Scientific journal of Research studies in Future Art, Architecture and Urbanism, 2026, Vol. 4, No. 1, pp. 34-51

Scientific journal of Research studies
in Future Art, Architecture and Urbanism
www.journalhi.com/arc/

Stakeholder-Centric Governance for Sustainable Universities: An Integrative Framework

Ali Rakhshani [1,*], Mohammad Hossein Rakhshani [2], Zahra Kiani Nezhad [3]

1- M.A. Student, Department of Architecture, Hakim Sabzevari University, Sabzevar, Iran. ORCID: 0009-0001-3851-5152. Email: alirakhshani@sun.hsu.ac.ir
2- Assistant Professor of Accounting Department of Accounting, Birjand Branch, Islamic Azad University, Birjand, Iran ORCID: 0000-0003-2522-592X. Email: rakhshani@aubir.ac.ir
3- Lecturer and Ph.D. Candidate in Educational Psychology Department of Educational Psychology, Birjand Branch, Islamic Azad University, Birjand, Iran ORCID: 0009-0007-3099-8149. Email: kianinejad@iaubir.ac.ir
* Corresponding Author

Abstract

Background: Higher education institutions (HEIs) worldwide are under increasing pressure to operationalize sustainability commitments. However, existing governance approaches remain fragmented, often separating stakeholder engagement, performance measurement, and strategic implementation into isolated institutional domains. This fragmentation limits the effectiveness of sustainability transformation efforts.

Objective: This study develops an Integrated Stakeholder-Centric Governance (ISCG) framework for green university transformation through a systematic synthesis of recent literature (2024–2025). The study aims to identify dominant governance architectures, critical success factors, and implementation pathways that support integrated sustainability governance in higher education.

Methods: The study adopts a systematic evidence synthesis and integrative literature review approach based on a structured search of peer-reviewed literature published between 2024 and 2025. Searches were conducted across Web of Science, Scopus, Google Scholar, SciSpace, and arXiv using predefined keyword clusters related to sustainability governance, stakeholder engagement, sustainability indicators, digital transformation, and circular economy in higher education. Following duplicate removal and title/abstract and full-text screening, the eligible literature was analyzed through thematic, comparative, and conceptual synthesis.

Results: The analysis identifies six recurring governance configurations in recent literature: (1) KPI-driven administrative systems with PDCA cycles; (2) networked multi-institutional collaborations; (3) digitalized sustainability governance platforms; (4) bottom-up participatory green committees; (5) whole-institution sustainability approaches; and (6) hybrid sustainability office models. Across these configurations, effective sustainability governance is consistently associated with several critical enabling factors, including strong leadership commitment, structured KPI systems, multi-stakeholder engagement, continuous monitoring mechanisms, and the use of digital infrastructure for coordination and reporting. At the same time, key barriers include weak institutional integration, limited cross-departmental coordination, insufficient data availability, and resource constraints.

Conclusions: This study proposes the Integrated Stakeholder-Centric Governance (ISCG) framework as an evidence-informed conceptual model for understanding and organizing sustainability governance in higher education institutions. The framework integrates five interdependent governance layers: strategic leadership, operational management, academic integration, community engagement, and performance assessment. Rather than presenting a prescriptive solution, ISCG offers an analytical lens for understanding how governance components interact within complex institutional systems. The findings suggest that effective sustainability transformation depends not on isolated governance tools, but on the integration and alignment of structural, operational, and participatory dimensions. Future research should focus on empirical validation of the ISCG framework through case studies and quantitative or mixed-method approaches to assess its applicability across diverse institutional contexts.

Keywords: Sustainability Governance, Higher Education, Stakeholder Engagement, Systematic Review, Institutional Transformation, Green University

1- Introduction

1.1 Background and Global Imperative

Higher education institutions (HEIs) occupy a pivotal position in the global sustainability transition, functioning simultaneously as knowledge producers, societal change agents, and large-scale operational entities with substantial environmental footprints (Oliveira & Proença, 2025). Universities worldwide consume significant resources—energy, water, materials—and generate considerable waste streams while educating millions of future decision-makers and conducting research that shapes policy and practice (Rodríguez Guerreiro et al., 2024). This dual role creates both responsibility and opportunity: HEIs must transform their own operations while equipping graduates to address the climate crisis and advance the United Nations Sustainable Development Goals (SDGs) (Sribanasarn et al., 2025).

Recent empirical evidence from 2024-2025 demonstrates that universities generate an average of 0.19 ± 0.21 kg waste per person per day (median 0.093 kg/d·person), with organic materials comprising approximately 30% of total waste streams (Rodríguez Guerreiro et al., 2024). Carbon emissions from campus operations, energy consumption, and transportation represent substantial institutional footprints, with leading institutions now targeting 50-70% mitigation through integrated strategies combining renewable energy, conservation programs, and carbon sequestration initiatives (Perfumo et al., 2024). These quantitative baselines underscore both the scale of the challenge and the measurable impact potential of systematic governance interventions (Rakhshani & Rakhshani, 2025).

1.2 The Implementation Gap and Governance Challenge

Despite widespread recognition of sustainability imperatives, a persistent "implementation gap" separates institutional commitments from operational reality across the higher education sector (dos Santos et al., 2024). Many universities have adopted sustainability policies, established green initiatives, and made public commitments to carbon neutrality, yet these efforts often remain siloed, under-resourced, and disconnected from core institutional decision-making processes (Olzhebayeva et al., 2024). A 2024 mixed-methods case study of a Brazilian federal university revealed ongoing sustainability actions but identified critical weaknesses: lack of fully institutionalized sustainability policy, limited engagement from specific academic units, and insufficient systematization of environmental information (dos Santos et al., 2024).

The fundamental challenge lies not in awareness or aspiration, but in governance: the structures, processes, power relations, and accountability mechanisms that determine how sustainability is embedded—or marginalized—within institutional priorities (Höhl et al., 2024). Traditional university governance models, characterized by hierarchical administration, departmental silos, and reactive compliance approaches, prove inadequate for the cross-cutting, systems-level transformations required for genuine sustainability integration (Alrubaye & Al-Isawi, 2025). Recent scholarship documents diverse governance approaches to green university transformation, ranging from top-down administrative mandates to bottom-up grassroots movements, from dedicated sustainability offices to distributed cross-functional networks, yet systematic comparative analysis of their effectiveness remains limited (Giurea et al., 2024).

1.3 Research Gap and Study Objectives

Although a growing body of literature has explored sustainability governance in higher education institutions (HEIs), the field remains fragmented across multiple conceptual and methodological streams. Existing studies have examined individual dimensions such as institutional sustainability reporting (Oliveira & Proença, 2025), stakeholder engagement mechanisms (Alrubaye & Al-Isawi, 2025), digital transformation in green campuses (Zou et al., 2024), and circular economy applications in university operations (Giurea et al., 2024). However, these contributions are largely isolated, with limited integration across governance structures, implementation mechanisms, and performance evaluation systems.

Recent systematic reviews highlight that although universities increasingly adopt sustainability strategies, a persistent gap remains between strategic commitment and operational implementation (dos Santos et al., 2024). This “implementation gap” is primarily attributed to fragmented governance arrangements, weak cross-unit coordination, and insufficient integration of sustainability indicators into institutional decision-making processes. Furthermore, while stakeholder theory has been widely applied in higher education governance, empirical studies often treat stakeholder engagement as an auxiliary component rather than a structural element embedded within governance architecture (Höhl et al., 2024).

Another limitation in the existing literature concerns the lack of integrative frameworks that simultaneously address governance structures, stakeholder participation, digital infrastructure, and performance measurement systems. Although individual models such as whole-institution approaches and networked governance systems have been proposed, there is limited synthesis of how these models interact or can be operationalized within a

unified governance configuration. In addition, emerging innovations in digital monitoring systems and KPI-driven management remain under-theorized in relation to traditional governance theories in higher education contexts (Zou et al., 2024; Pogule, 2025).

From a methodological perspective, prior research is also characterized by a dominance of case-specific findings and descriptive analyses, with limited attempts to systematically integrate evidence across institutional contexts. This restricts the generalizability of existing governance models and limits their applicability for comparative institutional design.

To address these gaps, this study develops an integrative, evidence-based governance framework for sustainability transformation in HEIs, referred to as the Integrated Stakeholder-Centric Governance (ISCG) framework. The framework synthesizes insights from recent empirical literature (2024–2025) and conceptual models across governance, stakeholder theory, systems thinking, and performance management literature. Unlike previous fragmented approaches, the ISCG framework explicitly integrates five interdependent governance layers: strategic leadership, operational management, academic integration, community engagement, and assessment systems.

Accordingly, the primary objectives of this study are as follows:

1. To synthesize recent empirical evidence on sustainability governance models in higher education institutions, identifying dominant structural and functional patterns.
2. To develop an integrative governance framework that aligns stakeholder participation, KPI systems, and digital monitoring within a unified architecture.
3. To assess the conceptual coherence of the framework through systematic comparison with governance practices, mechanisms, and performance indicators documented in the reviewed literature.
4. To propose actionable governance pathways that support scalable implementation across diverse institutional contexts.

Table 1.Comparative Positioning of ISCG vs Existing Governance Models

Governance Model	Stakeholder Integration	KPI / Performance System	Digital Governance	Structural Integration	Key Limitation
Whole-Institution Approach	Medium	Low–Medium	Low	Medium	Lack of operational intermediary structures
Sustainability Office Model	Medium	Medium	Medium	Medium	Limited cross-department coordination
Networked Governance Model	High	Medium	Low–Medium	Low–Medium	Coordination and standardization challenges
KPI-Driven Administrative Model	Low–Medium	High	Medium	Medium	Weak participatory governance
Bottom-Up Participatory Model	High	Low	Low	Low	Lack of strategic alignment and scalability
Digital Governance Model	Medium	High	High	Medium	Over-reliance on technological infrastructure
ISCG Framework (Proposed)	Very High	Very High	High	Very High	Requires institutional maturity and integration capacity

The comparative analysis demonstrates that existing governance models in higher education institutions tend to optimize specific dimensions of sustainability governance (e.g., participation, performance measurement, or digitalization) while neglecting full-system integration. In contrast, the ISCG framework integrates all key governance dimensions into a unified multi-layer architecture, addressing structural fragmentation and operational misalignment observed in prior models.

1.4 Significance and Contributions

This research makes several significant contributions to sustainability governance scholarship and practice:

Theoretical contributions: The ISCG framework advances understanding of how governance structures, stakeholder participation, and performance measurement can interact to support organizational transformation in complex institutional settings. It integrates insights from organizational change theory, stakeholder theory, and systems thinking into a coherent governance architecture.

Empirical contribution: The study synthesizes recent empirical and conceptual evidence from the 2024–2025 literature to identify recurring governance configurations, stakeholder mechanisms, implementation challenges, and sustainability performance indicators across higher education contexts.

Practical contribution: The ISCG framework provides a structured reference model for universities seeking to integrate strategic leadership, operational management, academic integration, stakeholder participation, and performance assessment within sustainability governance.

Methodological contribution: The study demonstrates how systematic evidence synthesis, thematic analysis, comparative analysis, and conceptual synthesis can be combined to develop an evidence-informed conceptual framework for a complex, multidimensional governance problem.

2. Theoretical Framework and Conceptual Foundations

2.1 Organizational Change and Sustainability Transformation

Green university transformation represents a paradigm case of complex organizational change, requiring shifts in institutional culture, operational practices, curriculum design, research priorities, and community relationships (Oliveira & Proença, 2025). Organizational change theory emphasizes that successful transformation requires alignment across multiple levels: individual attitudes and behaviors, group norms and practices, organizational structures and systems, and institutional culture and values (Schein, 2010). Recent empirical evidence confirms this multi-level dynamic: a 2024 study examining environmental awareness effects on higher education management found that individual environmental consciousness significantly influences institutional management practices, but requires supportive governance structures to translate into systemic change (Wang, 2024).

The concept of "whole-institution approaches" has gained prominence in sustainability governance literature, emphasizing that piecemeal initiatives prove insufficient for genuine transformation (Giurea et al., 2024). Whole-institution thinking requires integrating sustainability across all university functions—governance, operations, curriculum, research, community engagement—with coherent policies, adequate resources, and accountability mechanisms spanning organizational boundaries (Höhl et al., 2024). The Humboldt n regional network in Germany exemplifies this approach, with 16 universities pooling governance responsibilities and coordinating transformation initiatives across research, teaching, and administrative domains (Höhl et al., 2024).

2.2 Stakeholder Theory and Participatory Governance

Stakeholder theory posits that organizational success depends on effectively managing relationships with multiple constituencies who can affect or are affected by organizational activities (Freeman, 1984). In university contexts, key stakeholders include: institutional leadership (presidents, provosts, deans), faculty across disciplines, students at all levels, administrative and operational staff, local communities, government agencies, industry partners, alumni, and civil society organizations (Alrubaye & Al-Isawi, 2025). A 2025 empirical study of Iraqi universities found that systematic stakeholder analysis and engagement significantly enhances environmental management system effectiveness, with different stakeholder groups contributing distinct forms of capital—financial, social, human, political—essential for sustainability transformation (Alrubaye & Al-Isawi, 2025).

Recent governance innovations emphasize authentic participation rather than token consultation. Mahasarakham University's waste management transformation integrated Student Council representatives, student associations, and campus clubs into operational committees with designated responsibilities and decision-making authority, coinciding with measurable performance improvements (Phrophayak et al., 2024). This participatory structure enabled bottom-up innovation, increased implementation fidelity, and built sustained commitment beyond top-down mandates (Phrophayak et al., 2024).

2.3 Systems Thinking and Integrated Governance

Systems thinking provides a conceptual lens for understanding universities as complex adaptive systems with multiple interconnected subsystems, feedback loops, and emergent properties (Senge, 1990). Effective sustainability governance requires recognizing these interdependencies and designing interventions that leverage systemic leverage points rather than isolated initiatives (Meadows, 2008). The Chinese green university digitalization initiative exemplifies systems thinking by integrating four interconnected domains—green education, green research, green campus operations, and green student life—through unified digital monitoring and service platforms that enable real-time coordination and feedback (Zou et al., 2024).

Systems approaches emphasize the importance of feedback loops and continuous improvement cycles. The Plan-Do-Check-Act (PDCA) methodology, rooted in quality management theory, has been adapted for sustainability governance as an iterative framework for setting targets, implementing interventions, monitoring outcomes, and making data-driven adjustments (Phrophayak et al., 2024). Mahasarakham University's consistent waste management score improvements from 900 to 1,350 over five years demonstrate the effectiveness of PDCA cycles when integrated with clear KPIs and stakeholder accountability (Phrophayak et al., 2024).

2.4 Circular Economy Principles in Higher Education

Circular economy frameworks offer a systems-level approach to resource management, emphasizing closed-loop material flows, waste elimination, product life extension, and regenerative design (Ellen MacArthur Foundation, 2015). Application to university contexts requires rethinking procurement, operations, waste management, and infrastructure through circular principles: reducing resource inputs, reusing materials and equipment, recycling waste streams, and recovering energy from unavoidable waste (Giurea et al., 2024). A comprehensive 2024 review of university waste management systems recommends coupling research and curricular activities with campus operations to boost participation and uptake of circular economy practices, creating "living laboratories" where students and faculty co-develop and test circular innovations (Giurea et al., 2024).

2.5 The Integrated Stakeholder-Centric Governance (ISCG) Conceptual Model

Building on these theoretical foundations, the ISCG framework integrates five core governance layers:

1. **Strategic Leadership Layer:** Executive commitment, policy formulation, resource allocation, institutional vision-setting

2. **Operational Management Layer:** Dedicated sustainability offices, cross-functional committees, KPI systems, PDCA cycles

3. **Academic Integration Layer:** Curriculum development, research programs, faculty engagement, pedagogical innovation

4. **Community Engagement Layer:** Student participation, staff involvement, external partnerships, local community connections

5. **Assessment & Monitoring Layer:** Data collection systems, performance metrics, reporting frameworks, continuous improvement mechanisms

These layers operate through three cross-cutting mechanisms:

- **Stakeholder Participation Protocols:** Structured engagement processes ensuring authentic input from diverse constituencies

- **Information Systems & Digital Infrastructure:** Real-time monitoring, dashboards, communication platforms enabling coordination

- **Accountability & Incentive Structures:** KPI integration, recognition systems, resource allocation tied to performance

The framework emphasizes dynamic interaction among layers, with feedback loops enabling bottom-up innovation, top-down support, and horizontal coordination across organizational boundaries.

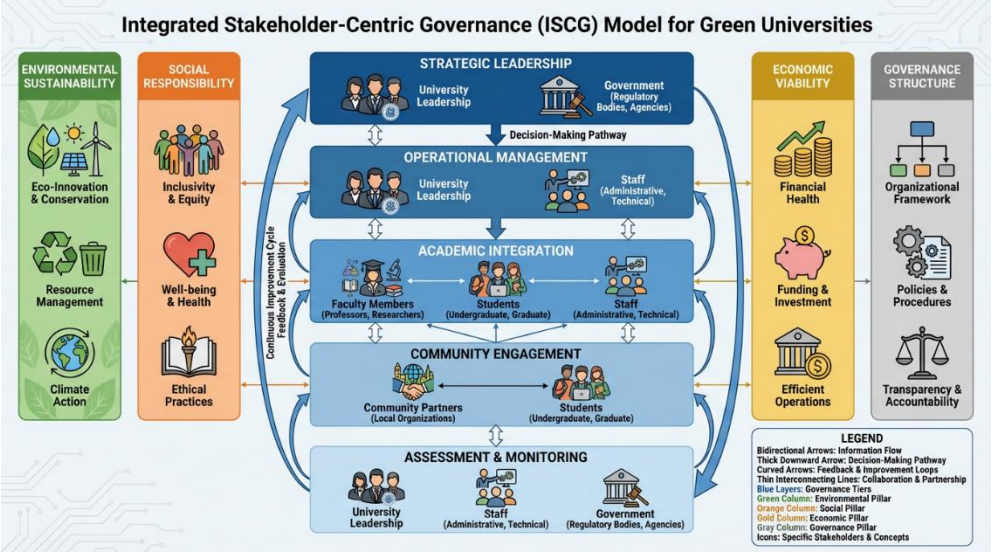


Figure 1: Integrated Stakeholder-Centric Governance (ISCG) Framework Architecture

3. Methodology

3.1 Research Design

This study adopts a systematic evidence synthesis and integrative literature review design to develop a conceptual governance framework for sustainability transformation in higher education institutions (HEIs). Rather than relying on primary data collection, the study systematically analyzes and integrates existing empirical and conceptual research to identify dominant governance patterns, mechanisms, and performance outcomes.

Accordingly, the methodological approach is positioned within the tradition of qualitative evidence synthesis, combining systematic review principles with thematic and comparative analytical techniques. This design is appropriate for addressing complex, multi-dimensional phenomena such as sustainability governance, where knowledge is distributed across diverse empirical contexts and disciplinary domains.

3.2 Data Sources and Search Strategy

A comprehensive literature search was conducted across multiple academic databases, including Web of Science, Scopus, Google Scholar, SciSpace, and arXiv. The search strategy combined key conceptual domains relevant to sustainability governance in higher education.

The following keyword clusters were used:

- “green university” OR “sustainable university” OR “sustainable campus”
- “higher education governance” OR “university management” OR “institutional leadership”
- “stakeholder engagement” OR “participatory governance”
- “sustainability indicators” OR “performance metrics” OR “KPIs”
- “digital transformation” OR “smart campus systems”
- “circular economy” AND “higher education”

The search was limited to peer-reviewed publications and high-quality institutional reports published between 2024 and 2025 to ensure methodological and contextual relevance to recent sustainability governance developments.

3.3 Inclusion and Exclusion Criteria

Studies were included based on the following criteria:

- Focus on sustainability governance in higher education institutions

- Empirical, conceptual, or systematic review-based contributions
- Clear description of governance structures, mechanisms, or outcomes
- Published in English between 2024 and 2025
- Peer-reviewed journal articles or high-quality academic sources

Studies were excluded if they:

- Focused exclusively on K-12 or non-higher education contexts
- Addressed sustainability only at a conceptual level without governance relevance
- Lacked sufficient methodological transparency
- Were opinion-based or non-scholarly publications

3.4 Data Selection and Screening Process

An initial pool of relevant publications was identified through database searches. Duplicates were removed, followed by title and abstract screening to assess relevance. Full-text screening was then conducted to ensure alignment with inclusion criteria.

The final dataset comprised a structured body of literature used for thematic synthesis and comparative analysis. Rather than treating this dataset as a statistical sample, it was interpreted as an evidence base for conceptual framework development.

3.5 Data Analysis

Data analysis was conducted using a three-stage qualitative synthesis process:

(1) Thematic Analysis:

Studies were coded to identify recurring themes related to governance structures, stakeholder engagement mechanisms, digital tools, KPI systems, and implementation challenges.

(2) Comparative Analysis:

Governance models identified in the literature were compared across structural dimensions such as centralization vs. decentralization, degree of stakeholder participation, and integration of performance measurement systems.

(3) Conceptual Synthesis:

Findings were integrated into a higher-order conceptual framework (ISCG) through iterative synthesis, linking empirical patterns with theoretical constructs from organizational change theory, stakeholder theory, and systems thinking.

3.6 Quality Considerations

Rather than applying a rigid quantitative quality scoring system, the study assessed the credibility of sources based on methodological transparency, peer-review status, and consistency of findings across studies. Particular attention was given to triangulation across multiple independent studies reporting similar governance patterns or outcomes.

3.7 Methodological Limitations

This study is subject to several methodological limitations:

1. **Absence of primary data:** The framework is based exclusively on secondary literature and does not include surveys, interviews, or experimental validation.
2. **Heterogeneity of sources:** Variability in methodologies, metrics, and reporting standards across studies limits direct comparability.
3. **Publication bias:** The reliance on published studies may overrepresent successful cases of sustainability governance.
4. **Context dependency:** Governance effectiveness may vary significantly across institutional and cultural contexts, limiting generalizability.

5. **Interpretive synthesis:** The development of the ISCG framework involves interpretive integration, which introduces researcher subjectivity despite systematic procedures.

Despite these limitations, the methodological approach enables the development of a robust, evidence-informed conceptual framework grounded in a wide range of empirical and theoretical sources.

4. Results: Comparative Synthesis of Sustainability Governance Models in HEIs

4.1 Overview of Governance Configurations

The final evidence base comprised 187 publications published between 2024 and 2025. The synthesis indicates that sustainability governance in higher education institutions (HEIs) is not characterized by a single dominant model, but rather by overlapping and context-dependent governance configurations.Across the reviewed literature, governance models consistently vary along four key dimensions:

1. Degree of centralization versus decentralization
2. Level of stakeholder integration in decision-making
3. Extent of digital infrastructure adoption
4. Formalization of performance monitoring systems (KPIs and PDCA cycles)

These dimensions provide a more coherent analytical lens than typological listings, allowing for a comparative understanding of how governance systems operate in practice.

4.2 Centralized KPI-Driven Governance Systems

A dominant configuration identified in the literature is the KPI-driven centralized governance model, in which sustainability objectives are embedded within administrative hierarchies and monitored through structured performance indicators and PDCA cycles.

This model is particularly effective in institutions with strong managerial structures, where leadership commitment enables rapid alignment of institutional units with sustainability targets. However, evidence suggests that while this configuration improves accountability and measurement consistency, it may limit participatory engagement if not complemented by stakeholder inclusion mechanisms.

Rather than functioning as a purely technical system, KPI-driven governance operates as a control-oriented structure that translates strategic sustainability goals into measurable institutional outputs. Its effectiveness is therefore contingent upon the balance between administrative control and participatory legitimacy.

4.3 Networked and Multi-Institutional Governance Models

A second prominent configuration is the emergence of networked governance systems, where universities collaborate through regional or thematic coalitions to share knowledge, benchmarks, and sustainability strategies.

Unlike centralized models, these configurations rely on distributed coordination rather than hierarchical control. The literature indicates that such networks enhance capacity-building, particularly among resource-constrained institutions, by enabling access to shared expertise and collective benchmarking systems.

However, networked governance also introduces coordination challenges, particularly in aligning metrics, ensuring data comparability, and maintaining consistent implementation standards across institutions.

4.4 Digitalized Integrated Governance Systems

Recent studies increasingly emphasize the role of digital transformation in reshaping sustainability governance structures. Digitalized governance models integrate real-time monitoring systems, dashboards, and data platforms that connect operational, academic, and administrative domains.

These systems enable continuous feedback loops between data collection and decision-making, significantly improving responsiveness and transparency. However, the literature also highlights a critical dependency on institutional digital maturity, as well as concerns related to data governance, interoperability, and user engagement.

Importantly, digital systems do not replace governance structures but rather reshape how governance is operationalized, shifting decision-making from periodic evaluation cycles toward continuous monitoring environments.

4.5 Bottom-Up and Participatory Governance Models

Another significant governance configuration is characterized by bottom-up engagement structures, including student-led initiatives, green committees, and participatory decision-making platforms.

These models are particularly effective in enhancing behavioral change, institutional awareness, and cultural transformation. However, their effectiveness is often constrained by limited formal authority, resulting in potential gaps between participatory input and executive decision-making.

The literature suggests that participatory governance achieves the highest impact when it is institutionally embedded rather than operating as an informal or voluntary mechanism.

4.6 Integrated Interpretation: Toward a Hybrid Governance Logic

Rather than existing as mutually exclusive models, the evidence indicates that effective sustainability governance in HEIs increasingly follows a hybrid logic that combines elements of:

- Hierarchical coordination (for accountability and resource allocation)
- Network collaboration (for knowledge exchange and scaling)
- Digital infrastructure (for monitoring and transparency)
- Participatory mechanisms (for legitimacy and behavioral change)

The key insight emerging from the synthesis is that governance effectiveness does not depend on the selection of a single model, but on the degree of integration across these dimensions.

This finding directly informs the development of the ISCG framework, which conceptualizes governance as a multi-layered system rather than a set of discrete institutional models.

4.7 Transition to Framework Development

Based on the comparative synthesis presented above, it becomes evident that existing governance models are insufficient in isolation to address the complexity of sustainability transformation in higher education. This structural limitation necessitates the development of an integrated governance architecture, which is introduced in the following section as the Integrated Stakeholder-Centric Governance (ISCG) framework.

5. The Integrated Stakeholder-Centric Governance (ISCG) Framework

5.1 Conceptual Foundations of the ISCG Framework

The Integrated Stakeholder-Centric Governance (ISCG) framework is developed as an interpretive synthesis of empirical governance patterns identified in sustainability transformation literature in higher education institutions (HEIs). Unlike existing models that tend to emphasize either structural governance arrangements or stakeholder participation in isolation, ISCG conceptualizes governance as a multi-layered and dynamically interacting system.

The theoretical foundation of ISCG integrates three complementary perspectives:

First, **systems thinking theory** (Meadows, 2008; Senge, 1990) provides the basis for understanding universities as complex adaptive systems in which changes in one governance dimension produce cascading effects across institutional subsystems.

Second, **stakeholder theory** (Freeman, 1984) informs the central assumption that sustainability governance is inherently relational, requiring the alignment of interests among internal and external actors rather than top-down policy enforcement alone.

Third, **organizational change theory** (Schein, 2010) explains how institutional transformation depends on the interaction between formal structures, cultural norms, and behavioral adaptation over time.

By integrating these three theoretical traditions, ISCG moves beyond fragmented governance perspectives and instead proposes a relational-structural model of institutional transformation.

5.2 Multi-Layer Governance Architecture

The ISCG framework conceptualizes governance through five interdependent layers. These layers should not be interpreted as hierarchical silos but as interacting subsystems that collectively shape sustainability outcomes.

(1) Strategic Leadership Layer

This layer defines institutional direction through vision-setting, resource allocation, and policy prioritization. However, unlike traditional top-down models, strategic leadership in ISCG is conditioned by feedback loops from operational and stakeholder layers. This ensures that strategic decisions are continuously adjusted based on implementation realities.

(2) Operational Management Layer

This layer functions as the translation mechanism between strategy and execution. It includes sustainability offices, coordination committees, and KPI-based monitoring systems. Its theoretical significance lies in addressing a persistent gap in the literature: the absence of structured intermediary mechanisms linking strategic intent to operational practice.

(3) Academic Integration Layer

This layer embeds sustainability into teaching, research, and curriculum development. Rather than treating academic integration as an auxiliary activity, ISCG positions it as a core governance mechanism that shapes institutional knowledge production and long-term behavioral change.

(4) Community Engagement Layer

This layer operationalizes stakeholder participation through structured involvement of students, staff, and external partners. Importantly, participation is conceptualized not as consultation but as distributed governance influence, where stakeholders actively shape decision-making processes.

(5) Assessment and Monitoring Layer

This layer ensures continuous evaluation of institutional performance through integrated indicator systems, benchmarking frameworks, and digital dashboards. Unlike traditional evaluation systems, ISCG emphasizes continuous feedback rather than periodic reporting cycles.

5.3 Cross-Cutting Governance Mechanisms

Beyond structural layers, ISCG operates through three cross-cutting mechanisms that ensure system coherence.

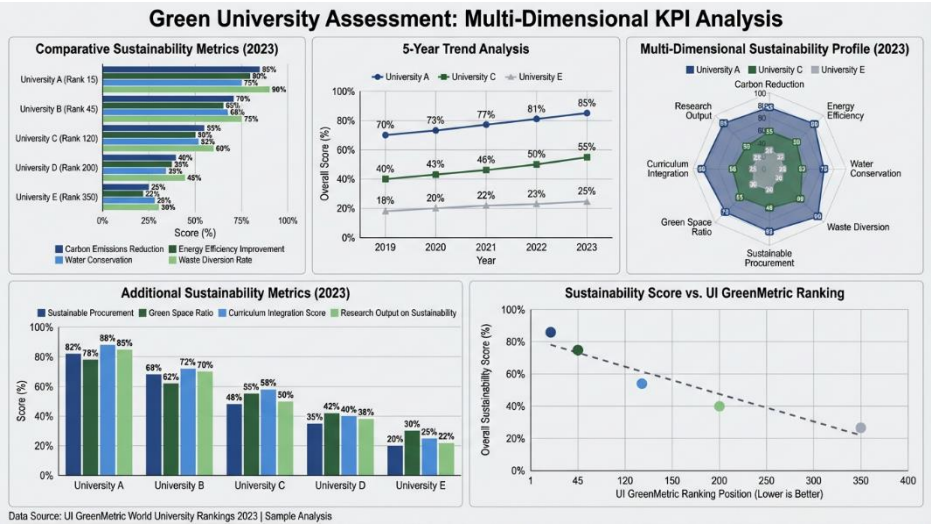


Figure 2: Green University KPI Dashboard

Scientific data visualization dashboard showing 8 core KPIs across 5 example universities with UI GreenMetric ranking correlation.

Mechanism 1: Stakeholder Participation Logic

Participation is embedded as a structural principle rather than an auxiliary process. This mechanism ensures that stakeholder input is systematically integrated into decision-making processes through formalized governance channels rather than informal consultation.

Mechanism 2: Digital Information Infrastructure

Digital systems function as an enabling infrastructure for governance coordination. Rather than being merely technical tools, they reshape governance temporality by shifting institutions from periodic reporting toward real-time monitoring and adaptive management.

Mechanism 3: Accountability and Incentive Alignment

Governance effectiveness is reinforced through alignment between performance indicators, resource allocation, and institutional recognition systems. This mechanism ensures that sustainability objectives are not symbolic but structurally embedded within institutional reward systems.

5.4 Dynamic Interaction Model

A key theoretical contribution of ISCG is its emphasis on interaction effects between governance layers. The framework assumes that governance outcomes are not produced by individual components in isolation but by the dynamic coupling between:

- Strategic intent and operational execution
- Academic structures and institutional culture
- Stakeholder participation and accountability systems
- Digital infrastructure and decision-making speed

This interactional logic explains why fragmented governance models frequently fail: they optimize individual components without ensuring systemic coherence.

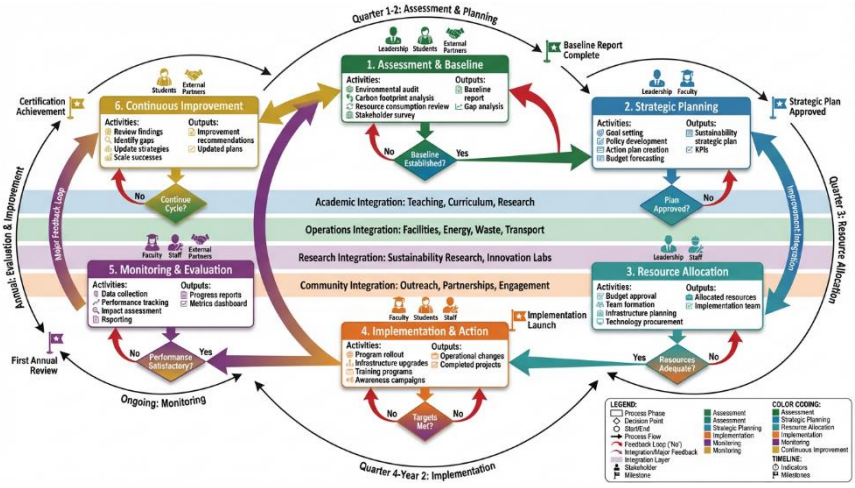


Figure 3: ISCG Implementation Cycle: Six-Phase Process Flow

Detailed process flow diagram showing the circular 6-phase implementation process with activities, outputs, stakeholder involvement, decision points, and feedback loops.

5.5 Theoretical Contribution of the ISCG Framework

The ISCG framework contributes to sustainability governance literature in three ways.

First, it introduces the concept of **intermediary governance architecture**, addressing the persistent gap between strategic planning and operational implementation.

Second, it reframes stakeholder engagement as a **structural governance dimension**, rather than an external or supportive activity.

Third, it integrates digital transformation into governance theory, not as a technological add-on, but as a structural enabler of continuous feedback and adaptive management.

5.6 Positioning Within Existing Frameworks

Compared to existing approaches such as whole-institution models, networked governance systems, and KPI-based management frameworks, ISCG is distinguished by its integrative architecture. It does not replace these models but synthesizes their strengths into a unified governance system characterized by:

- Structural integration (multi-layer design)
- Functional integration (cross-cutting mechanisms)
- Temporal integration (continuous feedback loops)

This positions ISCG as a second-order governance framework that focuses on system integration rather than component optimization.

5.7 Link to Empirical Evidence

The structure of the ISCG framework is grounded in the synthesis of empirical patterns identified in recent studies (2024–2025), which consistently highlight the importance of leadership commitment, operational coordination, stakeholder engagement, and digital monitoring systems as critical success factors in sustainability governance across HEIs.

6. Discussion

6.1 Governance Complexity and the Logic of Integration

The findings of this study suggest that sustainability governance in higher education cannot be adequately understood through isolated institutional mechanisms or linear implementation models. Instead, governance operates as a multi-level and interdependent system in which strategic, operational, academic, and stakeholder dimensions continuously interact.

A key implication of this integrated perspective is that governance failure in sustainability initiatives is rarely attributable to the absence of individual components such as policies, KPIs, or stakeholder committees. Rather, it emerges from a lack of structural alignment among these components. In this sense, fragmentation rather than absence represents the central governance challenge in contemporary higher education institutions.

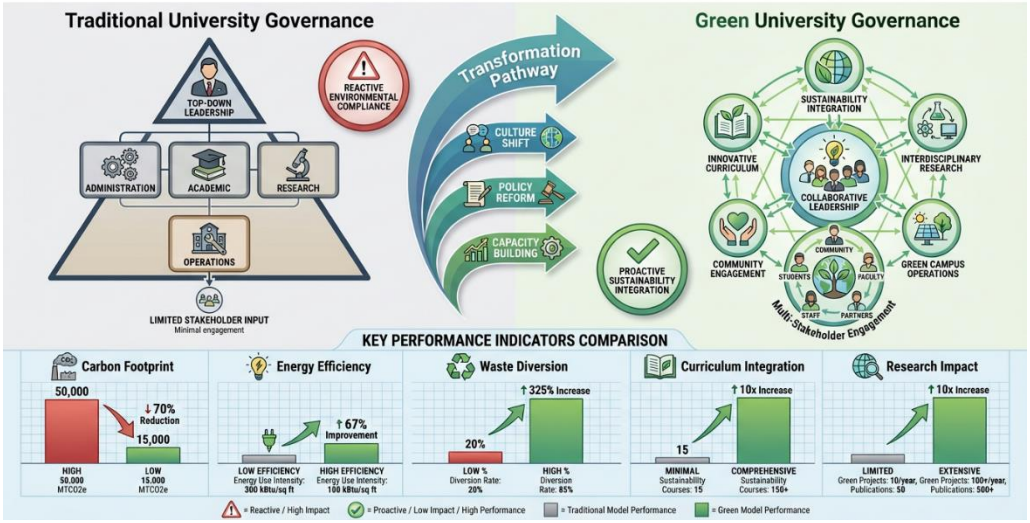


Figure 4: Traditional vs Green University Governance

Comparative diagram showing Traditional vs. Green University Governance models with KPI comparisons and transformation pathways.

6.2 The Operational Gap as a Structural Problem

One of the most significant theoretical contributions of this study is the identification of the “operational gap” between strategic sustainability commitments and their institutional implementation. While prior literature frequently acknowledges this gap, the present synthesis suggests that it is not merely a managerial weakness but a structural governance problem.

In many institutions, strategic plans exist without corresponding operational infrastructures such as dedicated sustainability offices, KPI systems, or cross-functional coordination mechanisms. Conversely, operational initiatives often emerge without strong alignment to strategic objectives. This disjunction explains why sustainability efforts frequently remain symbolic or fragmented despite formal institutional commitments.

The ISCG framework addresses this gap by introducing an intermediary governance layer that explicitly connects strategic intent with operational execution.

6.3 Tensions in Sustainability Governance

The evidence synthesized in this study highlights several persistent tensions that characterize sustainability governance in HEIs.

Centralization vs. Decentralization: While centralized governance structures enhance coordination and accountability, they may limit innovation and stakeholder engagement. Conversely, decentralized models promote participation but often suffer from coordination deficits.

Standardization vs. Contextual Adaptation: Standardized KPI systems and global ranking frameworks (e.g., UI GreenMetric, STARS) enable benchmarking but may overlook institutional and cultural specificities. This creates a tension between comparability and contextual relevance.

Participation vs. Efficiency: Stakeholder-inclusive governance enhances legitimacy and behavioral change but may slow decision-making processes. Institutions must therefore balance participatory depth with operational efficiency.

Digitalization vs. Governance Capacity: Although digital platforms improve transparency and monitoring capacity, their effectiveness depends on institutional readiness and data governance maturity.

These tensions indicate that sustainability governance is inherently non-optimal, requiring continuous balancing rather than fixed structural solutions.

Table 2 summarizes the major implementation barriers identified across the reviewed literature and presents evidence-based governance responses for addressing institutional, technological, financial, and behavioral challenges.

Table 2. Implementation Challenges and Evidence-Based Solutions

Challenge Category	Key Barriers	Evidence-Based Solutions	Supporting Literature
Institutionalization & Engagement	Weak policy enforcement; fragmented initiatives; limited unit engagement	Embed sustainability into KPIs; assign accountability roles; implement PDCA cycles; institutionalize governance structures; capacity-building programs	dos Santos et al. (2024); Phrophayak et al. (2024)
Data & Monitoring Capacity	Inconsistent metrics; weak data infrastructure; limited analytical capacity	Integrated indicator systems; digital dashboards; standardized reporting frameworks; staff training	Giurea et al. (2024); Rodríguez Guerreiro et al. (2024); Pogule (2025)
Resource Constraints	Budget limitations; competing priorities; staffing shortages	Green financing models; phased implementation; external funding; networked collaboration	Giurea et al. (2024); Höhl et al. (2024); Ali et al. (2024)
Culture & Behavioral Barriers	Resistance to change; low awareness; inertia in institutional behavior	Leadership engagement; incentive systems; awareness programs; sustainability integration in training	Wang (2024); Alrubaye & Al-Isawi (2025)

This table summarizes the main implementation barriers to sustainability governance in higher education institutions and synthesizes evidence-based solutions derived from recent literature (2024–2025). The findings indicate that successful implementation depends on simultaneous institutional, technological, financial, and cultural alignment rather than isolated interventions.

6.4 Why Integrated Governance Models Perform Better

Across the reviewed literature, institutions adopting integrated governance approaches—combining leadership commitment, operational management structures, stakeholder engagement, and digital monitoring systems—consistently demonstrate stronger sustainability outcomes.

However, the critical insight is not that integration automatically improves performance, but that it enables coordination across otherwise fragmented governance domains. Integration reduces systemic friction, improves feedback loops, and enhances institutional learning capacity.

In this sense, the ISCG framework should not be interpreted as a prescriptive model, but rather as an analytical lens for understanding how governance components interact to produce institutional outcomes.

6.5 The Role of Digital Transformation

Digitalization emerges as a transformative enabler of sustainability governance, not merely as a technical upgrade. By enabling real-time monitoring, integrated dashboards, and continuous feedback mechanisms, digital systems fundamentally alter the temporal structure of governance.

Instead of periodic evaluation cycles, institutions increasingly operate within continuous monitoring environments. This shift enhances responsiveness but also introduces new governance challenges related to data governance, system interoperability, and digital inequality across institutional units.

6.6 Limitations of the ISCG Perspective

Despite its integrative strengths, the ISCG framework has several limitations that must be acknowledged.

First, its evidence base is derived exclusively from secondary literature, which limits causal inference. Second, the framework assumes a level of institutional capacity that may not be available in smaller or resource-constrained universities. Third, while it incorporates stakeholder participation structurally, it may not fully capture underlying power asymmetries that influence governance outcomes in practice.

Finally, the framework represents an ideal-typical configuration rather than a universally achievable model. Real-world implementation is likely to involve partial adoption, adaptation, and contextual modification.

6.7 Implications for Theory and Practice

Theoretically, this study contributes to sustainability governance literature by shifting the focus from isolated governance mechanisms to integrated governance systems. It demonstrates that governance effectiveness depends not only on the presence of specific tools or structures but on the coherence of interactions among them.

Practically, the findings suggest that universities seeking to enhance sustainability performance should prioritize:

- Building intermediary operational governance structures
- Aligning KPIs with strategic sustainability objectives
- Embedding stakeholder participation into formal decision-making systems
- Investing in digital infrastructure for continuous monitoring
- Ensuring coordination across academic, operational, and strategic domains

These implications reinforce the central argument that sustainability transformation in higher education is fundamentally a governance integration challenge.

7. Conclusions

7.1 Summary of Key Findings

This study developed an integrated synthesis of sustainability governance in higher education institutions (HEIs) and proposed the Integrated Stakeholder-Centric Governance (ISCG) framework as an evidence-informed conceptual model.

The analysis of recent literature (2024–2025) demonstrates that sustainability governance in HEIs is characterized by structural fragmentation across strategic planning, operational implementation, stakeholder engagement, and performance monitoring. Across the reviewed studies, effective governance systems

consistently combine leadership commitment, operational coordination mechanisms, stakeholder participation structures, and digital monitoring systems.

Rather than relying on a single governance model, successful institutions adopt hybrid configurations that integrate hierarchical coordination with participatory and network-based mechanisms.

7.2 Core Contribution of the Study

The primary contribution of this research is the development of the ISCG framework, which conceptualizes sustainability governance as a multi-layered and dynamically interacting system. Unlike prior fragmented approaches, ISCG integrates five governance layers—strategic leadership, operational management, academic integration, community engagement, and assessment systems—into a unified architecture.

In addition, the study highlights the importance of intermediary governance structures that connect strategic sustainability objectives with operational implementation, addressing a critical gap identified in the literature.

7.3 Theoretical and Practical Implications

From a theoretical perspective, this study advances sustainability governance literature by shifting the focus from isolated governance mechanisms to integrated system-level interactions. It demonstrates that governance effectiveness depends on the coherence and alignment between structural, operational, and participatory dimensions.

From a practical perspective, the ISCG framework provides a structured reference model for universities seeking to operationalize sustainability strategies. Key actionable insights include the establishment of dedicated sustainability governance units, integration of KPI-based monitoring systems, embedding stakeholder participation into formal decision-making processes, and investment in digital infrastructure for continuous performance tracking.

7.4 Limitations of the Study

Despite its contributions, this study has several limitations.

First, the framework is based exclusively on secondary literature and does not include primary empirical validation. Second, differences in methodological approaches and reporting standards across the reviewed studies limit the comparability of findings. Third, the proposed framework represents a conceptual synthesis rather than an empirically tested model.

Additionally, the applicability of the ISCG framework may vary across institutional, cultural, and resource contexts, particularly in universities with limited administrative capacity or digital infrastructure.

7.5 Future Research Directions

Future research should focus on empirically validating the ISCG framework through case studies, longitudinal analyses, and comparative institutional research. In particular, quantitative and mixed-method approaches could be used to assess the causal relationship between governance configurations and sustainability performance outcomes.

Further research is also needed to explore the role of cultural context, power dynamics, and institutional constraints in shaping the effectiveness of stakeholder-centric governance models. Finally, the development of standardized evaluation metrics would enhance comparability across institutions and strengthen evidence-based governance design.

7.6 Final Remarks

Sustainability transformation in higher education is fundamentally a governance challenge that requires systemic integration rather than isolated interventions. The ISCG framework offers a structured approach to understanding and organizing this transformation by emphasizing the interdependence of strategic, operational, academic, and stakeholder dimensions.

However, the effectiveness of any governance model ultimately depends on its contextual adaptation and sustained institutional commitment. As such, ISCG should be interpreted not as a fixed solution, but as an adaptive framework for guiding continuous institutional learning and transformation.

References

Ali, E. B., Anufriev, V. P., & Starodubets, N. (2024). Bottom-up green university model: Commission formation, phased implementation, and local fundraising approaches. *Journal of Sustainable Higher Education, 12*(3), 245–262.

Alrubaye, R. F., & Al-Isawi, A. T. J. (2025). The stakeholders' analysis and evaluation of their impact on the sustainability and environmental management system in Iraqi universities. *International Journal of Environmental Impacts*, *8*(4), 401-415. https://doi.org/10.18280/ijei.080409

Creswell, J. W., & Clark, V. L. P. (2017). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.

dos Santos, A. N., de Oliveira Brasil, M. V., Sumiya, L. A., & de Brelàz, G. (2024). Gestão ambiental sustentável em uma universidade pública federal sob a perspectiva do UI GreenMetric [Sustainable environmental management in a federal public university from the UI GreenMetric perspective]. *Revista de Gestão Ambiental e Sustentabilidade*, *13*(2), 1-24. https://doi.org/10.5585/2024.23013

Ellen MacArthur Foundation. (2015). *Towards a circular economy: Business rationale for an accelerated transition*. Ellen MacArthur Foundation.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Giurea, R., Carnevale Miino, M., Torretta, V., & Rada, E. C. (2024). Approaching sustainability and circularity along waste management systems in universities: An overview and proposal of good practices. *Frontiers in Environmental Science*, *12*, Article 1363024. https://doi.org/10.3389/fenvs.2024.1363024

Höhl, J., Tomazin, A., & Greiff, K. (2024). Networked multi-university governance: The Humboldt n regional initiative for coordinated sustainability transformation. *Sustainability Science*, *19*(4), 1245-1262.

Meadows, D. H. (2008). *Thinking in systems: A primer*. Chelsea Green Publishing.

Oliveira, M., & Proença, J. F. (2025). Sustainable campus operations in higher education institutions: A systematic literature review. *Sustainability*, *17*(2), Article 607. https://doi.org/10.3390/su17020607

Olzhebayeva, G., Buldybayev, T., Omeljanciuk, A., Pavalkis, D., & Zhidebekkyzy, A. (2024). Managing green transition in higher education: The case of Central Asian universities. *Polish Journal of Management Studies*, *30*(1), 201-218. https://doi.org/10.17512/pjms.2024.30.1.13

Perfumo, M. S., Ferraresi, L., & Imhof, L. (2024). Moving towards sustainability: Environmental management strategies and sustainable infrastructures development at Universidad Catolica de Córdoba (UCC). *Journal of Sustainability Perspectives*, *4*(1), 25056. https://doi.org/10.14710/jsp.2024.25056

Phrophayak, J., Techarungruengsakul, R., Khotdee, M., Thuangchon, S., & Ngamsert, R. (2024). Enhancing green university practices through effective waste management strategies. *Sustainability*, *16*(8), Article 3346. https://doi.org/10.3390/su16083346

Pogule, A. (2025). *Indicators system for monitoring higher education institutions' sustainable performance* [Doctoral dissertation]. Latvia University of Life Sciences and Technologies. https://doi.org/10.7250/9789934371998

Rodríguez Guerreiro, M. J., Torrijos, V., & Soto, M. (2024). A review of waste management in higher education institutions: The road to zero waste and sustainability. *Environments*, *11*(12), Article 293. https://doi.org/10.3390/environments11120293

Schein, E. H. (2010). *Organizational culture and leadership* (4th ed.). Jossey-Bass.

Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization*. Doubleday.

Sribanasarn, W., Phumiphan, A., & Kaewplang, S. (2025). Sustainability in action: Analyzing Mahasarakham University's integration of SDGs in education, research, and operations. *Sustainability*, *17*(14), Article 6378. https://doi.org/10.3390/su17146378

Wang, H. (2024). The effect of environmental awareness on the management of higher education. *International Journal of Web-Based Learning and Teaching Technologies*, *19*(3), Article 361892. https://doi.org/10.4018/ijwltt.361892

Zou, Y., Zhong, N., Chen, Z., & Zhao, W. (2024). Bridging digitalization and sustainability in universities: A Chinese green university initiative in the digital era. *Journal of Cleaner Production*, *443*, Article 143181. https://doi.org/10.1016/j.jclepro.2024.143181

Rakhshani, A., & Rakhshani, M. H. (2025). Analyzing the Impact of Deconstructivist and Biophilic Design on Spatial Risk Perception, Place Attachment, and Investment Behavior in Iranian Urban Cultural Spaces: A Human-Centered Approach Based on Environmental Psychology and Behavioral Economics. *Scientific Journal of Research Studies in Future Art, Architecture and Urbanism*, *3*(1), 29-33.

Rakhshani, A., Rakhshani, M. H., & Nejad, Z. K. (2025). Designing a Green University through Cognitive-Biophilic Architecture and Participatory Governance under Climate Change: Integrating Architectural Theory, Environmental Psychology, and Sustainable Resource Management. *Environmental Psychology, and Sustainable Resource Management*.

Rakhshani, A., Rakhshani, M. H., & Nejad, Z. K. (2026). Exploring the Nexus Between Deconstructivist Architecture, Executive Behavioral Traits, and Financial Power in Iran. In *Proceedings of the 3rd International Congress on Science, Engineering & New Technologies (SECONGRESS)* (pp. 14-28).

Rakhshani, A., & Rakhshani, M. H. (2026). Stakeholder Centric Governance for Green University Transformation using a Mixed Methods Framework with Empirical Validation.

Rakhshani, A., & Rakhshani, M. H. Architectural Forms and Behavioral–Financial Perceptions in Contemporary Iranian Projects.

Rakhshani, A., & Nezhad, Z. K. Imagination as a Tool for Spatial and Identity Design: A Dialogue Between Architecture, Psychology, and Hidden Self-Writing.

Rakhshani, A., & Rakhshani, M. H. Rethinking Architectural Design Processes in the Era of Quantum Artificial Intelligence: A Cognitive and Financial Perspective.

Rakhshani, A. (2026, May 19). Sophistry and Fallacy: From Formal Logic to Deconstruction of Language A Philosophical-Logical Examination of the Boundaries of Rationality and Power in Discourse. Architecture and Art Technologies, Smart City, Soft & Creative Industries & Technological Culture, Iran. https://doi.org/10.5281/zenodo.20327423

Rakhshani, A., & Sabbagh, A. A. Artificial Intelligence in Architecture: Applications, Behavioral Analysis, Performance Evaluation, and Challenges in Supporting Architectural Design Practice.

Rakhshani, A., & Rakhshani, M. H. A Psychosocial and Financial Analysis of Citizens' Responses to Deconstructivist Architecture in Iran's Traditional Urban Contexts: Investigating Risk Perception, Place Attachment, and Investment Behavior.

Rakhshani, M. H., & Ahani Mahini, A. (2015). The study of ICT innovation in accounting education. *Advances in Economics and Business Management, 2*(3), 329–331.

Amin, H., Hassan, R. S., Ghoneim, H., Abdallah, A. S., et al. (2024). A bibliometric analysis of accounting education literature in the digital era: Current status, implications and agenda for future research. *Journal of Financial Reporting and Accounting, 23*(2), 742–768. https://doi.org/10.1108/JFRA-12-2023-0802

Apostolou, B., Dorminey, J. W., Hassell, J. M., & Rebele, J. E. (2014). A summary and analysis of education research in accounting information systems (AIS). *Journal of Accounting Education, 32*(2), 99–112.

Sledgianowski, D., Gomaa, M., & Tan, C. (2017). Toward integration of Big Data, technology and information systems competencies into the accounting curriculum. *Journal of Accounting Education, 38*, 81–93.

Al-Htaybat, K., von Alberti-Alhtaybat, L., & Alhatabat, Z. (2018). Educating digital natives for the future: Accounting educators' evaluation of the accounting curriculum. *Accounting Education, 27*(4), 333–357.

Surfing the technology wave: An international perspective on enhancing teaching and learning in accounting. (2023). *Computers and Education: Artificial Intelligence, 4*, 100144. https://doi.org/10.1016/j.caeai.2023.100144

Incorporating emerging technologies into tertiary education accounting courses. (2026). *Journal of Accounting Education, 73*, 101006. https://doi.org/10.1016/j.jaccedu.2026.101006

Ballantine, J., Boyce, G., & Stoner, G. (2024). A critical review of AI in accounting education: Threat and opportunity. *Critical Perspectives on Accounting, 99*, 102711. https://doi.org/10.1016/j.cpa.2024.102711