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EDITED BY

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REVIEWED BY

Ana Paula Perlin,
Federal University of Santa Maria, Brazil
Beatriz Lucia Salvador Bizotto,
Unifacvest, Brazil

*CORRESPONDENCE

Johnatan Castro-Gómez
✉ johnatan223@gmail.com

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University governance and institutional management for sustainability: teachers' perspectives on policy implementation in higher education

Johnatan Castro-Gómez^{1*}, Natalia Marulanda-Grisales²,
César Zapata-Molina¹ and Javier A. Sánchez-Torres³

¹Tecnológico de Antioquia, Medellín, Colombia, ²Corporacion Universitaria Minuto de Dios, Bogotá, Colombia, ³Universitat de Barcelona, Barcelona, Spain

Universities are responsible for training professionals whose decisions in the economic and governmental scenario will lead to comply with sustainability principles. This research seeks to analyze the influence of campus governance and management actions on the implementation of sustainability in teaching, research, and community extension activities from the teaching perspective. A mixed sequential model composed of a theoretical phase and a literature review are conducted through bibliometric and content analysis. In the quantitative phase, a structural model is validated to estimate the relationship among variables. Results of the research showed that teachers act as a bridge to materialize the purposes and principles proposed in university governance actions and are responsible for linking the sustainable management of the campus with teaching and research processes. Likewise, it was identified that teachers commit to connect external stakeholders such as business communities to public institutions for training processes on sustainability. In addition, they are the main reference for scientific production and new knowledge that contributes to the construction of sustainability principles.

KEYWORDS

campus management, governance, missions of the university, structural model, sustainability, teaching perspective

1 Introduction

One of the main challenges that universities face is to become sustainable organizations to guarantee society their commitment and contribution to human and organizational transformation processes and achieve the wellbeing of the latter and care for the environment. Therefore, the mission of the university must be structurally and strategically transformed to respond to the needs of today's world, especially integrating sustainability goals proposed by university governments and educational experience as training to achieve sustainable behaviors (Basheer et al., 2025). Even though there has been a growing interest in analyzing components of university sustainability, its main barriers and drivers, and various methods of evaluating how teachers could contribute to the implementation of sustainability in substantive functions,

further academic development is required (Li, 2025). This is a real restriction on the way curriculum, classroom activities, research approaches and the response to community needs are transformed, understood by the government, and management decisions are made at universities to achieve sustainability (Kasalak et al., 2019).

From the teaching perspective, university sustainability addresses actions that seek the development of skills and abilities in training that make Sustainable Development Goals a reality (Hammer and Lewis, 2023). This perspective does not imply that including sustainability in university education is just a transmission of information, but a process of educational transformation that seeks to adopt and implement principles, ethics, and values for citizen and business life (Ellis et al., 2025). Hence, higher education must promote competencies for sustainability—understood as a set of knowledge, attitudes, skills and values applicable to various contexts—to address complex situations (Kioupi and Voulvoulis, 2022). This educational approach is understood from the impact that the university can have on the external sector (business, government, families).

As for university governance, it is defined as the set of practical institutions and decisions that establish strategic objectives for the institution and ensure its performance. It is also responsible for relations with stakeholders and the fulfillment of goals (Agasisti et al., 2025). Its main functions are resource management, personnel management, compliance with development and strategic plans, and accountability (Bergsteed and du Plessis, 2025). Regarding the sustainable management of the campus, this is understood as the policies and actions implemented by the university to manage its infrastructure, resources, training spaces, and daily operation in such a way that it contributes to the care of the environment, social welfare, and optimal management of financial resources (Hudler et al., 2021).

Regarding the contribution of universities to sustainability from their mission, it is necessary to govern and manage to achieve the actions that show the institutional achievements in terms of sustainability and the desired social transformation (Jiang and Xiao, 2024). This evaluative process adapts to the characteristics of the university and is proposed as a communicative management process with internal and external stakeholders, who are linked to the development of the substantive functions of the university (Yi et al., 2022). Therefore, this research aims to analyze the influence of campus governance and management actions on the implementation of sustainability in teaching, research, and community extension activities from the teaching perspective. We seek to contribute a theoretical and managerial perspective to bridge the gaps in academic literature on the impact of university governance and management activities regarding the implementation of sustainability in the substantive functions. Thus, the teacher is approached as a mediator, who makes tangible the strategic ideals of the universities in terms of sustainability, and their role in the university mission.

The decision to concentrate on the study by university professors was not made without careful consideration. This choice was made due to the role they play in proposing and implementing institutional policies with the objective of ensuring the sustainability of higher education institutions (HEIs). In this sense, the selection of professors as the sample group enables the recognition of their perspective, through their experiences and opportunities for participation in the implementation of institutional policies (Rioseco País et al., 2025). HEI managers require teachers to operate the measures outlined in institutional sustainability policies, a task that has become increasingly challenging for HEI management. They are under pressure to guarantee the implementation

of strategies that incentivize, retain, and encourage the voluntary engagement of teachers in this domain. In addition, it is imperative to engage teachers in the formulation of policies and the decision-making process at higher education institutions (HEIs) to ensure the effective integration of sustainability and environmental management into mission-related activities (Díaz-Del Águila et al., 2025).

Therefore, this research seeks to respond to the question: *How to evaluate the teacher's perspective on the influence of governance and management actions regarding the implementation of sustainability actions in teaching, research, and extension activities?* This study is relevant because it analyzes the coherence between management and development of the university mission with implications for the management of teaching activities.

Although there are studies that address the relationships between university governance, campus management, and sustainability initiatives, the approaches used have focused on normative perspectives, centered on governance as a set of institutional policies, standards, declarations, or planning items. These approaches develop linear theoretical and strategic frameworks in the relationships between sustainability and the substantive functions of the university. However, they do not delve into the organizational mechanisms, centered on the structure and strategy of the institution, through which sustainability initiatives are effectively made tangible (Rodríguez-Aceves et al., 2024). Consequently, this study does not seek to analyze the linear relationships between campus governance and university sustainability, but rather its theoretical and strategic contribution focuses on how universities move from the normative to the operational, centered on the role of the teaching staff. Thus, the campus is understood as a hidden curriculum for sustainability education and a conception of governance that is not only prescriptive but also visibly articulates the substantive functions around the achievement of sustainability objectives through the institution's resources and capacities (Srivastava et al., 2019).

In particular, the literature has paid little attention to the role of teachers as active agents in the relationships between governance, campus management, and substantive functions. This study addresses this gap by proposing and validating a model that conceives of teachers not only as recipients of policies and regulations for compliance with sustainability requirements, but also as organizational agents who operationalize the regulatory and strategic approaches and frameworks of governance and the campus into concrete and visible sustainability practices. Furthermore, the study considers teachers to be one of the main agents, along with students, through whom the institution's mission-related functions are fulfilled. This work is composed, in addition to this section, of a theoretical framework that addresses the central conceptualization of the topic; the methodology that addresses a sequence analysis and a model of structural equations from the Partial Least Squares (PLS-SEM) approach; findings, discussions, conclusions, managerial implications, and future recommendations.

2 Theoretical framework

2.1 University sustainability

The concept of sustainability is associated with the so-called *Triple Bottom Line (TBL)* relationship, i.e., the 3Ps of wellbeing: people, planet, profit (Kligyte et al., 2025). In this way, it is conceived as a

socio-economic process that defends a holistic view of the environment and an equitable use of resources (Song et al., 2021). Therefore, the current performance of sustainability is considered when talking about the Triple Bottom Line—social, environmental, and economic—balance, while considering future performance of governance actions, business ethics, relations with stakeholders and public and corporate policies favorable to sustainable development. Thus, university sustainability is conceived as those Higher Education Institutions that are managed according to social and environmental wellbeing and economic progress in their missionary functions to favor social transformation processes (Castro-Gómez et al., 2024; Nazneen et al., 2023). Theoretical and strategic aspects of university sustainability are presented in Table 1.

2.2 University governance and campus management

University governance is conceptualized as the organizational subsystem in charge of making strategic decisions and guiding the institution toward the achievement of its goals and its relationship with the various stakeholders (Sun et al., 2025). The organizational forms adopted by university governance have evolved from the traditional bureaucratic hierarchical approach to becoming a community made up of actors from various social scenarios; for instance, teachers,

administrative staff, students, members of the public sector, accreditation bodies, industry representatives, and community representatives (Bergsteed and du Plessis, 2025).

Moreover, campus management is defined as the process through which the university plans, organizes, and controls its physical, technological, ecological, social, and symbolic infrastructure to ensure the development of substantive functions and integration with stakeholders (Hudler et al., 2021). They are scenarios of cultural, artistic, and scientific creation where innovation is promoted. Citizen coexistence and the care of the environment include energy, waste water management, sustainable mobility, sustainable food, inclusion and diversity policies, smart infrastructure and the way in which the institution achieves sustainable development goals (Pereira Ribeiro et al., 2021). It involves an operational dimension related to logistics and maintenance services, and a strategic dimension related to sustainability, corporate reputation, institutional image, and brand image (Spry and Pich, 2021).

A theoretical understanding of governance and campus management conceives both dimensions as analytically distinct levels of institutional action, while recognizing their complementary roles in practice. University governance operates at a strategic and normative level, prioritizing institutional needs, allocating resources, and establishing formal commitments whose outcomes are linked to planning and control processes (Rodríguez-Aceves et al., 2024). Its functioning relies on policies, strategic plans, accountability mechanisms, and formal decision-making structures.

By contrast, campus management performs a predominantly operational and tactical role, as it constitutes the arena in which governance orientations become visible in practice. The campus represents the space where strategic approaches to sustainability are made tangible through concrete actions. These include the integration of infrastructure, logistics, technological resources, recycling processes, biodiversity spaces, water management, and awareness-raising activities related to the achievement of the Sustainable Development Goals, among other initiatives that involve both internal and external stakeholders and enable institutions to demonstrate their contribution to sustainable development (Hudler et al., 2021).

Accordingly, governance establishes the institutional direction toward sustainability, whereas campus management facilitates its practical application through operational capacities, resource management, and tangible actions (Srivastava et al., 2019). This distinction is fundamental for understanding both the formulation and the implementation of sustainability strategies in universities.

2.3 Proposed hypothesis

The relationship between governance and strengthening the curriculum in Higher Education Institutions (HEIs) depends on the institutional intentionality to guide university management and the incorporation of sustainability in the competencies and learning outcomes of the different academic programs. In turn, governance from a participatory perspective allows learning from different disciplines to be integrated into curricula (Tan et al., 2023; Velasco et al., 2021).

Likewise, incorporating new governance and leadership practices guide curricula updating based on the requirements of the educational market (Iskindirova et al., 2024; Berzosa et al., 2017). It is relevant to articulate institutional governance with regional strategic plans and the achievement of the Sustainable Development Goals (SDGs) (Wajid, 2025). In this way, governance viewed from curricula helps

TABLE 1 Conceptualization of university sustainability.

Definition of university sustainability	Theoretical aspects	Authors
Change processes that involve innovation management to generate novelty in products or ideas.	Supported by stakeholder relations and change management	Leal Filho (2021)
Holistic process of permanent change that requires measurement.	Organizational capacity management.	Fissi et al. (2021)
Application of the Sustainable Development Goals to the university environment.	Dimensions: framework, institutional framework, campus operations and experiences, education, research, evaluation and reporting.	Smaniotto et al. (2020)
Holistic approach that encompasses social responsibility, ethics, management training in sustainability and improving attitudes and knowledge.	Multilevel process: institutional, curricular, and instrumental.	Horan and O'regan (2021)
Measurable organizational process that guides holistic integration.	Strengthens identity through transparency, politics, communication and leadership.	Horan and O'regan (2021)

Source: Own elaboration.

HEIs not only to train students in technical skills, but also in knowledge related to different perspectives of sustainability. Therefore, it is proposed as a first hypothesis:

H1: Governance positively impacts HEI's curriculum.

Governance in the research activities developed by HEIs promotes collaborative work with different stakeholders and increases academic productivity by research professors (Truong et al., 2021). Thus, some factors related to governance such as calls for research projects funding, leadership, decentralization, and resources have a positive impact on the results presented by research groups and researchers (Zakharova, 2019). In turn, governance generates collaborative spaces and practices to include communities in the generation of more inclusive research results (Karlsson et al., 2024).

From another perspective, the systematization of governance practices in HEIs generates conditions to promote job stability and internationalization of academic staff dedicated to research (Haworth et al., 2023). It is therefore necessary to favor the management of institutional governance based on data, which allow to measure, evaluate, and take improvement actions regarding the scientific performance of the institution (Hue et al., 2022; Mauro et al., 2024). Therefore, it is proposed as a second hypothesis:

H2: Governance positively impacts the substantive research function in HEIs.

It is important to highlight that governance in HEIs strengthens the development of extension activities with the community by creating participatory structures, coordination mechanisms and access to information policies that consolidate social trust (Kuiper et al., 2024). Similarly, governance in projects that involve active work with communities becomes the core element to articulate missional teaching, research, and extension activities (Sribanasarn et al., 2025).

From another perspective, including SDGs in the institutional governance structure strengthens the extension programs in which the students can participate, encourages the creation of local alliances, and demonstrates transparency in the management of resources toward society (De Iorio et al., 2022; Rodríguez-Aceves et al., 2024). Finally, governance promotes the creation of projects and ventures with community extension (Barro et al., 2025).

Therefore, it is proposed as a third hypothesis:

H3: Governance positively impacts community extension activities in HEIs.

Campus operations impact academic training by promoting experiential learning opportunities, co-creation spaces, and learning to solve problems (González-Fernández and Pérez-Moreno, 2025; Nazneen et al., 2023). Campuses are managed in a sustainable way when they impact curricular training, becoming living laboratories (Leal Filho, 2021). Likewise, the sustainable management of the campus is integrated into the curricular orientation for sustainability by serving as an experiential and empirical support to the activities of the classroom, generating group cohesion and collaborative work (Ramakrishna, 2021). Therefore, it is proposed as a fourth hypothesis:

H4: Operations positively impact HEIs' curriculum.

Likewise, institutional operations in HEIs have a positive relationship with research activities, since they generate the structural and financial conditions that allow their execution in a given period of time (Quoc et al., 2025). Moreover, the management of these operations facilitates monitoring research results and products. In turn, this operational management directly affects the productivity of the scientific personnel working at HEIs (Temoso et al., 2023).

The financial income obtained from institutional operations can be used to strengthen infrastructure, mobility, protection of intellectual property and dissemination of the scientific activity generated in the HEIs (Parker et al., 2023). In the same vein, institutional operations promote hiring researchers and highly trained personnel for missional teaching, research, and extension activities (Martelli et al., 2025). In addition, the adoption of information systems and educational technologies to support the management of institutional operations strengthens the development of scientific and research activity among different stakeholders (Svetsky and Moravcik, 2025). Thus, it is proposed as a fifth hypothesis:

H5: Operations positively impact the substantive research function of HEIs.

Also, institutional operations boost community extension by articulating internal management with the social commitment of HEIs. Thus, community extension provides spaces to develop international mobility programs, community immersions, and access to transformative experiences for students (Kumpoh et al., 2021). Likewise, integrating SDGs into the operational management of university campuses, investment in infrastructure, and operational strategic planning translate into a greater number of projects involving the community (Sribanasarn et al., 2025).

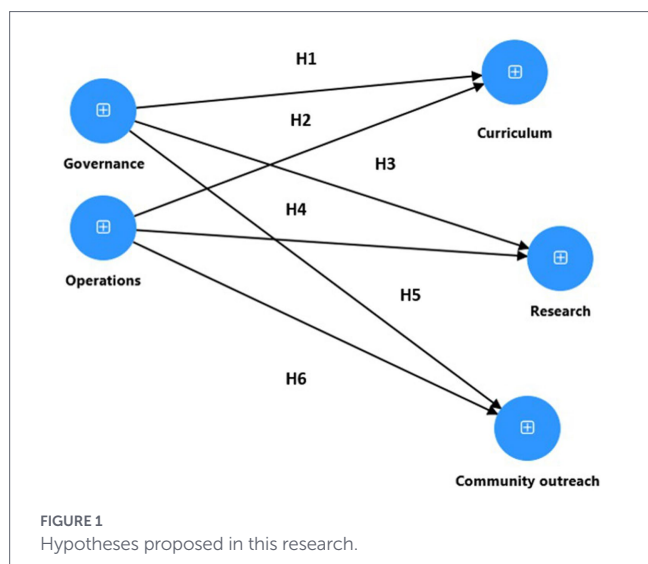
In this same line, the redesign of campus operations toward the adoption of circular economies strengthens interaction with different local actors and promotes shared benefits (Oldham et al., 2021). This includes alleviating and searching solutions to problems of vulnerable populations (De Iorio et al., 2022). Thus, it is proposed as a sixth hypothesis:

H6: Operations positively impact community extension activities in HEIs.

Hypotheses proposed in the present study can be seen in Figure 1.

Although previous studies have demonstrated that governance and campus management are key factors in the implementation of university sustainability, the literature still reveals significant gaps in understanding how governance and campus management actions are operationally articulated with the substantive missions to achieve sustainability objectives in the education of future professionals (Kioupi and Voulvoulis, 2022). Most existing research on university sustainability focuses on infrastructure, regulatory frameworks, strategic plans, or reporting and accountability mechanisms, thereby framing sustainability achievement primarily as an organizational endeavor. Such an approach overlooks the dynamic processes through which resources and capabilities are integrated to enable the education of future professionals, namely through teaching activities, research, and community engagement (Hamadi and El-Den, 2024; Lopes et al., 2023).

Accordingly, the present theoretical framework extends this academic debate by integrating governance actions and campus management within a single explanatory context that addresses the



performance of the university’s substantive missions in relation to sustainability objectives (Mendoza-Villafaina and López-Mosquera, 2024). From this perspective, the campus is conceived not only as a physical asset but, as a hidden curriculum, as a pedagogical environment that requires governance to be redefined not merely as a set of static principles and regulations, but as an expression of institutional leadership capacity to articulate and make visible the achievement of sustainability through the substantive missions (Ramakrishna, 2021).

Thus, this study seeks to make a theoretical contribution by clarifying the organizational mechanisms through which institutional strategies aimed at achieving sustainability become manifest in the university’s substantive missions (Castro Gómez et al., 2025). By focusing on the operational processes of governance and campus management, together with the processes underpinning teaching, research, and community engagement, the study contributes to a more integrated understanding of university sustainability implementation, in which the structural and strategic elements of the institution are inseparable from the performance of its core missions.

3 Methodology

To establish the construct and its dimensions, a sequential mixed methodology was employed. It integrates two phases: qualitative and quantitative. In the first phase, the main theoretical contributions on university sustainability and teaching were compiled. The texts were extracted from the Scopus indexer with a time range from 2014 to 2023 using the following search equation:

$$\left(\left(\text{“Sustainability” OR “education for sustainable development”} \right) \text{AND} \left(\text{“university” OR “college” OR “school” OR “higher education”} \right) \right)$$

The search was carried out using the Citation Pearl Growing technique to detect relevant literature. Data was then processed in the Vos Viewer software version 1.6.19 to identify connections and indicators of occurrence. Results were observed, selected, evaluated, and compiled following the PRISMA 2020 method (Page et al., 2021). Forty-five records

were selected once the title, summary, introduction, methods, findings, discussions, and thematic relevance were analyzed (Figure 2).

Subsequently, the dimensions and indicators with the greatest global and cultural relevance were detected. Also, an expert review and a pilot test were carried out. The survey evaluated the constructs with a seven-point Likert scale from 1 (totally disagree) to 7 (totally agree). Data were analyzed by exploratory and confirmatory factor analysis. Subsequently, hypothetical relationships were validated by SEM modeling with the Adjusted PLS technique to ensure the quality and robustness of the analysis using SmartPLS software 4.1.1.4.

3.1 Sample

The perception study was carried out in 6 Colombian universities certified with high quality accreditation. This is granted by the Colombian Ministry of Education to institutions that have demonstrated excellent management in academic operational and sustainability matters. Likewise, they are among the higher education institutions with the greatest academic prestige in the region and the greatest acceptance in the business field. Thus, the survey was applied to 636 teachers from various faculties and located at various position rankings (see Table 2). Although the Partial Least Squares technique does not require a large number of samples, the suggestion to address a robust sample has been followed to guarantee the quality of the observations and data of subsequent analysis (Hair et al., 2014). It is noteworthy that this research complies with ethical guidelines approved by the Ethics Committee of the universities that support it. Likewise, participants gave their informed consent before participating. Confidentiality and anonymity were guaranteed throughout the investigation process. Secondary data sources are appropriately cited to ensure academic integrity.

3.2 Construction of measuring instruments

For the university government independent variable, the aspects proposed Rodríguez-Aceves et al., 2024 on the management and direction of universities were considered. The study of Niedlich et al. (2020) was considered for issues related to the inclusion of sustainability in the mission, vision, values, and strategic statements of the institution. For the second independent variable, sustainable management of the campus, the proposal of Amaral et al. (2020) regarding the management of intelligent infrastructure, recycling, renewable energies and waste management was considered. In addition, Pereira Ribeiro et al. (2021) and Wang et al. (2022) contributed to the themes of green spaces, biodiversity and inclusion.

To measure the inclusion of sustainability in teaching and lifelong learning activities in sustainability, the proposal of Ramakrishna (2021) was followed. Also, Okanović et al. (2021) contributed the items related to curriculum and classroom activities. The research dimension was developed based on Du et al. (2020) and Castro-Gómez et al. (2024) about academic publications, scientific research projects, and participation in city and company projects. The community extension was developed based on the contributions of Iskindirova et al. (2024).

4 Findings

After the suggested changes in the expert review due to lack of clarity and the pilot test, two items were eliminated: one from the

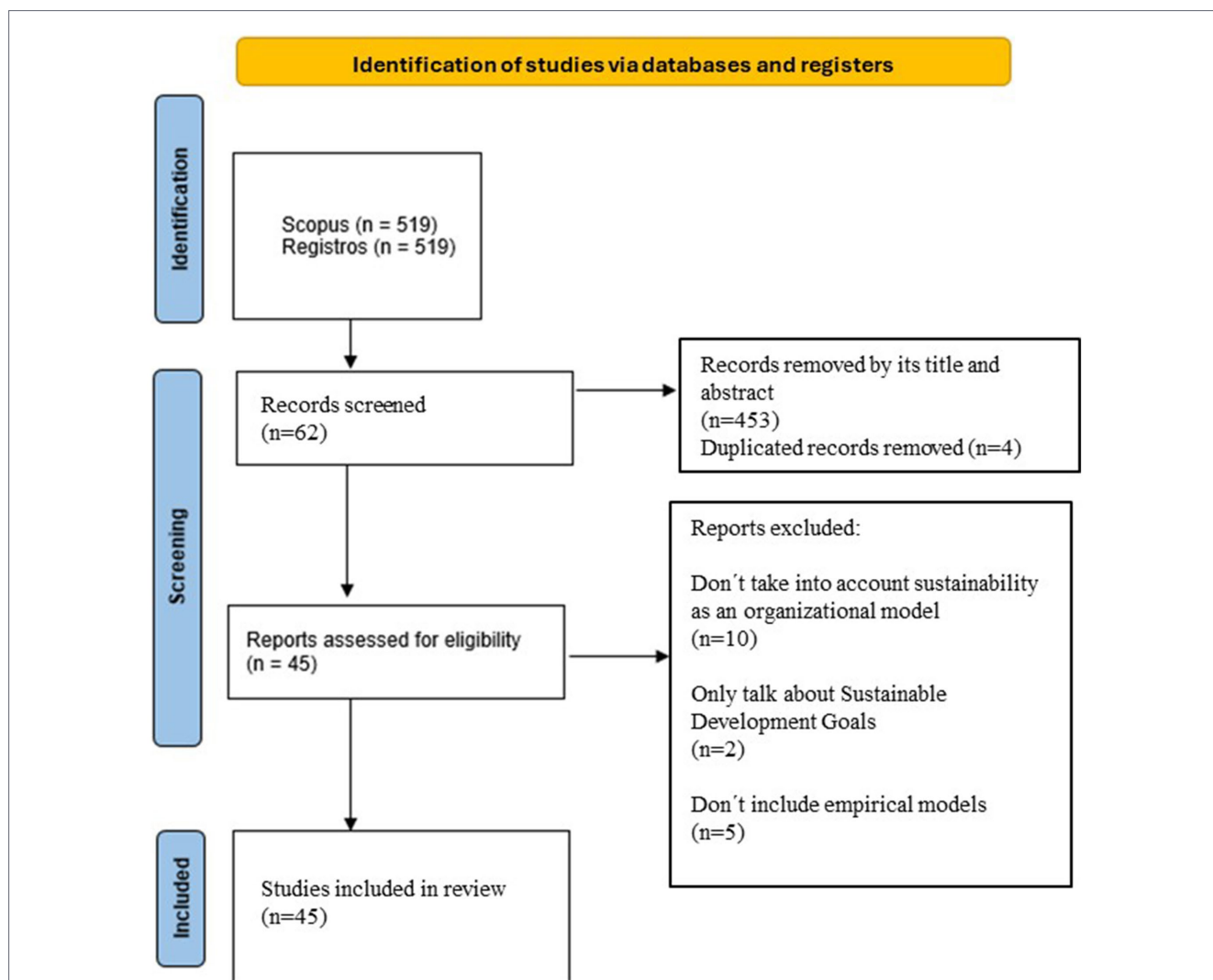


FIGURE 2 Selection of records with PRISMA 2020 method.

TABLE 2 Population sample from certified universities.

University	Total teachers from selected universities	Percentage	Date sample collected
University 1	879	17%	149
University 2	780	17%	133
University 3	572	15%	86
University 1	977	20%	195
University 2	271	17%	46
University 3	177	15%	27
Total	3,656	100%	636

curriculum dimension (CU 5) due to lack of clarity and theoretical relevance; and one item related to community extension classified at the time as OU 3 because of the same reasons. Thus, eight items were established for government, seven items for campus management, and four items each for curriculum, research, and extension.

4.1 Results of exploratory factor analysis

The “main axes” rotation was used with the smart PLS software, as it is ideal to estimate reflective models and part of the non-normality of the data. The sample size is validated exceeding the threshold of 0.60 established by Hair et al. (2014) with a KMO = 0.963 for government, 0.979 for field operations, and 0.912 for substantive functions. Bartlett’s sphericity presented a level of significance of 0.00; therefore, it is statistically significant in its exploratory phase. Cronbach’s alpha was higher in all cases at 0.791; thus, all variables are statistically significant, which is proof that they explain the latent variables by their common factors. Factorial loads for all items were greater than 0.845 except for GV7, which was 0.56. In both cases, the significance of the loads is strong (>0.70) (Hair et al., 2014). No factor that explains the model more than 50% was detected; therefore, there was no common method bias.

To assess the potential presence of common method bias, Harman’s single-factor test was conducted as an initial diagnostic, revealing that no single factor accounted for more than 50% of the total variance. This finding suggests that common method bias is unlikely to constitute a serious concern in the validation of the measurement items. Nevertheless, acknowledging the potential

limitations of this test when applied in isolation, full collinearity and variance inflation factors (VIFs) were examined, with all values remaining below the threshold of 3.3 recommended for this assessment (Kock, 2015; Hair et al., 2014). Furthermore, preventive ex ante procedural remedies were implemented to minimize the risk of bias, including expert judgment in the validation of the measurement instruments and the application of a pilot test. These procedures facilitated the verification of item clarity and relevance and contributed to reducing the likelihood of common method bias, in line with the recommendations of Podsakoff et al. (2003) and MacKenzie and Podsakoff (2012).

4.2 Validation of the structural model

Confirmatory factorial analysis validated factorial loads of the items greater than 0.850 for all items, except for GV 7, which was 0.504. This is still excellent value to support the permanence of the item. Cronbach's alpha is greater than 0.773, as well as the composite reliability values rho_c (greater than 0.811). This confirms the reliability and internal consistency of the instruments by exceeding the threshold of 0.70 recommended by Hair et al. (2014).

With the average variance extracted (AVE), the convergent validity of the models was estimated. For university government it was 0.87; for sustainable management of the campus, it was 0.93; and for the substantive functions, all were higher than 0.845. These values confirm convergent validity (>0.50) according to Hair et al. (2014). Therefore, the levels of explained variance fit the theoretical nature of the constructs. The values of the analysis of reliability, composite reliability, and convergent validity are presented in Table 3.

4.3 Discriminant validity

The discriminant validity of the model was verified with the Heterotrait-Monotrait (HTMT) ratio. All the correlations between the indicators were less than 0.85 and the confidence interval less than 1 (Hair et al., 2014). In this way, the discriminant validity of the model is corroborated. Therefore, it is shown that the constructs are properly differentiated conceptually and operationally as seen in Table 4.

4.4 Structural model

Results of the structural model estimated by robust PLS-SEM show significant effects on the proposed relationships between governance and substantive functions, and between campus management and mediated substantive functions. The structural model of the research is shown in Figure 3.

The model confirmed the direct effects of governments and sustainable management of the campus on the substantive functions with adequate route levels (>0.30) and significance ($p < 0.05$) as seen in Table 5. The bootstrapping resampling method was used with 5,000 samples to ensure the strength of the statistical significance. In this way, all the hypothetical relationships of the research were validated.

4.5 Explanatory capacity of endogenous constructs and other indicators of the structural model

The level of variance in the endogenous variables was analyzed with the R^2 and adjusted R^2 indicators, whose values ≥ 0.10 (acceptable) and ≥ 0.25 (good) indicate an adequate understanding of the constructs. The model shows an excellent predictive capacity with values ≥ 0.50 . The R^2 for the substantive functions was ≥ 0.782 and the adjusted $R^2 \geq 0.781$, which indicates that the model has a high explanatory capacity. Thus, more than 78% of the variance of the dependent variables are explained by the effects of the independent variables. As for the predictive validity of the model, the values were $Q^2 = 0.38$ for curriculum, 0.36 for research, and 0.35 for extension for the relationship between government and substantive functions. For the relationships between campus management and substantive functions, $Q^2 = 0.36$ for curriculum, 0.36 for research, and 0.35 for extension. In all cases, indicators showing robustness and high predictive capacity were presented. They exceeded the threshold of 0.35 for an optimal predictive validity result indicated by Hair et al. (2014).

The effect size in all cases was greater than 0.35, indicating that the independent variables optimally explain the endogenous constructs. It was validated that university government has large effects on the substantive functions $f^2 \geq 0.35$. Likewise, sustainable management of the campus presents an excellent explanatory capacity on the substantive functions with $f^2 \geq 0.35$. As for the overall fit of the model, the SRMR values = 0.037 well below the threshold of 0.08 suggested by Hair et al. (2014), indicates a good fit of the model. The NFI = 0.91 indicating that the model has an adequate global fit.

5 Discussion

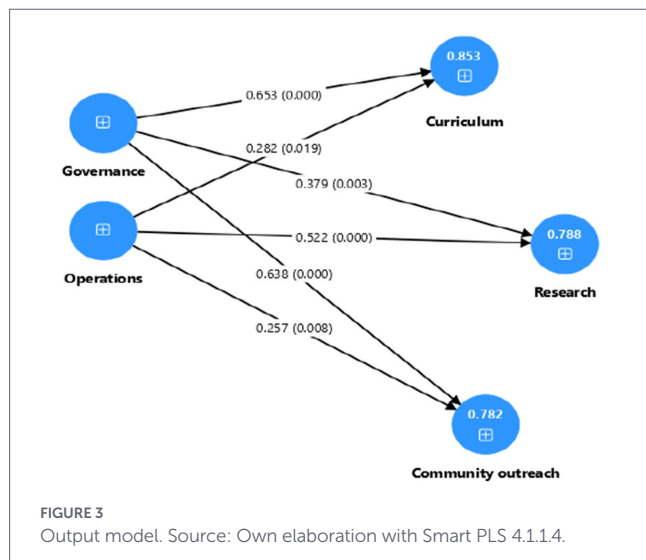
This research aims to analyze the influence of campus governance and management actions on the implementation of sustainability in teaching, research, and community extension activities from the teaching perspective. Results of this study confirmed that, from the teaching perspective, university management actions such as strategic

TABLE 3 Reliability, composite reliability, and convergent validity of the model.

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average extracted variance (AVE)
University government	0.88	0.89	0.90	0.87
Sustainable campus management	0.91	0.94	0.94	0.93
Curriculum	0.87	0.89	0.89	0.86
Research	0.91	0.92	0.94	0.90
Extension	0.93	0.94	0.95	0.91

TABLE 4 Discriminant validity with HTMT.

	Government	Campus	Curriculum	Research	Extension
Government	1				
Campus	0.501	1			
Curriculum	0.658	0.309	1		
Research	0.483	0.430	0.583	1	
Extension	0.601	0.506	0.730	0.622	1



planning, development plans, collegiate bodies, institutional statements, among others related to institutional leadership, favor and support the restructuring substantive functions to train professionals toward the achievement of Sustainable Development Goals (Veidemane, 2022). The campus is one of the main references of quality in the universities, considered as a hidden curriculum whose spaces, infrastructure, technology and other means of social integration, reinforce the learning and development of academic activities (Shishakly et al., 2024).

Thus, H1: *Governance does positively impact HEIs' curriculum* was validated. Results of the empirical analysis showed a strong impact of government on curriculum management for sustainability. The most important direct effects had a predictive relevance of $Q^2 = 0.38$, and a total explained variance (R^2) of 0.782. Therefore, governance can favor curricula restructuring, learning outcomes, and classroom activities toward achieving sustainable development goals. Empirical and theoretical findings are congruent because the routes drawn for institutional governance from strategic direction and fulfillment of objectives and goals of the strategic and development plans support and guarantee that approaching the curriculum from sustainability training is effective (Nguyen and Zuidwijk, 2025). Governance actions institutionally align the members of the organization to guarantee the transversality of sustainability in the curriculum. Therefore, university government guarantees the institutionalization of sustainability studies in the various subjects of the study plan, preventing this academic approach from being freely chosen by the teacher (Rodríguez-Aceves et al., 2024). University governance is one of the main drivers of sustainability, both as an organizational model and as a learning approach (Giraldo-Giraldo et al., 2025).

Likewise, the study corroborated H2: *Governance does positively impact the substantive research function in HEIs*. With route coefficients of 0.379, and a significance of $p = 0.003$, the positive effect of the government on research is validated. Although it presents a moderate but statistically significant effect size ($f^2 = 0.351$) compared to the actions of the curriculum, the impact that the government exerts on research from the teaching perspective corroborates the multifactorial nature of scientific production in universities (Yi et al., 2022). In particular, it is multifaceted regarding the resources and capacities of the institution to address social and environmental relevance that positively impact community needs (Rose and Sayed, 2024). Other aspects that affect the relationship between government and research are fundraising and the system of incentives and categorization of teachers to do research activities that promote sustainability projects (Li, 2025). These aspects depend on the initiatives of the university government and the relevance they give to research as a means of achieving sustainability goals (Leal Filho et al., 2018; Svetsky and Moravcik, 2025). Moreover, university government supports and validates the creation of networks, the existence of resources and decision-making that favor the production of new knowledge in terms of sustainability (Leal Filho et al., 2019; Kasalak et al., 2019). Likewise, the relationship between research and government leads to corporate reputation, by enabling the location of the institution in national and international rankings, promoting the legitimacy of the stakeholders.

H3: *Governance positively impacts community outreach activities in HEIs*. The validation of this hypothetical postulate with $\beta = 0.638$ route indicators and excellent significance levels $p = 0.000$, added to an optimal global adjustment SRMR = 0.037 and NFI = 0.91. Thus, the research found that community extension actions favor the integration of the community to the various spaces of concretion for sustainability projects (Nazneen et al., 2023). They also show that extension actions favor interaction with stakeholders and impact various territories with different socioeconomic and environmental needs (Fissi et al., 2021). Extension actions allow teachers to develop their training activities as living laboratories to favor transformation in terms of sustainability by encouraging the participation of multiple social and economic actors (Cai and Ahmad, 2023; Sribanasarn et al., 2025). This dimension of the substantive functions includes the participation of teachers in academic interinstitutional networks for the development of projects on sustainability, as well as the collaboration with industry and the public sector to promote joint projects in favor of socioeconomic and environmental wellbeing (Adams et al., 2018).

As for H4: *Operations do positively impact HEIs' curriculum*. The fact that campus is a hidden curriculum for sustainability training shows a positive and statistically significant effect on the curriculum ($\beta = 0.282$; $p < 0.019$). The explained variance R^2 of 0.767 and the predictive relevance $Q^2 = 0.41$, positively validate the relationships between the sustainable management of the campus and the curriculum. It was confirmed in the research that the actions of the campus

TABLE 5 Route coefficients of the structural model.

	Original sample (O)	Sample average (A)	Standard Deviation (STDEV)	Statistics t (O/STDEV)	p-values
Governance → Community extension	0.638	0.637	0.098	6.509	0.000
Governance → curriculum	0.653	0.658	0.120	5.446	0.000
Governance → research	0.379	0.376	0.130	2.929	0.003
Operations → community extension	0.257	0.259	0.096	2.672	0.008
Operations → curriculum	0.282	0.277	0.121	2.341	0.019
Operations → research	0.522	0.525	0.127	4.092	0.000

operated through intelligent infrastructure, technological implementation suitable for the classrooms, innovative laboratories and access to various digital platforms, guarantee the creation of novel pedagogies that promote training for sustainable development (Kioupi and Voulvoulis, 2022; Rosak-Szyrocka et al., 2022). The size, with an observed effect ($f^2 = 0.392$) confirms that the institution’s commitment to sustainable development is part of the campus management. This is fundamental to achieve sustainable behaviors in the members of the organization (Castro-Gómez et al., 2024; Kato and Arahata, 2025). It is noteworthy that the campus not only integrates activities of an ecological nature but also addresses elements of social sustainability such as physical and mental health, inclusion, diversity, gender equity and personal wellbeing, aspects demanded today in the field of social sustainability (Nazneen et al., 2023). This finding is strongly linked to teaching activities, since the teacher articulates the activities of the curriculum with the extra-classroom activities (Erjansola et al., 2021).

In turn, H5: *Operations positively impact the substantive research function in HEIs*. Research results show a positive and moderate impact of campus management ($\beta = 0.522$; $p = 0.000$), with an R^2 of 0.589 and a $Q^2 = 0.33$. This research confirmed that campus management acts operationally for the integration of sustainability in research activities, while it acts as logistical and infrastructure support for scientific creation activities. In addition, it is a strategic part of research activities because its physical and virtual spaces provide teachers with the necessary inputs for the creation of new knowledge in the field of sustainability (Hudler et al., 2021). With a moderate effect size ($f^2 = 0.345$), it is evident that the performance of the campus for the achievement of research in sustainability is multifactorial in nature, since it depends on other actors such as university government, funding policies, available infrastructure, and teacher training in research (Amaral et al., 2020). On the other hand, research confirms the existing studies, according to which, the sustainable management of the campus favors the capacities and research resources for a relevant research activity. The efficient management of campus operations guarantees that teachers generate and use spaces to put into practice the knowledge and results obtained through research activities (Neupane, 2024). That is, when the institution guarantees physical infrastructure, teachers’ skills, access to financing sources, and incorporation of technologies for sustainability studies, suitable teaching teams consolidate to fulfill the mission of this substantive function (Pereira Ribeiro et al., 2021; Wang et al., 2022).

Finally, H6: *Operations positively impact community outreach activities in HEIs*. The structural model confirmed a strong effect of campus management on community extension ($\beta = 0.257$; $p < 0.008$). With an excellent explanatory capacity $R^2 = 0.704$ and a high predictive capacity $Q^2 = 0.36$, the study showed that campus management is one of the

determining aspects for the design and execution of community extension projects. This research also confirmed, theoretically, that community extension mixes welfare activities, protocols of agreements, and projects of public and business interest that open the campus to society. Thus, the third university mission focuses on achieving sustainability to the extent that there is an infrastructure that supports community integration (Donner et al., 2024; Wajid, 2025). In this way, the communities inside and outside the university will be able to protect and reduce the negative impacts on the environment that surrounds the campus by including their perspectives in the sustainability programs implemented by each HIE’s (Yetri et al., 2024).

Although both governance and campus management exert significant effects on the substantive missions, the empirical results reveal differences in the nature and magnitude of their influence on the endogenous variables, which justify their treatment as distinct constructs with differentiated effects. Governance exhibits stronger effects on academic activities and community engagement, indicating that its strategic role in institutional alignment enables the prioritization of an academic orientation aimed at education for sustainable development (Rose and Sayed, 2024). Moreover, these findings highlight governance’s fundamental role in ensuring institutional legitimacy and coherence in the implementation of sustainability policies within academic performance (Neupane, 2024; Wang et al., 2022). By contrast, campus management shows comparatively stronger effects on research activities, which is consistent with its operational function in providing infrastructure, resources, personnel, and other conditions required for the generation of new knowledge (Donner et al., 2024). The results suggest that governance primarily determines the direction and organizational intent to articulate sustainability with the university’s substantive missions, whereas campus management conditions the feasibility and materialization of this organizational intent (Yetri et al., 2024). Although the model reflects a close conceptual relationship between both constructs, it also supports their differentiated performance by demonstrating that they fulfill distinct roles in the processes of university sustainability implementation, with one operating at a strategic and managerial level and the other at a tactical and operational level.

5.1 Limitations and future recommendations

As main limitations, this study only addressed the institutional aspects of the campus and university government. This limits only two variables of the organizational management of universities for sustainability; thus, the study should be extended to other administrative aspects. Likewise, perspective is analyzed, thus limiting a general perception of all the interested parties of the organization. These are

fundamental aspects to evaluate university performance in terms of sustainability. Therefore, future research could incorporate variables such as sustainability reports and log files; analysis of strategic plans and development plans, and their relationship with sustainability; and participation of administrative staff in the achievement of sustainability goals.

5.2 Theoretical implications

As a main theoretical contribution, this study has shown that governance and management of the university campus are two strategic components that drive the application of sustainability goals to the substantive missions of the university. Therefore, as the main theoretical contribution, it was demonstrated that the management of the campus represents a cause for integrating sustainability into curriculum actions, research, and extension by providing the resources and capacities that allow including the academic community around sustainable development goals. The relationship between university government and the teaching perspective was also verified as the main support around sustainable development goals. The novelty of the study lies in addressing the campus, concomitantly with the university government, as the cause of a sustainable approach to the missionary functions of the university. Thus, this study contributes theoretically to rethinking the understanding of university sustainability, which integrates organizational and academic staff capacities into a single operational framework. The campus is not conceived as a set of physical elements but as a pedagogical and organizational force thanks to which governance for sustainability becomes tangible in substantive functions.

5.3 Management implications

For the management of the university toward the achievement of the Sustainable Development Goals, it is suggested to incorporate campus management as a strategic element that enables integrating sustainability training into each project of the substantive mission. Furthermore, the study presents the empirical difference between governance and management in the field, which is supported by the variation observed in their path coefficients, effect sizes, and predictive irrelevance in substantive missions. This reinforces the need to theoretically and strategically address both constructs as independent but interrelated analytical units. Thus, directives and institutional managers must promote both financial and infrastructure resources, as well as the adequate application of policies and strategic objectives to gather all members of the organization around sustainability goals. Likewise, in the teaching activity, campus must be considered as a training space, whose pedagogical approach guarantees the experience in terms of sustainability to future professionals. Coherence between the strategic and operational formulation of the sustainability goals in universities is guaranteed whenever the main actors of the academic activity, teachers and students, are aligned and articulated with proposals raised by the managers in terms of sustainability.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

Ethics statement

The studies involving humans were approved by the Comité de ética del Tecnológico de Antioquia. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

JC-G: Formal analysis, Validation, Methodology, Supervision, Software, Conceptualization, Writing – original draft, Investigation. NM-G: Writing – review & editing, Visualization, Data curation, Project administration, Validation. CZ-M: Conceptualization, Formal analysis, Writing – review & editing, Investigation, Supervision, Funding acquisition. JS-T: Data curation, Validation, Writing – review & editing.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2026.1731067/full#supplementary-material>

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