

Integrating Sustainability in Indian Higher Education Institutions to Implement Agenda 2030: Analysis of Contributing Factors and Strategies

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Abstract

As torch bearers for progressive change, higher education institutions (HEIs) need to focus on embedding sustainability into their core strategic objective, to align education towards sustainable development of society. This research aims at identifying strategies to integrate sustainability in the core of Indian management HEIs. A systematic literature review was done to identify factors that influence sustainability in university practices and curriculum. The factors were used to create a SWOT flashcard questionnaire, through which top 50 Indian management institutes based on the National Institutional Ranking Framework (NIRF 2021) were surveyed. IFE and EFE matrices were then formulated to identify appropriate alternative strategies. Analysis of IFE and EFE found that HEIs need aggressive strategies to align their internal capabilities and skill sets to the external environment opportunities available. QSPM matrix concluded that aggressive strategies are most effective for Integrating sustainability into the learning process of HEIs along with suggestions for future.

Keywords: Higher Education Institutions, HEIs, sustainability, education, SWOT-QSPM Analysis, Systematic Literature Review.

1. Introduction

Higher education system in India is the third largest in the world. This is with respect to student intake next to China and the United States. Indian Higher Education institutions have seen a steep increase post-independence in terms of the number of universities and colleges. Despite this only three Indian universities i.e., IIT Mumbai, IIT Delhi and IISc Bangalore were included in QS World University Rankings, 2020 of top 200 universities. The challenges with the Higher Education system in India are galore. HEIs (Higher education institutions) are plagued with lack of employability, rote learning method, lack of Infrastructure, lack of well qualified faculty and many more, leading to the low quality of education.

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It is known that culture and social growth of a country is linked to the quality of education system which it is exposed to during higher education and post education. HEIs are torch bearers of progressive change. They curate the way a society thinks and operates. They are the backbone of a country. In order to create a sustainable future of peace, prosperity and equality our higher education institutions should focus on embedding sustainability into their strategic objective. We need to align education towards sustainable development of the society. This can be achieved by integrating higher education in India to social, technical, cultural, and economic issues of the country. There is a need to use education as a strategic tool to achieve Agenda 2030.

Higher education institutions (HEIs) and in collaboration with other stakeholders have been working together for the greening of campuses and curriculum across India. Despite all these efforts there is a lack of following a ‘Whole Institutional Approach’ or ‘System redesign’ when it comes to inclusion of environment and sustainability within the HEIs. We need a holistic approach rather than a piecemeal approach. Institutions selectively focus either on introducing new courses on environment and sustainability or setting up environmental management systems (Greening) or promoting advocacy/innovation. In the absence of a synergistic approach among the HEIs and the other stakeholders, it is difficult to assess or even piece together the impact of the efforts at a pan India level with regard to inclusion of environment and sustainability in HEIs. Moreover, there is no study or reports on the extent of work that has been done.

Understanding the urgency to integrate sustainability in HEIs in India, University Grants Commission (UGC) in 2020 proposed a framework for sustainable campus. The proposed framework will help the HEIs to lead by example. By not just restoring the surrounding landscape, but to think strategically and identify behaviours and practices which need to be addressed immediately, for instance food wastage in canteen, energy consumption, water consumption etc. Management education has evolved over the years. Integrating Sustainability practices and education into the learning process helps students understand how their decisions and actions affect the environment and society. It enables them to make informed decisions as managers of the future. Businesses have started looking beyond profitability now. It’s all about sustainability, business continuity and resilience. Sustainability integrated in the core of business schools make the students more mindful of its significance. It helps them to make more conscious and informed business decisions.

As a part of establishing “India Green University Network (IGUN)”, a stakeholder dialogue was conducted by TERI School of Advanced Studies and UNEP, India. The stakeholder dialogue was conducted on 17th September 2021 from 4pm-7pm in online mode. The Online Stakeholders’ Dialogue, for establishing the India Green University Network (IGUN), brought out several insights on the need for establishment of a green university network for India, the existing green practices in Higher Education Institutions (HEIs) in the country, and the challenges and potential solutions associated with it. The 52 participants were from diverse backgrounds which included policy makers, practitioners, faculty, and students. The deliberation during the dialogue were very enriching and fulfilling. The stakeholder dialogue helped us in identifying challenges and opportunities of HEIs in integrating sustainability in their core.

2. Research purpose and objectives:

The purpose of the study is to provide strategies to integrate sustainability practices in the core of higher education management institutes. This can be done by including sustainability in various dimensions such as curriculum, pedagogy, collaboration and university infrastructure. For the study we took the top 50 management institutions of India. These management institutions were selected on the basis of their NIRF 2021 ranking. The research was conducted in two parts. The first part included doing

bibliometric analysis from recent scientific publications to identify contributing factors that influence management HEIs sustainability performance. In the second part, a SWOT Flashcard was sent to 200 respondents which included faculty and administration staff from top 50 management HEIs. Responses help us identify strengths, weaknesses, opportunities and threats of these HEIs in incorporating sustainability practices and education in their core processes and approach. Alternative strategies were made using SWOT matrix. QSPM was also used in the process for strategy analysis and choice. The objectives of the research are as follows:

- (1) To identify the contributing factors influencing management higher education institutions sustainability performance.
- (2) To understand the challenges and opportunities of HEIs in implementing sustainability in their strategic objective.
- (3) To develop strategies for management HEIs to integrate sustainability in their core.

3. Systematic Literature Review of Sustainability in Higher Education Institution

3.1. Research Methodology

3.1.1. Systematic Literature Review

A systematic literature review is studied to understand comprehensively, the history and trends in a particular area. It helps in finding and extracting the exact information needed to understand a particular area. A systematic literature review will help analyse the factors, discussions and issues related to sustainability in institutions of higher education. It is a step-by-step process that is less prone to biases (Moher, Liberati, Tetzlaff, & Altman, 2009).

To incorporate the most recent trends of sustainability practices in higher education institutions, the study has taken a limited period of 2018 to 2021. In the last four years, education has seen various changes, especially due to the pandemic. This study has used the Web of Science Core collection database. Web of Science provides a vast corpus of multidisciplinary research. It also provides a detailed analysis on the citations and advanced keyword search that is helpful to its users. After the initial keyword search (n=6675), the inclusion and exclusion criteria were applied to find papers exactly related to the domain.

3.1.2. Eligibility criteria and Information Sources

The purpose of applying an inclusion and exclusion criteria is to refine the article search so that papers exactly related to the domain are extracted from the database. The articles are chosen based on the discipline, language, accessibility, year, organization, funding etc. The table 1 provides a glimpse of the exact inclusion and exclusion criteria along with the justification for its application. Despite the refinement, the authors admit that certain studies may get excluded.

Table 1: Inclusion – Exclusion Criteria for systematic literature review.

Criteria	Included	Excluded	Point of Reason
Subject Area	Education, Educational Research, Social Sciences Multidisciplinary	Core Science	For Precise papers on HEIs research
Timeline	2018 to 2021	Prior to 2018	Older data, lack of new trends and patterns

Journals	All	None	Comprehensive data
Document type	Research Articles	Review, Conference Proceedings, Book Review, Encyclopaedia and others	For Accurate depiction and analysis
Language	English	Others	Comprehending data
Access	Open	Non Open	For finding most accessible articles
Funding/ Sponsor	All	None	Comprehensive
Organisation	All	None	Comprehensive
Publishers	All	None	Comprehensive

3.1.3. Search Database Strategy

To thoroughly investigate the factors for sustainability in higher education institutions, a keyword search strategy was devised to incorporate papers exactly associated with this domain. The search was initiated on the Web of Science database with the phrase "Sustainability Higher education". The synonyms of "institutions" such as, "campus", "university" "green campus" was used to incorporate all such other papers related to this topic. This search was a TS Search, which means that titles, abstract and keywords were searched thoroughly which was represented in Table 2.

Table 2: Detailed Keyword Search

Terminologies searched (TS)	Number of Articles (Web of Science Core Collection)
"Sustainability Higher education" OR "Sustainable campus" OR "Green campus" OR "university" OR "institution"	6675
Final Result	6675

3.1.4. Data collection and screening

The data from the Web of Science collection was retrieved on 2nd March 2022. The PRISMA methodology was used as a reference to conduct the data collection. It is a step-by-step approach for researchers to conduct a systematic literature review. The methodology is extremely useful to avoid biases and non-relevant data collection (Moher et al., 2009) (Stevenson, Hartmeyer, & Bentsen, 2017). Through the stages of identification, screening, eligibility and inclusion, the researcher can refine and exclude non-relevant articles. After the keyword search (n=6675), the inclusion and exclusion criteria were applied. After applying criteria like "English", "Timeline 2018-2021", "Open Access" et al., the number of articles was refined (n=381). Around 6294 articles were excluded. The 381 articles were closely related to the topic of sustainability in higher education institutions. This was followed by the inclusion of educational research and exclusion of core science and technology papers. The list of papers was curated (n=142).

The last stage of data collection involved careful title and abstract screening to remove non-relevant papers. The final number of articles included in the study was 117. The process of data collection is represented in Figure 1, which was based on PRISMA methodology.

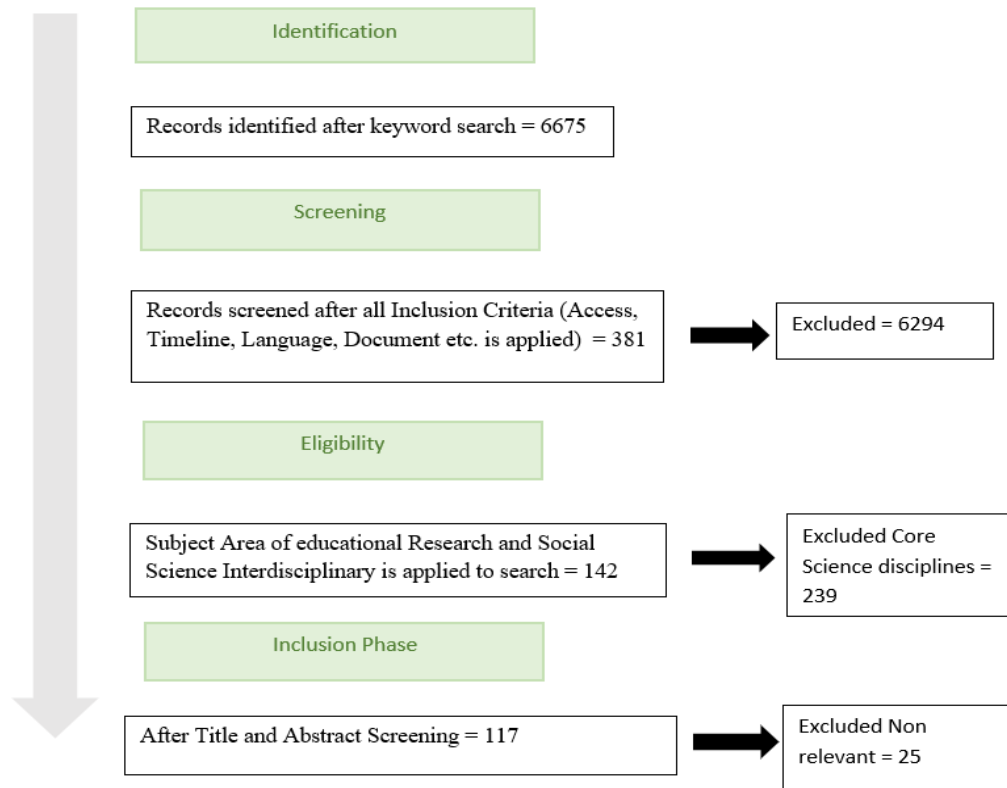


Figure 1: Data collection process of systematic literature review based on PRISMA Methodology (Moher et al., 2009)

3.1.5. Qualitative Content Analysis

The identification of factors for sustainability in higher education was done through bibliometric analysis. This type of analysis was adopted because, firstly, it helps in assessing the keywords being discussed in several papers related to sustainable educational research (Budihardjo, Ramadan, Putri, Wahyuningrum, & Muhammad, 2021). Secondly, bibliometric analysis summarises the journals and co-authorship links of the domain. This helps in collaboration. The keywords are analysed using the VOSviewer software. This software creates network and density visualisation maps (Guo et al., 2019). Co-occurring keywords in title and abstracts are extracted and clustered. Each cluster comprises keywords closely linked to each other. This is beneficial in identifying generic and specific factors associated with sustainability in higher education institutions (Budihardjo et al., 2021).

3.2. Results

3.2.1. Publication and Growth Trend

Prominent journals of research are listed in table 3. The journals "International Journal of Sustainability in Higher Education" have the most cited articles among the 117 papers. It has contributed to approximately 59% articles used in the study. These journals have produced papers in this research area. Sustainability in higher education has become relevant in the past few years. The increasing awareness and importance given to circular economy and sustainable business has created a need for students across various fields to be equipped with detailed knowledge of this domain (Emblen-Perry, 2019). Sustainability

is being taught and included in the curriculum of various fields including STEM. Graduates of sustainability are seen as “change-makers” in business and society (Salovaara & Soini, 2021). With the rising significance of sustainability experts, since the past few years, as evident in Figure 2, research on sustainability in higher education has gained momentum.

Table 3: Prominent Journals in this area of research found in systematic literature review.

Journal	Number of Articles	Percentage %	Total Citations
Australasian Journal of Educational Technology	1	0.8547	9
BMC Medical Education	3	2.5641	3
British Journal of Educational Technology	3	2.5641	27
Educational Assessment, Evaluation and Accountability	1	0.8547	3
Educación XX1	1	0.8547	18
Environmental Education Research	5	4.2735	26
Eurasia Journal of Mathematics, Science and Technology Education	1	0.8547	14
Health Education Journal	1	0.8547	1
Higher Education: The International Journal of Higher Education Research	4	3.4188	169
Higher Education Research & Development	1	0.8547	0
International Journal of Educational Development	1	0.8547	22
International Journal of Technology in Education (IJTE)	3	2.5641	41
International Journal of Management Education	2	1.7094	11
International Journal of STEM Education	1	0.8547	0
International Journal of Sustainability in Higher Education	70	59.829	376
Journal of Baltic Science Education	3	2.5641	1
Journal of Biological Education	1	0.8547	0
Journal of Education for Teaching	1	0.8547	6
Journal of Geography in Higher Education	4	3.4188	11
Journal of Hospitality, Leisure, Sport & Tourism Education	2	1.7094	3
NPJ Science of Learning	1	0.8547	4
Research in Science & Technological Education	1	0.8547	0
RIED. Revista Iberoamericana de Educación a Distancia	1	0.8547	6
Science & Education	1	0.8547	14
Studies in Higher Education	4	3.4188	40
	Sum = 117	100%	

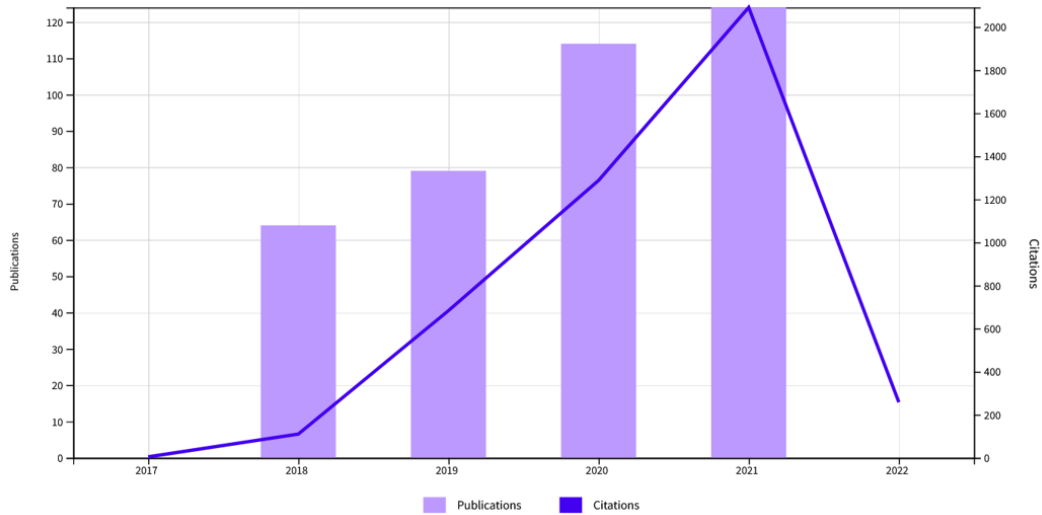


Figure 2: Growth Trend of 142 articles derived in Screening Phase (Source: Web of Science Core Collection)

Over the years, the most prominent authors in the field have been identified through VOSviewer network visualisation map in Figure 3. Several prominent authors include “Leal Filho, Walter”, “Aklilu, Eleni”, “Belete, Anteneh”, “Caffery, Connor”, “Collins, Asha” and others. For the purpose of collaboration, the co-authorship maps can identify the researchers working in this domain.

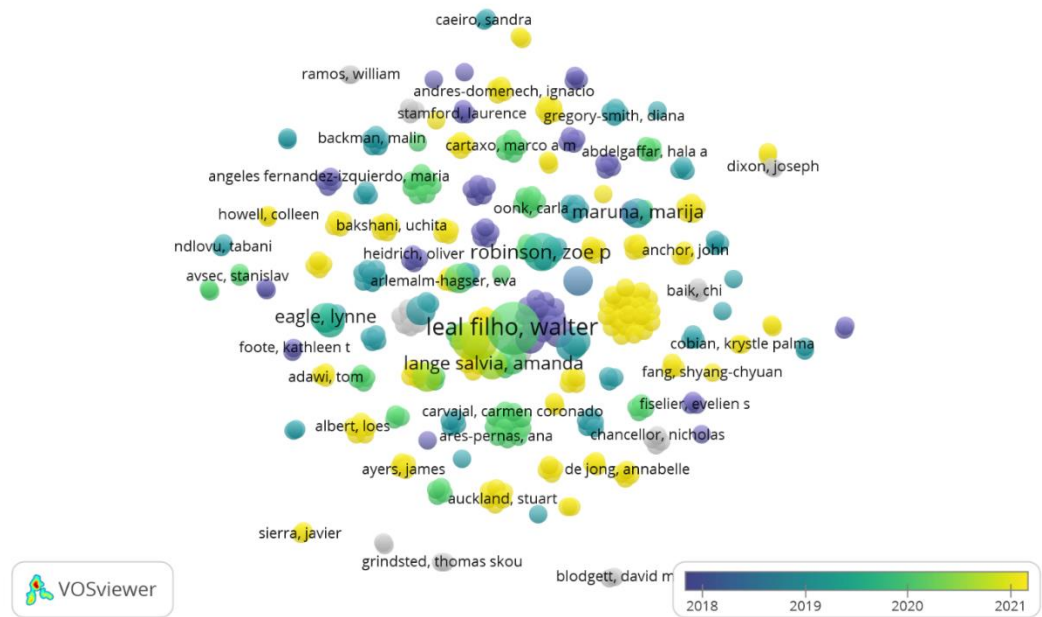


Figure 3: Network visualisation map of co-authorship links of Sustainability in Higher education research as per VOSviewer.

3.2.2. Keyword Analysis

The VOSviewer software was used to map 576 keywords of the 117 articles. The different links were presented on a map, with each cluster representing a particular cluster. Words with high occurrences in Title and abstract include “pedagogy”, “collaboration”, “community”, “SDGs”, “carbon footprint” “circular economy” etc are represented in Figure 4. The keywords were used to formulate a list of factors that act as indicators of sustainability in higher educational institutions. These keywords have been

researched in recent years. The top 10 list of the most relevant words identified in VOSviewer is listed in Table 4. The overlay visualisation map of keywords in figure 5 reflect the year wise relevance of keywords. While “ethics”, “accountabilization” was discussed during 2018, terms like “SDGs”, “curriculum”, “employability” are being discussed in 2020-21.

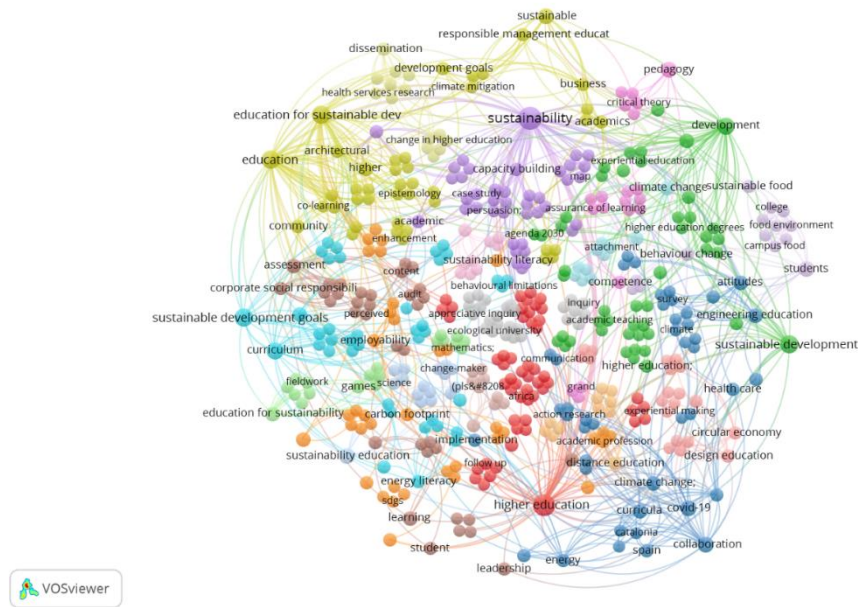


Figure 4: Network visualisation map of keywords of Sustainability in higher education research as per VOS Viewer.

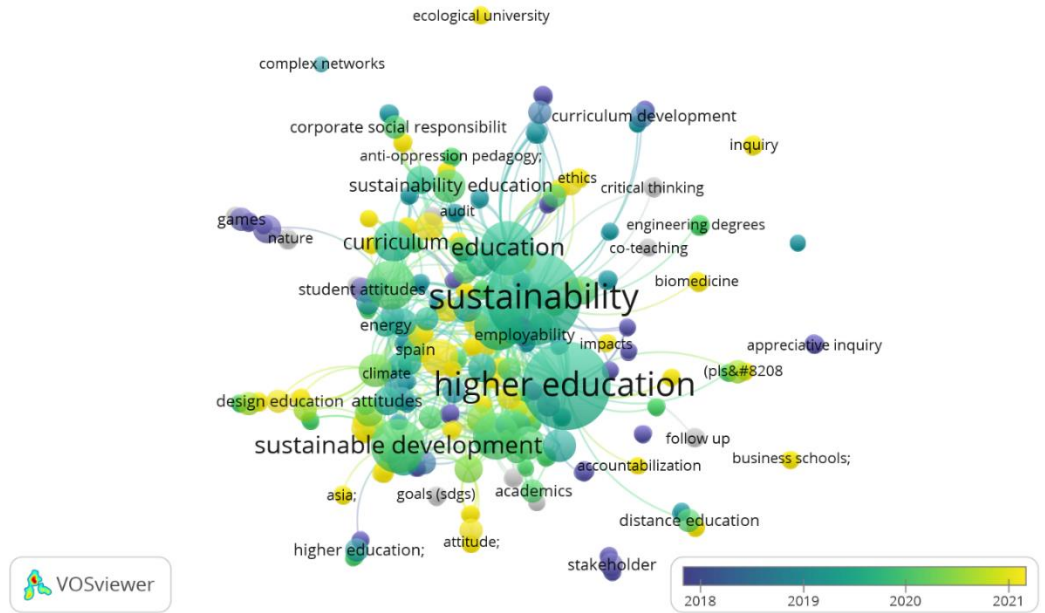


Figure 5: Overlay visualisation map based on Average publication year of keywords of Sustainability in higher education as per VOSviewer

Table 4: Top 10 most relevant keywords with the highest links and occurrences.

Rank	Keywords	Cluster	Links	Total Link Strength	Occurrences	Average Publication year
1	Sustainability	31	163	33	33	2019
2	Education	10	56	11	11	2019
3	Development	5	42	8	8	2020
4	SDG	7	48	9	9	2020
5	Collaboration	4	27	4	4	2020
6	Curriculum	26	27	6	6	2019
7	Sustainable	9	22	4	4	2020
8	Pedagogy	18	23	4	4	2019
9	Students	3	23	4	4	2019
10	Assessment	6	16	3	3	2019

3.2.3 Identification of sustainability factors in HEIs

Universities are viewed as leading creators of sustainability because of their collaboration, participation and research (Chen & Vanclay, 2021). Researchers have tried to work on the different aspects of sustainability in higher education. In figure 6, the factors are clubbed under 5 broadheads. This was done on the basis of the high occurrence of these keywords in network maps. For a comprehensive study, similar factors are clustered under broad heads. A list of generic and specific factors found in systematic literature review for sustainability in higher education is mentioned in Table 5. Table 5: List of generic and specific factors that indicate the presence of sustainability in higher education institutions or universities.

S.No.	Generic factors	Specific factors	References
	Curriculum	<ul style="list-style-type: none"> • “SDG” related concepts in syllabus • Compulsory courses on sustainability • Inclusion of sustainability in Final year thesis • Multi and interdisciplinary teaching related to sustainability • “Experiential learning” activities like field trips, internships on sustainability • “Flipped learning” or Synthesis of sustainability related case studies in curriculum • Offering employability/ placement in sustainability as well as business entrepreneurship opportunities • Diversity and innovation in sustainability courses (offering different types rather just one course on sustainability) • MOOCs on sustainability • Sustainability reporting in curriculum • Sustainability in STEM Curriculum 	(Esther Gomez-Martin, Gimenez-Carbo, Andres-Domenech, & Pellicer, 2021) (Wen-Yu Lee, Shih, Liang, & Tseng, 2021) (Macheridis & Paulsson, 2021) (Sanchez-Carracedo, Sureda Carbonell, & Moreno-Pino, 2020) (Aleixo, Azeiteiro, & Leal, 2018) (Backman, Pitt, Marsden, Mehmood, & Mathijs, 2019) (Tomas, Evans, Doyle, & Skamp, 2019) (Winfield & Ndlovu, 2019) (Browne, Bender, Bradley, & Pang, 2020) (Ferrero-Ferrero, Angeles Fernandez-Izquierdo, Jesus Munoz-Torres, & Belles-Colomer, 2018) (Vemury, Heidrich, Thorpe, & Crosbie, 2018)
II.	Collaboration and Research	<ul style="list-style-type: none"> • Short term projects • engagement in competitions 	(Bull et al., 2018) (Aleixo et al., 2018)

		<ul style="list-style-type: none"> Partnering with local stakeholders and “Community Outreach” Ongoing national and international projects on Sustainability Level of frequency in publishing sustainability based research Alumni of “sustainability professionals” Media engagement of the HEIs w.r.t sustainability contributions Training in Ethical research practices 	
III.	Infrastructure	<ul style="list-style-type: none"> Reusable services on campus (water cooler) Energy efficiency of the institutional building Waste separation measures on campus Disability friendly campus “Purchasing organic food on campus” or food leftover/wastage policy Awareness on natural biodiversity and greenery in and vicinity of institute Shift to sustainable based transport/conveyance to institute digital and physical resource access Post pandemic hygiene, social distancing, handwash, water infrastructure Presence of physical open space/urban forest in campus 	(Fedi et al., 2021) (Aleixo et al., 2018) (Charania et al., 2021) (Leal Filho, 2021) (Salovaara & Soini, 2021)
IV.	Pedagogy	<ul style="list-style-type: none"> Training the faculty, availability of “teaching material” Periodic guest lectures and seminars of sustainability experts 	(Macheridis & Paulsson, 2021) (Aleixo et al., 2018)
V.	Participation	<ul style="list-style-type: none"> Diversity among students Non-academic staff engagement in sustainable behaviour Gender inclusivity in faculty and non-academic staff Student Clubs, union and partnerships 	(Macheridis & Paulsson, 2021) (Ferrero-Ferrero et al., 2018) (Ferrero-Ferrero et al., 2018) (Briggs et al., 2019)

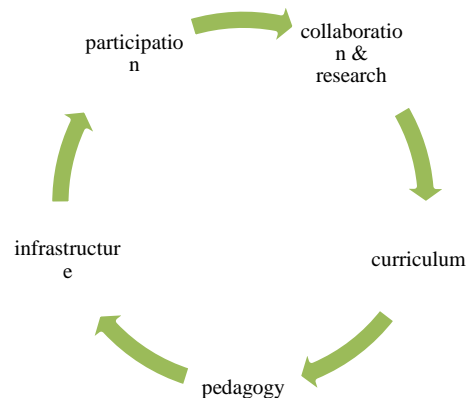


Figure 6: The 5 generic factors that are significant in creating sustainable HEIs.

4. Identifying Challenges and Opportunities:

The stakeholder dialogue amongst 52 diverse set of participants highlighted the following obstacles to implement Sustainability in Indian management HEIs. The online dialogue was conducted by TERI SAS and UNEP:

- Sustainability in an institution usually becomes confined to an individual faculty or department instead of adopting a whole institution approach.
- Lack of capacity building programs to orient those faculty members who are not involved in sustainability roles and responsibilities Integrating sustainability in courses being offered across programs Disconnect between faculty and students.
- Often the student council does not have a voice in decision making related to certain sustainability projects and likewise there are initiatives undertaken by students where faculty involvement is insignificant.
- Universities with sustainability focus face competition from the already established disciplines or traditional programs offered by other colleges.
- The existing yardsticks for measurement may not favour green institutes.
- There is a need to look at complementarity rather than competition. Challenge of practicing sustainability knowledge beyond campus and beyond academics.

4.1. Opportunities highlighted by stakeholders:

- Instead of just delegating the task and telling the youth about the projects, co-creation can take place where they are the stakeholders.
- Tapping all the skill sets that the youth have and integrating them into the sustainability domain. Institute should ensure synchronization of the career objectives with sustainability.
- It is critical to make sustainability a way of life for everyone. Mandatory environment-based projects can be taken up by every student (or in groups) to design sustainable solutions to pressing problems related to the environment, conservation of resources and minimizing consumption patterns.
- Youth representation in decision making bodies and establishing Youth Parliaments and mock COP, where they are able to speak to policy makers.
- Nurture platforms that respect diversity and considers regional perspectives and the special needs of a variety of institutions.

4.2. Strategy Analysis and Choice

A strategy formulation framework was used for strategic planning. The framework was used to analyse and select strategies for management HEIs to integrate sustainability in their core. This was done by finding a strategic fit between HEIs internal capabilities and skills opportunities present in the external environment to catalyse HEIs towards India's sustainability agenda and provide them an opportunity to synergize and work towards a common goal. 200 faculty of top 50 management institutes (NIRF 2021) were contacted for our survey, out of which 48 responded.

A SWOT flashcard was sent to all the participants. Respondents were asked to assign scores from 1 to 4 for the factors. Score of 1 and 2 denoted a weakness or a threat and 3,4 represented a strength or opportunity for all factors. The factors were grouped and analysed on the basis of their importance and influence on sustainability implementation in top management HEIs in India. Internal factor evaluation (IFE) and External factor evaluation (EFE) matrix were used to assess weight of each internal and external factor in Table 6 and Table 7 respectively.

Table 6: Internal factor evaluation (IFE) matrix.

IFE	Strength	Factors	Normalised Weights
		HEIs offers MOOCs on sustainability.	0.072
Presence of sustainability education in STEM disciplines.	0.067		
HEIs conducts short term projects and community outreach programmes with external stakeholders (NGO, GOI).	0.104		
HEIs frequently publishes sustainability research.	0.072		
Media engagement of HEIs for sustainability.	0.0203		
HEIs provides faculty training in sustainability.	0.072		
Weakness	SDG related concepts are taught in HEIs.	0.053	
	HEIs includes sustainability reporting in curriculum.	0.1087	
	HEIs has an alumni of sustainability professionals.	0.058	
	HEIs has ethical labour policies for faculty and non-academic staff.	0.088	
	HEIs has clubs and union on sustainability.	0.285	

Table 7: External factor evaluation (EFE) Matrix

EFE	Opportunities	HEIs offers experiential learning (field trips) on sustainability.	0.069
		HEIs offers employability (placement) after sustainable education.	0.086
		HEIs is part of ongoing national and international projects.	0.134
		HEIs conducts research conferences and competitions.	0.106
		HEIs participates in International and National forum on sustainability.	0.072
		HEIs conducts periodic guest lectures and seminars of sustainability experts.	0.058
		HEIs offers digital mode of teaching and e-resources.	0.059
		HEIs conducts faculty feedback survey from students.	0.106
		Interdisciplinary collaboration among faculty and researchers.	0.085
		Threats	HEIs provides compulsory courses on sustainability.
	HEIs has diversity among students and employees.		0.064
	HEIs engages non-academic staff in sustainability.		0.077

The respondents identified above Strengths, Weaknesses, Opportunities and threats for Integrating sustainability in India top 50 management HEI's. The same was identified by using SWOT Flashcard approach. The factors of IFE and EFE were compared and aligned to create alternate strategies. The strategies then were made to find a strategic fit between HEIs internal capability, strengths and skill set to opportunities and threat of the external environment. Strategies we divided into four categories. S-O Strategies

(Aggressive strategies), W-O Strategies (Conservative strategies), S-T Strategies (Competitive strategies) and W-T Strategies (Defensive strategies) as represented in Table 8.

Table 8: Alternative Strategies.

SO1	Incorporating more certificate programs, MDP, in online, offline and hybrid mode.
SO2	Encouraging collaboration between industry academia for sustainability programs.
SO3	Nurturing collaboration with external stakeholders for research, societal and community led initiatives.
WO1	Organising training programs, workshops and TrainTheTrainer programs from professionals inside and outside the institutions related to the implementation of sustainability.
WO2	Engaging the internal stakeholders through various programs. Creating a forum for implementation of sustainability initiatives.
WO3	Creating fundamental sustainability by offering short courses/distance learning courses by multidisciplinary researchers and faculty.
ST1	Adding more physical and non-physical infrastructure related to sustainability programs.
ST2	Intensifying academic-quality assurance systems.
ST3	Strengthening cooperative systems between HEIs and commercializing research output.
WT1	Improving nominal budgets of sustainability-research and community development programs.
WT2	Implementing and improving accountability and good-governance programs.
WT3	Downsizing organizational systems for effective resource management.

5. Quantitative Strategy Planning Matrix (QSPM)

The QSPM matrix was created through IFE and EFE which is represented in Table 9. According to the Internal factor evaluation matrix, conducting short term projects and community outreach programmes with external stakeholders (NGOs and Government of India) was considered as a major strength for HEIs in management domain. Collaboration plays an important key in integrating sustainability to the core of top 50 Indian management HEIs. Being a part of national and international projects was considered as a good opportunity to leverage the sustainability orientation in HEIs. Conducting frequent seminars, conferences and workshops was also considered as an opportunity to create awareness and sustainability orientation amongst stakeholders. Curriculum lacking courses on sustainability was considered as a major threat. Analysis of IFE and EFE found that Indian management HEIs need to use aggressive strategies in order to align their internal capabilities and skill sets to the external environment opportunities available. To find their strategic fit they need to incorporate more certificate programs, MDP, in online, offline and hybrid mode. They should encourage collaboration between industry academia for sustainability programs. They should nurture collaboration with external stakeholders for research, societal and community led initiatives.

Table 9: Quantitative Strategic-Planning Matrix

Sustainability Factors	Normalised Weights	First Strategy		Second strategy		Third strategy	
		AS	TAS1	AS	TAS2	AS	TAS3
S1	0.072	4	0.288	3	0.216	2	0.144
S2	0.067	3	0.201	3	0.201	2	0.134
S3	0.104	3	0.312	2	0.208	2	0.208
S4	0.072	2	0.144	2	0.144	3	0.216
S5	0.0203	3	0.0609	1	0.0203	1	0.0203
S6	0.072	1	0.072	1	0.072	1	0.072
W1	0.053	3	0.159	2	0.106	2	0.106
W2	0.1087	3	0.3261	3	0.3261	3	0.3261
W3	0.058	2	0.116	4	0.232	2	0.116
W4	0.088	3	0.264	2	0.176	2	0.176
W5	0.285	1	0.285	2	0.57	1	0.285
O1	0.069	3	0.207	1	0.069	3	0.207
O2	0.086	3	0.258	2	0.172	2	0.172
O3	0.134	2	0.268	3	0.402	3	0.402
O4	0.106	4	0.424	3	0.318	1	0.106
O5	0.072	1	0.072	2	0.144	1	0.072
O6	0.058	2	0.116	3	0.174	4	0.232
O7	0.059	3	0.177	1	0.059	1	0.059
O8	0.106	3	0.318	1	0.106	3	0.318
O9	0.085	4	0.34	3	0.255	1	0.085
T1	0.084	2	0.168	3	0.252	4	0.336
T2	0.064	2	0.128	4	0.256	3	0.192
T3	0.077	3	0.231	2	0.154	3	0.231
		4.935		4.632		4.215	

6. Discussion:

This research aims at identifying strategies to integrate sustainability in the core of Indian management HEIs. A systematic literature review was hence done to identify indicators and factors that influence sustainability inclusion in university practices and curriculum. Inclusion and exclusion method was used to review the literature and identify factors. Through a SWOT flashcard questionnaire, top 50 Indian Management institutes (according to NIRF 2021) were surveyed. IFE and EFE matrix were formulated on the basis of the survey which helped us identify appropriate alternative strategies. QSPM matrix helped us identify aggressive strategies as most attractive one. Incorporating more certificate programs, MDP, in online, offline and hybrid mode, encouraging collaboration between industry academia for sustainability programs and nurturing collaboration with external stakeholders for research, societal and community led initiatives were the strategies preferred.

Incorporating more certificate programs in online, offline/ hybrid mode

A key strategy that emerged from this study is the need for incorporation of more certificate courses or programs in HEIs. These programs are help in value addition, specific targeted learning as well as offer students to build professional experience in the sphere of sustainability in a short period of time. As industries and business shift to

sustainable practices, these courses can help industry experts, entrepreneurs, CEOs and managers who are looking to gain more understanding on how to adopt sustainability in their respective organisations. These courses also help policy makers and civil servants to apply the knowledge of sustainability in governmental schemes and projects. Additionally, these courses are an opportunity for students and researchers who are looking to build a career in into this field. Organising such certificate programs at specific intervals in online, offline or hybrid mode help in integrating sustainability at the core of HEIs. While sustainability is a broad topic, these programmes can help discuss specific issues within sustainability, for instance, financing, marketing, strategy, policy-making etc. Certificate programmes nurture collaboration between industry, academia, and policy makers. These act as avenues for knowledge sharing, participation, and overall awareness of sustainable development.

Encouraging collaboration between industry academia for sustainability programs

An important discrepancy faced by HEIs is the gap between academia and industry. As more and more businesses expand their sustainability departments, students with expertise in this field are being recruited. While theoretical and conceptual understanding of topics is delivered to students in HEIs, many industry experts complain that students lack what is actually demanded by the industry. Hence, to minimise this gap, HEIs must encourage collaboration with industry through different endeavours. Organising on-campus industry fairs help familiarise students to the companies in this field. Industry experts who are invited for workshops, guest lectures and expert talks reveal the level of education and training required by industries. Industry experts can also be invited to seek recommendations for development of curriculum of these courses. Industry specific case studies in classrooms help students gain a simulative experience. Moreover, frequent industry visits and short-term projects also enhance experience and collaboration. Creation of innovation hubs and start-up incubators related to sustainability also help in developing innovative projects that has commercial value for industries. Frequent interactions between industry and academia through the above will help create hands on experience and 'work ready' talent for the future.

Nurturing collaboration with external stakeholders for research, societal and community led initiatives.

Apart from industry, HEIs must nurture collaboration with external stakeholders of sustainability including policy makers, civil society, international bodies, researchers, media etc. Through this, HEIs create an overall impact on sustainable wellbeing of the society. Academic experts must collaborate with government bodies to help in local schemes and policy building. HEIs must organise an annual or biennial stakeholder dialogue or conferences specific to sustainability. Creation of knowledge hub within these institutions help in introduction of conservation projects and specific drives related to this field. Collecting feedback from different stakeholders especially civil society experts on research projects developed by students in these HEIs help in active learning and social impact assessment. HEIs must also encourage student run media clubs related to sustainability. HEIs also act as a bridge between civil society and industry by promoting the funding and commercialisation of sustainability related projects or start-ups. Setting up virtual or hybrid interactions with foreign delegates, organising exchange programme for students and researchers for core sustainability related projects or courses, setting up social entrepreneurship exhibits, engaging with marginal and rural communities through research and volunteer activities and setting up youth action committees in this field are all ways to engage and nurture collaboration with external stakeholders.

7. Scope and Conclusion

“A Networked and Nested Whole Institution Approach to Sustainability” – aiming to reach a larger goal requires connecting the various niches of change and transformation found around the world to build the foundation for a strong transition movement. One of the most crucial steps to advance towards achieving Sustainable Development Goal (SDG) 4: ‘Quality Education’ on the United Nations Agenda 2030 (United Nations, 2016), is to integrate sustainability education and practices in our education system. Such a system which aims to minimise the environmental footprint of educational institutions and implements an embedded sustainability curriculum and practices effectively. As the backbone of any society, HEIs can help in creating citizens that are engaged and committed to sustainable development. HEIs must engage with industry, civil society, academic experts and international bodies on an active basis to ensure that students are given an overall understanding of sustainability related practices in business, economy and society in general. If the holistic concept of Sustainable Development is formally embraced by education systems worldwide, it has the potential to drive us towards a safer fate for life on Earth (Jetly & Singh, 2019). Sustainability would also provide young innovators with the appropriate tools, knowledge and skills to develop new initiatives. Higher Education Institutions can serve as examples to society by shouldering the responsibility of lowering their environmental impact. Post-secondary institutions are centres for new research and help produce valuable knowledge that is used to combat global issues like climate change. In this context, Higher Education Institutions (HEIs) are subject to increased scrutiny, competition and social expectation (Budihardjo et al., 2021). Thus, it is widely expected that Higher Education Institutions also bear initiative and implement helpful measures on-campus to minimise their footprint and environmental impact. To achieve this goal, Higher Education Institutions (HEIs) and their on-campus practices play a pivotal role.

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References

- Aleixo, A. M., Azeiteiro, U., & Leal, S. (2018). The implementation of sustainability practices in Portuguese higher education institutions. *International Journal of Sustainability in Higher Education*, 19(1), 146–178. <https://doi.org/10.1108/IJSHE-02-2017-0016>
- Backman, M., Pitt, H., Marsden, T., Mehmood, A., & Mathijs, E. (2019). Experiential approaches to sustainability education: towards learning landscapes. *International Journal of Sustainability in Higher Education*, 20(1), 139–156. <https://doi.org/10.1108/IJSHE-06-2018-0109>
- Browne, G. R., Bender, H., Bradley, J., & Pang, A. (2020). Evaluation of a tertiary sustainability experiential learning program. *International Journal of Sustainability in Higher Education*, 21(4), 699–715. <https://doi.org/10.1108/IJSHE-08-2019-0241>
- Budihardjo, M. A., Ramadan, B. S., Putri, S. A., Wahyuningrum, I. F. S., & Muhammad, F. I. (2021). Towards sustainability in higher-education institutions: Analysis of contributing factors and appropriate strategies. *Sustainability (Switzerland)*, 13(12), 6562. <https://doi.org/10.3390/su13126562>
- Bull, R., Romanowicz, J., Jennings, N., Laskari, M., Stuart, G., & Everitt, D. (2018). Competing priorities: lessons in engaging students to achieve energy savings in universities. *International Journal of Sustainability in Higher Education*, 19(7), 1220–1238. <https://doi.org/10.1108/IJSHE-09-2017-0157>
- Chen, C., & Vanclay, F. (2021). Transnational universities, host communities and local residents: social impacts, university social responsibility and campus sustainability. *International*

- Journal of Sustainability in Higher Education, 22(8), 88–107. <https://doi.org/10.1108/IJSHE-10-2020-0397>
- Emblen-Perry, K. (2019). Can sustainability audits provide effective, hands-on business sustainability learning, teaching and assessment for business management undergraduates? *International Journal of Sustainability in Higher Education*, 20(7, SI), 1191–1219. <https://doi.org/10.1108/IJSHE-10-2018-0181>
- Esther Gomez-Martin, M., Gimenez-Carbo, E., Andres-Domenech, I., & Pellicer, E. (2021). Boosting the sustainable development goals in a civil engineering bachelor degree program. *International Journal of Sustainability in Higher Education*, 22(8), 125–145. <https://doi.org/10.1108/IJSHE-02-2021-0065>
- Fedi, A., la Barbera, F., de Jong, A., & Rollero, C. (2021). Intention to adopt pro-environmental behaviors among university students of hard and soft sciences: the case of drinking by reusable bottles. *International Journal of Sustainability in Higher Education*, 22(4), 766–779. <https://doi.org/10.1108/IJSHE-08-2020-0320>
- Ferrero-Ferrero, I., Angeles Fernandez-Izquierdo, M., Jesus Munoz-Torres, M., & Belles-Colomer, L. (2018). Stakeholder engagement in sustainability reporting in higher education: An analysis of key internal stakeholders' expectations. *International Journal of Sustainability in Higher Education*, 19(2), 313–336. <https://doi.org/10.1108/IJSHE-06-2016-0116>
- Guo, Y. M., Huang, Z. L., Guo, J., Li, H., Guo, X. R., & Nkeli, M. J. (2019). Bibliometric analysis on smart cities research. *Sustainability (Switzerland)*, 11(13), 3606. <https://doi.org/10.3390/su11133606>
- Jetly, M., & Singh, N. (2019). Analytical study based on perspectives of teacher educators in India with respect to education for sustainable development. *Journal of Teacher Education for Sustainability*, 21(2), 38–55. <https://doi.org/10.2478/jtes-2019-0016>
- Macheridis, N., & Paulsson, A. (2021). Greening higher education? From responsabilization to accountabilization in the incorporation of sustainability in higher education. *International Journal of Sustainability in Higher Education*, 22(8), 208–222. <https://doi.org/10.1108/IJSHE-09-2020-0338>
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009, August 8). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *BMJ*, 339, b2535. <https://doi.org/10.1136/bmj.b2535>
- Salovaara, J. J., & Soini, K. (2021). Educated professionals of sustainability and the dimensions of practices. *International Journal of Sustainability in Higher Education*, 22(8), 69–87. <https://doi.org/10.1108/IJSHE-09-2020-0327>
- Sanchez-Carracedo, F., Sureda Carbonell, B., & Moreno-Pino, F. M. (2020). Analysis of sustainability presence in Spanish higher education. *International Journal of Sustainability in Higher Education*, 21(2), 393–412. <https://doi.org/10.1108/IJSHE-10-2019-0321>
- Stevenson, M. P., Hartmeyer, R., & Bentsen, P. (2017). Systematically reviewing the potential of concept mapping technologies to promote self-regulated learning in primary and secondary science education. *Educational Research Review*, 21, 1–16. <https://doi.org/10.1016/J.EDUREV.2017.02.002>
- Tomas, L., Evans, N. (Snowy), Doyle, T., & Skamp, K. (2019). Are first year students ready for a flipped classroom? A case for a flipped learning continuum. *International Journal of Sustainability in Higher Education*, 16, 1–22. <https://doi.org/10.1186/s41239-019-0135-4>
- Vemury, C. M., Heidrich, O., Thorpe, N., & Crosbie, T. (2018). A holistic approach to delivering sustainable design education in civil engineering. *International Journal of Sustainability in Higher Education*, 19(1), 197–216. <https://doi.org/10.1108/IJSHE-04-2017-0049>
- Wen-Yu Lee, S., Shih, M., Liang, J.-C., & Tseng, Y.-C. (2021). Investigating learners' engagement and science learning outcomes in different designs of participatory simulated games. *Br J Educ Technol*, 52, 1197–1214. <https://doi.org/10.1111/bjet.13067>

Winfield, F., & Ndlovu, T. (2019). "Future-proof your Degree" Embedding sustainability and employability at Nottingham Business School (NBS). *International Journal of Sustainability in Higher Education*, 20(8, SI), 1329–1342. <https://doi.org/10.1108/IJSHE-10-2018-0196>