenda2030-completo-pt-br-2016.pdf
10. Singh AB, Mohapatra SS, Moharana HS, Rajeshkumar S. Sustainability assessment of higher education institutions: a systematic literature review. Eng Proc. 2023;37(1):23.
11. United Nations. SDG 11 synthesis report: tracking progress towards inclusive, safe, resilient and sustainable cities and human settlements. New York: High Level Political Forum; 2018.
12. Kang L, Xu L. Creating sustainable universities: organizational pathways of transformation. Eur J Sustain Dev. 2018;7(4):119–132.
13. Hobson K, O'Byrne M. What is the university for these days? Rethinking the foundations of the 'circular campus'. J Circular Econ. 2024;2(1):1–13.