



AN EMPIRICAL STUDY ON SUSTAINABILITY IN HIGHER EDUCATION: CHALLENGES, INNOVATIONS, AND RESEARCH PROSPECTS.

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ABSTRACT

Sustainability is higher education's major problem due to expanding environmental, social, and economic instability. HEIs support sustainability through instruction, research, and governance. Lack of understanding, financing, infrastructure, and stakeholder engagement hamper sustainability programs. The study measures HEI sustainability by measuring student and faculty awareness, institutional commitment, sustainability issues, creative and sustainable practices, research possibilities, and academic involvement. The study is cross-sectional and quantitative. Higher education students and professors completed a 34-item 5-point Likert scale survey. Statisticians use SPSS and SEM. Participants have moderate to high sustainability awareness. Innovation and institutional commitment increased research and sustainability. Poor infrastructure, financial constraints, and change resistance impeded sustainability attempts. The study revealed that higher education sustainability required institutional support, stakeholder participation, and innovation. Research and interdisciplinarity boost institutional and social sustainability.

(Sustainable development, Higher education Institutions, Institutional commitment, innovative practices, academic engagement).

1. INTRODUCTION:

Higher education institutions come across various challenges for greater sustainability in transition with climate change and social inequalities. Higher education institutions should develop their vision beyond education, promoting research, innovation, and social impact with the perspective of sustainable development. This change involves altering curriculum, pedagogy, and activities by considering sustainability as a fundamental objective. Institutions are responsible for providing students with critical thinking abilities and ethical decision-making skills necessary for addressing 21st-century issues, particularly climate change and socioeconomic inequity. The COVID-19 pandemic has demanded the need for change in pedagogical methods

and involvement of stakeholder in order to meet significant research outcomes. Higher education institutions improve students to foster a fair and prosperous future by considering environmentally friendly practices, by showcasing the significance of sustainable development.

Thus, the objectives are:

1. To determine the level of awareness and commitment among Higher education institution students and educators on sustainability activities.
2. To explore the factors that make implementing sustainability initiatives in higher education institutions challenging.
3. Look into how new ideas for making things more sustainable may affect future research possibilities and sustainability outcomes at Higher education institution.

Research hypothesis:

Hypothesis	Statement
H1	Awareness on sustainability has a significant positive impact on Institutional commitment.
H2	Institutional commitment has a significant positive impact on research prospects.
H3	Research prospects have a significant positive impact on Future outcomes.
H4	Institutional Commitment serves as an intermediary between sustainability awareness and research prospects.
H5	Research prospects create a relationship between Institutional commitment and future outcomes.

2. LITERATURE REVIEW:

Higher education institutions (HEIs) are highly significant for promoting sustainability because they conduct research, train future leaders, and do activities which promote sustainable development (Leal Filho, 2023). Higher education institutions are gradually integrating sustainability to their courses, managing their resources better, and getting communities involved in line with the Sustainable Development Goals (SDGs). This partnership improves teaching, research, and community outreach (Leal Filho, 2023). To make stakeholders feel responsible for the environment, it is important to raise awareness and use interactive, project-based, and multidisciplinary learning methods to teach them about sustainable development. (Machado & Davim, 2023; Leal Filho et al., 2024). Higher education institutions can make lot of changes with the help of Dynamic curriculum and Pedagogy (Machado & Davim, 2023). The success of green campus programs and sustainability research depends on strong institutional support that is based on written rules and performance measures. Lozano (2023) says that unequal reporting and disconnected initiatives may make it harder to learn from each other and set benchmarks. Ongoing problems include a lack of money, bad infrastructure, uninterested stakeholders, and long-standing institutional cultures (Ramono Sari, 2023; Abo-Khalil, 2024). Digital platforms, renewable energy, and blended learning are all new ways to teach and use technology that can save money and improve education. Nonetheless, cost and equity are essential (Machado & Davim, 2023; Basheer et al., 2024). Finally, while there is limited research on faculty and student perspectives regarding institutional innovation in diverse contexts, interdisciplinary collaborations with external stakeholders may enhance the fusion of research and practical application (Leal Filho, 2024–25; Oliveira, 2025). This study aims to address that gap by employing stakeholder surveys to inform institutional governance and policy.

3. RESEARCH METHODOLOGY:

The present study employs a descriptive and analytical research method utilizing a quantitative methodology. It is empirical and aims to question sustainability practices in higher education institutions utilizing a survey of opinions of students and faculty as the primary participants. The study is cross-sectional, gathering data at a single point in time, and explanatory, centered on the causal relationships between sustainability awareness, institutional commitment, obstacles, innovations, and outcomes. A sample size is limited to 400 respondents in various Higher education institutions in kuvempu university was considered to achieve the requisite statistical test in SPSS and model stability for Structural Equation Modelling (SEM). The research employed stratified random sampling, dividing respondents into students and teachers, and subsequently conducting random selection within each group.

The tool was developed subsequent to a comprehensive examination of the literature, the establishment of sustainable frameworks in higher education, and expert validation. A 5-point Likert scale was utilized to evaluate six variables: Sustainability Awareness, Institutional Commitment, Sustainability Challenges, Sustainability Innovations, Research Prospects, and Sustainability Outcomes. We obtained secondary data from academic journals, publications, institutional reports, and policy documents about sustainability in higher education.

CONCEPTUAL FRAMEWORK:



4. DATA ANALYSIS AND RESULTS:

4.1. Descriptive statistics

SPSS was employed to generate descriptive statistics that summed up what respondents thought about variables linked to sustainability.

Table 1 Descriptive study of the variables:

Variable	Mean	Std dev	Interpretation
Sustainability Awareness	3.85	0.70	High
Institutional Commitment	3.74	0.81	Moderate to High
Research Prospects	3.89	0.75	High
Future outcomes	3.92	0.73	High
Overall Perception	3.70	0.84	Moderate

Interpretation:

The mean values exceeding 3.5 suggest that respondents predominantly concur with the significance and existence of sustainability practices in higher education institutions.

4.2. Reliability test :

Reliability test was conducted by using Cronbach's alpha to assess internal consistency among variables.

Table 2 : Reliability Test Of Variables :

Variable	No. of items	Cronbach's alpha
Sustainability Awareness	5	0.82
Institutional Commitment	5	0.79
Challenges and Innovation	5	0.81
Research Prospects	5	0.84
Future outcomes	5	0.86
Overall Perception	3	0.77

Interpretation :

All variables exhibit Cronbach's alpha values above 0.70, which confirms reliability satisfactory.

4.3. CORRELATION ANALYSIS:

Table 3: correlation analysis

Constructs	SA	IC	RP	FO
Sustainability Awareness (SA)	1.00			
Institutional Commitment (IC)	0.58	1.00		
Research Prospects (RP)	0.49	0.62	1.00	
Future outcomes (FO)	0.46	0.55	0.68	1.00

Interpretation:

All variables are positively correlated, supporting the framework and indicating sustainability for SEM analysis.

4.4. convergent validity:

Convergent validity is assessed through average variance extracted (AVE).

Table 4. convergent validity results:

Construct	CR	AVE
Sustainability Awareness	0.87	0.56
Institutional Commitment	0.85	0.53
Research Prospects	0.89	0.59
Outcomes & Future Directions	0.91	0.63

Interpretation :

All AVE values are above 0.50, confirming convergent validity.

4.5. DISCRIMINANT ANALYSIS:

Table 5. Discriminant validity (Fornell – Larcker)

Constructs	SA	IC	RP	OFD
SA	0.75			
IC	0.58	0.73		
RP	0.49	0.62	0.77	
OFD	0.46	0.55	0.68	0.79

Table 6. HTMT Values:

Constructs	SA-IC	IC-RP	RP-OFD
HTMT Value	0.71	0.78	0.82

Interpretation :

All HTMT values are below 0.85 , confirming discriminant validity.

4.6. CONFIRMATORY FACTOR ANALYSIS (CFA)

Table 7. Model Fit Indices :

Fit Index	Recommended Value	Obtained Value
χ^2/df	< 3.00	2.18
GFI	≥ 0.90	0.91
CFI	≥ 0.90	0.94
TLI	≥ 0.90	0.93
RMSEA	≤ 0.08	0.06

Interpretation:

The results indicate a **good model fit**, the measurement structure is validated.

4.7. Structural Equation Modeling (SEM) – AMOS.

Table 8. hypothesis testing results .

Hypothesis	Path	β	p-value	Result
H1	SA → IC	0.61	<0.001	Supported
H2	IC → RP	0.64	<0.001	Supported
H3	RP → OFD	0.71	<0.001	Supported

Interpretation:

All structural paths are positive and statistically significant, confirming H1–H3.

4.8. mediation analysis (AMOS)

Table 9. mediation results :

Relationship	Mediator	Effect Type	Result
SA → RP	Institutional Commitment	Partial Mediation	Supported
IC → OFD	Research Prospects	Partial Mediation	Supported

Interpretation:

The results confirm the mediating role of institutional commitment and research prospects, supporting H4 and H5.

Summary of Findings

Research involvement and sustainability awareness are essential for strengthening institutional commitment, hence boosting research opportunities. Furthermore, the mediating effects elucidate how sustainability promotes enduring institutional outcomes.

5. FINDINGS, SUGGESTIONS AND CONCLUSION:

Findings:

Individuals in higher education demonstrate a robust comprehension of sustainability, incorporating its principles into academic procedures; yet, communication with stakeholders need improvement. The institutional commitment to sustainability is moderate to high, supported by policies, although its implementation is inconsistent. Research illustrates that sustainability is essential for development, with institutional backing promoting research and participation from students and educators and resulting in improved outcomes. Sustainability strategies improve academic settings and institutional prestige while adapting for future challenges. Furthermore, institutional commitment impacts the relationship between sustainability awareness and research prospects, thus influencing overall outcomes.

Suggestions :

To improve sustainability education, curriculum frameworks must integrate principles of sustainability, reinforced by professional sustainability committees for policy implementation. Promoting multidisciplinary research, financing sustainability-focused projects, and engaging students in hands-on learning are essential. Institutions need to develop standardized assessment systems and obtain funding for sustainability research, while encouraging national sustainability rankings for higher education institutions.

Conclusion :

The research investigated sustainability practices in higher education, emphasizing that higher awareness levels alone are inadequate. Institutional commitment and research involvement are essential for transforming awareness into substantial academic and societal outcomes. Sustainability is characterized as a strategic endeavour requiring commitment, research commitment, and stakeholder engagement, which can enhance institutional performance, reputation, and social accountability.

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