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Creating Sustainable Entrepreneurial Ecosystems for Higher Education Students' Development

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Abstract

Background: Sustainable entrepreneurship significantly contributes to economic development by leveraging circumstances and social challenges to support sustainable development. Sustainable entrepreneurs actively engage with these challenges using innovative entrepreneurial approaches. Knowing its importance, Educational Institutions highlight sustainable entrepreneurship education as a key driver for preparing future entrepreneurial ambition and encouraging other related skills. *Objectives*: This paper investigates the association between sustainability practices and entrepreneurial goal among higher education students and identifies key components prompting students' involvement in sustainable entrepreneurship activities. *Methodology*: to attain the aim of this study, a survey was carried out at Alagappa University School of Management students, the data have been collected from 120 students. After the collection of data, it was evaluated with the uses of Chi-square test and factor analysis. *Findings*: The findings provide insights into how higher education institutions can cultivate sustainable entrepreneurial ecosystems, educating students with the talent and mindset necessary to engage in sustainability-focused entrepreneurship. This paper contributes to understanding the determinants of sustainable entrepreneurship and offers practical implications for designing educational strategies that align with sustainable development goals.

Keywords: Sustainable Entrepreneurship, Sustainable Value Creation, Entrepreneurial Aspiration of University Students, Higher Education Students

Introduction

Entrepreneurship is a cornerstone of economic development and societal transformation, offering innovative solutions to pressing challenges. Higher education institutions have increasingly been recognised as pivotal in fostering entrepreneurial mindsets and embedding sustainability practices into education (Smith, 2020). As an essential component of entrepreneurship, viability aligns with international precedence such as the United Nations Sustainable Development Goals (SDGs), emphasising inclusive and sustainable improvement (Brown et al., 2021). Despite its significance, there remains a limited understanding of how sustainability practices directly influence entrepreneurial intentions among students in higher education (Brown et al., 2021). Existing research highlights the benefits of integrating sustainability into entrepreneurship education, but significant gaps persist. Studies often focus on broader outcomes, such as entrepreneurial performance, without adequately addressing the antecedents of sustainable entrepreneurial intentions (Garcia, 2019). Furthermore, few studies explore the competence-based approaches required to engage students effectively in sustainable entrepreneurship activities (Chen, 2020).

Managing these gaps is necessary for promoting instructional structures that empower students to contribute meaningfully to inclusive entrepreneurial ecosystems. By researching these areas, this study seeks to provide teaching models for sustainable development entrepreneurship. These frameworks can enhance

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innovation and inclusivity, preparing students with the capacities needed to activate economic and social processes. Also, the findings will give practical insights for pedagogues and instructors to align higher education techniques with sustainability and inclusivity goals (Johnson, 2022). This review recommends that schools of management may endanger their reliability if they do not offer a solution of the problem education that focus on the challenges brought about by various international situations. Additionally relates to entrepreneurial and innovation curricula, which frequently include little reference to sustainability (Wyness & Jones, 2015). Furthermore, the discussion between the two camps of entrepreneurship and green sustainability has been limited, with very little exchange of awareness, skills and experience (Klapper, 2024). Therefore, large sustainability literacy (Barth, 2015), diminutive is known about what forms of education for Sustainable Development in Higher Education exist, how effective these are, or to what extent education for creation and technology innovation are carefully linked to sustainability norms.

Review of Literature

(Sophia et al., 2025) This study focuses on the effects of skill-based sustainable business development education on the sustainable entrepreneurship intentions and factors influencing higher education students. Likewise, studied are the effects of "disclosure to green-minded entrepreneurial role models" and gender, "two background variables that are usually studied. A controlled pre-post investigative design was executed between April and May 2023 to assess the changes in dependent variables Information from 169 students attending in sustainable entrepreneurship activities in Southern Germany was collected using a questionnaire.

(Fauske et al., 2024) The competencies they achieve to train are the main emphasis of this review discussion of educational resources for sustainable entrepreneurship. This study maps 51 instructional resources used to educate sustainable entrepreneurship in higher education. The basic pedagogical traditions that these instruments are based on are then discussed, along with the specific sustainable entrepreneurial abilities that each tool aims to develop.

(Arya et al., 2024) A bibliometric summary of the connection between environmental curriculum and the sustainable business development is given in this review. While looking through English-language papers from reputable journals and conferences listed in the Scopus databases, the authors identified 849 references for analysis using VOS viewer and R programming language. Our analysis showed that the number of educational publications on the subject has increased exponentially, highlighting its growth as an evolving field of research interest.

(Marquardt & Harima, 2024) This paper explores how a start-up environment that can influence extrinsic pathway which activate and assimilate outer resources. An illuminative descriptive N-of-1 study from Estonian enterprise environment is a base for this paper which formulates spanning of the digital limit and recognise significant start-up ecosystem competencies outlined from the theory of strong proficiency. The observations contribute to entrepreneurial environment analysis by integrating digital pathway into the theoretical insight of start-up environment and contributing a highly refined insight of emergent dynamics.

(Marchi et al., 2023) The text-mining technique used in this assessment, which is based on the creation of a temporary lexicon give intelligence into how 10 European tourism destinations transmit sustainability on their websites. Using this technology, an evaluation of online sustainability communication in these cities is fulfilled by defining and quantifying particular and detailed presence, depth and dispersal parameters. The results demonstrate how this technique can be applied to automatically evaluate the depth and the proportionate harmony of interaction between the general, social, economic, cultural, and environmental aspects of sustainability.

(Sieg et al., 2023) The conceptual framework of innovation and associated ideas, such as the idea of innovation for sustainable development, or eco-innovation, are presented

in this paper. Additionally, it examines the body of research in the field of academic entrepreneurship is complex idea that calls for a district, situation-specific strategy. The following methodologies were used: a case study of the study was the centre for knowledge and technology transfer. This was founded on structured interviews with a group of academic innovation practitioners who were purposefully chosen, and document analysis.

Objectives

- To investigate the association between sustainability practices and entrepreneurial goals among higher education students.
- To identify key components prompting students' involvement in sustainable entrepreneurship initiatives.

Research Gap

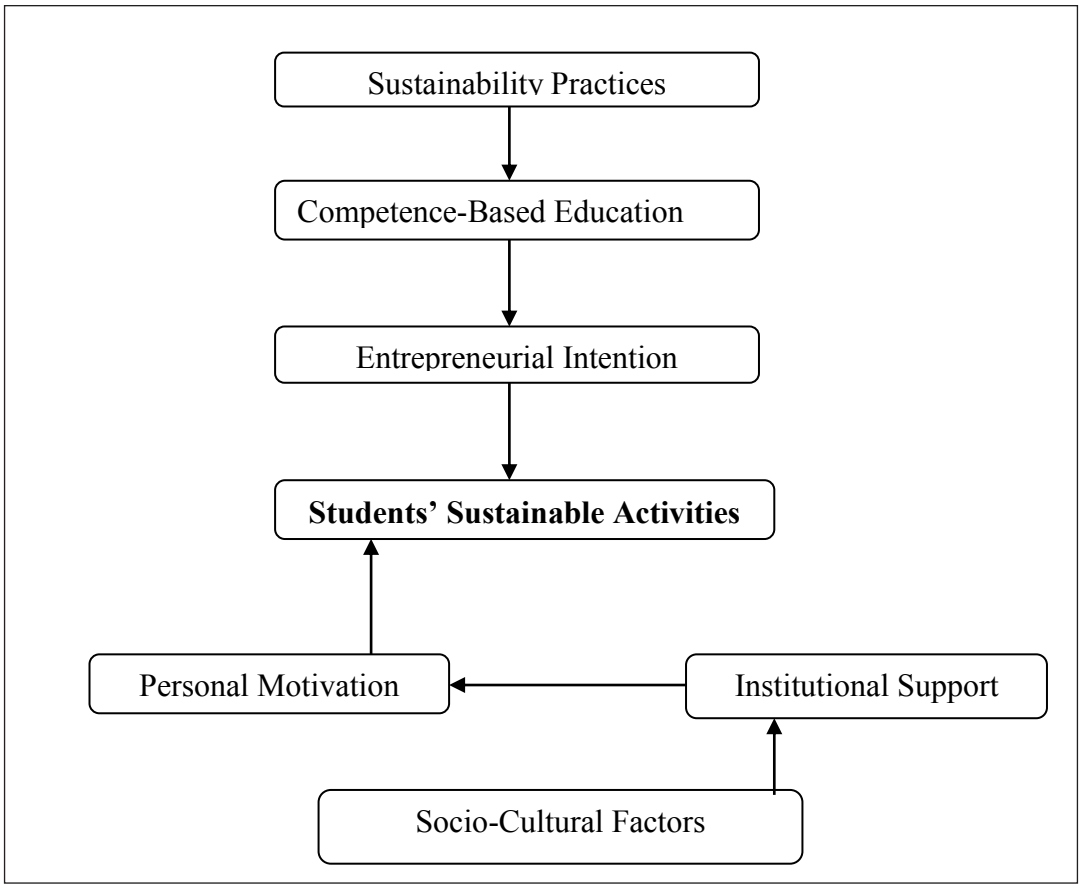
Although the focus is on entrepreneurship education, there is an important gap in understanding how sustainability practices influence entrepreneurial intentions among higher education students. Most studies focus on general entrepreneurship without integrating sustainability as a core component. Moreover, limited research exists on the role of skill-based education, higher educational institutions support, and socio-cultural factors in shaping sustainability-driven entrepreneurial ecosystems. This gap is particularly pronounced in developing regions like Tamil Nadu, India, where unique socio-economic conditions and cultural influences remain underexplored. Furthermore, gender disparities in sustainable entrepreneurship education have received inadequate attention, highlighting the need for more inclusive and region-specific studies to promote sustainable entrepreneurial development.

Theoretical Consideration and Conceptual Framework

Analysing the association between sustainability practices and entrepreneurial goals among higher education students is grounded in the Theory of Planned Behaviour (TPB) (Ajzen, 1991) and the Competence-Based Theory of Entrepreneurship (Mitchelmore & Rowley, 2010). The TPB explains that business intentions are shaped by attitudes, subjective norms, and perceived behavioural control. In this context, sustainability practices influence students' attitudes by demonstrating the value of environmentally and socially responsible behaviours, while subjective norms, such as societal and peer expectations, encourage the adoption of sustainability-focused entrepreneurship. Perceived behavioural control reflects students' confidence in applying sustainability practices to entrepreneurial endeavours.

Additionally, the Competence-Based Theory of Entrepreneurship emphasises the role of skills and knowledge, such as sustainability awareness and ethical reasoning, in driving entrepreneurial intentions. Higher education institutions contribute significantly to this relationship by embedding sustainability practices into entrepreneurship education, empowering students to recognise and act on sustainable entrepreneurial opportunities (Fayolle & Gailly, 2015). Collectively, these theories offer a broad explanation of how sustainability practices influence the entrepreneurial intentions of university learners. Identifying key factors influencing students' participation in sustainable entrepreneurship activities draws on the Self-Determination Theory (Deci & Ryan, 1985) and the Institutional Theory (Scott, 1995). Higher education institutions, through resources, mentorship, and supportive ecosystems, significantly influence students' participation by creating an enabling environment.

Conceptual Framework for Sustainable Entrepreneurship



The conceptual framework outlines the interconnected pathways through which students are guided toward sustainable entrepreneurial activities It begins with Sustainability Practices, that strengthen Competence-Based Education, equipping students with the essential skills and knowledge. This foundation subsequently cultivates entrepreneurial intentions, enhancing their preparedness to engage in sustainable entrepreneurship. Simultaneously, institutional support and socio-cultural factors strengthen personal motivation, a crucial internal driver that connects external influences to students' actions. Ultimately, these combined factors culminate in students' sustainable activities, reflecting the practical application of sustainability principles in entrepreneurial endeavours. This framework emphasises the synergy between educational strategies, external support systems, and individual motivation in cultivating sustainable entrepreneurship among students.

Methodology

Research Design

This analysis method is used to collect data for the study, employing a quantitative approach to research. It seeks to document the viewpoints of final-year students at the School of Management, Alagappa University. A

systematic questionnaire was used to collect primary data, and secondary data were collected from published materials such as books, scholarly journals, theses, articles, and websites.

Sample Method

The study employed a stratified random sampling method, dividing the population into strata based on the six departments of the School of Management: Commerce, Management, International Business, Banking, Logistics, and Corporate Secretaryship. From each department, a random sample was selected to ensure unbiased and proportional representation because they were the ones who were supposed to become employment seekers or employment providers.

Sample Size

The study comprised a total sample size of 120 respondents, with 20 respondents selected from each of the six departments. This equal representation ensures that perspectives from all departments are adequately captured for analysis.

Measurement and Statistical Methods

Hypotheses

- H_{o1}: There is no statistically significant influence of personal motivation on students' participation in sustainable entrepreneurship activities.
- H_{02}. There is no statistically meaningful connection between gender and awareness of the importance of sustainability in entrepreneurship-focused higher education.
- H_{03}: There is no statistically significant factor structure that influences students' participation in sustainable entrepreneurship activities.

Table 1: Demographic Profile

Sr. No.	*Characteristic*	*Distribution*	*Frequency (N=120)*	*Percentage (%)*
1	Age	20-22	47	39.16
		23-25	62	51.67
		26-28	09	7.50
		Above 29	02	1.67
2	Gender	Male	69	57.50
		Female	51	42.50
3	Educational Background	Undergraduate in Commerce	51	42.50
		Undergraduate in Management	65	54.16
		Other (Please specify)	04	3.33
4	Current Studies (Department)	Commerce	20	16.66
		Management	20	16.66
		International Business	20	16.67
		Banking	20	16.67
		Logistics	20	16.67
		Corporate Secretaryship	20	16.67
5	Family Business Background	Yes	27	22.50
		No	93	77.50
6	If yes, Working experience	No experience	98	81.67
		Under 1 year	10	8.33
		Moderate experience	05	4.16
		Over 2 years	07	5.83

Sr. No.	*Characteristic*	*Distribution*	*Frequency (N=120)*	*Percentage (%)*
7	Entrepreneurial Exposure	Attended entrepreneurship workshop/seminars	99	82.50
		Part of a startup or entrepreneurial project	03	2.50
		No prior exposure	18	15.00
8	Career Aspiration	Employment Seeker	58	48.33
		Employment Provider (Entrepreneur)	52	43.33
		Undecided	10	8.33
Motivation to Participate in Activities				
9	Personal Motivation to participate in extracurricular or academic activities	Personal Interest	23	19.17
		Skill development	12	10.00
		Networking opportunities	16	13.33
		Enhancing employability	26	21.67
		Passion for entrepreneurship	21	17.50
		Desire to make a social impact	08	6.67
		Academic requirements	14	11.66
		Other (Please specify)	-	-
10	How often do you participate in extracurricular or academic activities related to entrepreneurship or business?	Never	15	12.50
		Occasionally	43	35.83
		Frequently	62	51.67
11	Do you believe that participation in these activities has influenced your career goals?	Strongly agree	49	40.83
		Agree	55	45.83
		Neutral	08	6.67
		Disagree	05	4.17
		Strongly disagree	03	2.50
12	Do you feel that your personal motivation (e.g., passion, career aspirations) plays a significant role in our involvement in entrepreneurial or business-related activities?	Completely agree	47	39.17
		Somewhat Agree	59	49.16
		Undecided	09	7.50
		Somewhat disagree	03	2.50
		Completely disagree	02	1.67

Source: Computed from the primary data.

The respondent's demographic profiles reveal that the majority (51.67%) fall within the age classification includes of 23–25 years, with 39.16% aged 20–22 years. Older participants are relatively fewer, with only 7.50% aged 26–28 years and 1.67% above 29 years. The sample is slightly male-dominated, with 57.50% male and 42.50% female respondents. Regarding educational background, most participants hold undergraduate degrees in Management (54.16%) or Commerce (42.50%), while only 3.33% come from other disciplines (Table 1). The representation from all six departments is evenly distributed, reflecting a stratified sampling approach. Notably, a majority (77.50%) do not have a family business background, and 81.67% lack prior working experience, indicating a focus on first-generation entrepreneurial aspirations. Entrepreneurial exposure is primarily limited to attending workshops or seminars (82.50%), with only 2.50% having practical experience through start-ups or entrepreneurial projects. In terms of career aspirations, 48.33% aim to seek employment, while 43.33% aspire to become entrepreneurs, showcasing a strong inclination towards entrepreneurial careers. Personal motivation plays a significant role in participation in entrepreneurial activities, with "enhancing employability" (21.67%), "personal interest" (19.17%), and "passion for entrepreneurship "(17.50%) being the key drivers. Over half of the respondents (51.67%) frequently engage in extracurricular activities related to entrepreneurship, and

a majority (86.66%) believe that participation in these activities has positively influenced their career goals. Personal motivation is also widely acknowledged, with 88.33% agreeing or strongly agreeing that it plays a significant role in their involvement in entrepreneurial activities.

Chi-Square Analysis

This test was utilised to analyse the connection between sustainability practices and entrepreneurial intention, providing insights into significant relationships between categorical variables of gender and knowledge of the significance of sustainability in entrepreneurship-focused higher education.

Table 2: Chi-Square Analysis

Association Between Gender and Awareness of the Importance of Sustainability in Entrepreneurship Higher Education

			Aware		*Total*
			Yes	*No*	
	Male	Count	42%	13%	55%
		% within Gender	76.4%	23.6%	100%
	Female	Count	19%	46%	65%
		% within Gender	28.2%	71.8%	100%
Total		Count	61	59	120
% within Gender		51%	49%	100%	
Pearson Chi-Square Df. p-value			< 0.001**		
Phi coefficient P-value			0.483 < 0.001**		

Source: Computed from the primary data.

The Chi-square analysis results reveal a notable relationship between gender and awareness of the significance of sustainability in entrepreneurship-related university-level education (Pearson Chi-Square, p-value < 0.001). The data indicate that a higher proportion of male students (76.4%) reported being aware of the importance of sustainability in entrepreneurship compared to female students (28.2%). Conversely, a majority of female students (71.8%) indicated a lack of awareness, compared to 23.6% of male students (Table 2). The Phi coefficient of 0.483 (p-value < 0.001) suggests a moderate strength of association between the two variables. This finding highlights a gender-based disparity in sustainability awareness, suggesting the need for targeted interventions to enhance awareness among female students in higher education settings.

Factor Analysis

Factor analysis is a commonly used method in multivariate research to identify latent variables that explain the commonalities among observable variables, especially when these variables exhibit systematic interdependence. Its primary objective is to condense a large set of measurable variables into a smaller number of underlying categories. Researchers employ this test to identify key variables and assess the reliability of the collected data. Using the Statistical Package of Social Science (SPSS) 23.0, investigative factor analysis assesses individual competency by starting with the creation of a factors similarity.

Table 3: KMO and Bartlett's Analysis

KMO Criterion of Sampling Adequacy		.753
Bartlett's analysis of Sphericity	Approx. Chi-Square	1240.531
	Df	105
	Sig.	.000

Source: Computed from the Primary Data.

The outcome of the KMO Measure of Sampling Adequacy and Bartlett's Test of Sphericity confirms the suitability of the data for factor analysis (Table 3). The Kaiser-Meyer-Olkin (KMO) value is 0.753, surpassing the acceptable threshold of 0.6, which indicates that the sample is adequate and the variables share a moderate level of common variance. Bartlett's Test of Sphericity yields a chi-square figure of 1240.531 with 105 degrees of freedom and a significance level of 0.000, confirming that the association table is not an identity matrix. This indicates substantial interconnections among the variables, offering a solid foundation for conducting factor analysis.

Table 4: Institutional Support Factors Influencing Sustainable Entrepreneurship Among Higher Education Students

Communalities		
	Initial	*Extraction*
Institutional Motivation Support:	1.000	.465
Institutional Confidence Building:	1.000	.614
Institutional Alignment with Values:	1.000	.589
Institutional Initiative Encouragement:	1.000	.927
Peer Support Environment:	1.000	.562
Social community norms	1.000	.858
Inspirational Success Stories:	1.000	.812
Cultural Awareness Promotion:	1.000	.917
Institutional Events and Competitions:	1.000	.702
Institutional Collaboration Opportunities:	1.000	.774
Institutional Encouragement for Application:	1.000	.644
Guidance of Faculty	1.000	.776
Sustainability focused project	1.000	.842
Infrastructure facility of sustainable entrepreneurship	1.000	.417
Regular organise events on sustainable entrepreneurship	1.000	.747

Source: Computed from the Primary Data.

The communalities table indicates the percentage of each variable's variance that can be explained by the factors extracted using Principal Component Analysis (PCA). Variables with high commonalities, such as Institutional Initiative Encouragement (0.927), Cultural Awareness Promotion (0.917), and Social Community Norms (0.858), are strongly represented within the factor solution. Variables with moderate communalities, including Institutional Confidence Building (0.614) and Peer Support Environment (0.562), suggest that a fair amount of their variance is explained by the factors. However, variables such as Institutional Motivation Support (0.365) and Infrastructure Facility of Sustainable Entrepreneurship (0.417) exhibit lower communalities, reflecting weaker representation in the factor structure (Table 4). Overall, the results demonstrate that most variables are well-represented in the factors, although further evaluation may be needed to enhance the alignment of variables with lower communalities to the extracted components.

Table 5: Total Variance Explained

Elements	*Starting Eigen Values*			*Extracted Eigen Value Summaries*			*Rotated Factor Loadings*
	Total	*Explained Variance (%)*	*Accretive %*	*Total*	*Explained Variance (%)*	*Accretive %*	*Total*
1	5.441	36.275	36.275	5.441	36.275	36.275	5.161
2	2.005	13.364	49.639	2.005	13.364	49.639	2.710
3	1.804	12.029	61.669	1.804	12.029	61.669	1.830
4	1.296	8.638	70.307	1.296	8.638	70.307	1.974
5	.962	6.411	76.718				

Elements	Starting Eigen Values			Extracted Eigen Value Summaries			Rotated Factor Loadings
	Total	Explained Variance (%)	Accretive %	Total	Explained Variance (%)	Accretive %	Total
6	.908	6.054	82.772				
7	.647	4.314	87.086				
8	.483	3.223	90.309				
9	.459	3.057	93.366				
10	.374	2.493	95.858				
11	.205	1.364	97.223				
12	.168	1.123	98.346				
13	.124	.824	99.170				
14	.084	.559	99.729				
15	.041	.271	100.000				

Source: Computed from the Primary Data.

Table 5 of Total Variance Explained illustrates the results of PCA in terms of the variance accounted for by each extracted component. The initial eigenvalues show that four components have eigenvalues greater than 1, cumulatively explaining 70.31% of the overall variance, which indicates a substantial reduction in data complexity while retaining most of the original information. The first component accounts for the highest variance (36.28%), followed by the second (13.36%), third (12.03%), and fourth component (8.64%). The extracted eigenvalue summaries confirm that these four components are retained, capturing the key patterns in the data. The rotated factor loadings redistribute the variance more evenly across components, improving interpretability, with the first component contributing slightly less after rotation (5.161) and the subsequent components gaining more clarity in their contributions. Components beyond the fourth have eigenvalues lower than 1 and explain minimal additional variance, indicating they are not retained in the final solution.

Findings

- *Demographic Profile of Respondents*
  - A significant portion (51.67%) of respondents are aged 23-25 years, followed by 39.16% in the 20–22 age group, highlighting a predominance of student participants.
  - The sample is slightly male-dominated, with 57.50% male and 42.50% female respondents.
  - Educationally, 54.16% of the participants hold undergraduate degrees in Management, while 42.50% have Commerce backgrounds. Only 3.33% represent other disciplines.
  - The stratified sampling approach ensured equal representation across six departments within the School of Management.
- *Entrepreneurial Background and Exposure*
  - A majority of respondents (77.50%) do not have a family business background, indicating a focus on first-generation entrepreneurs.
  - Most participants (8167%) lack prior working experience, with minimal exposure to start-ups (2.50%). However, 82.50% have attended entrepreneurship workshops or seminars.
- *Career Aspirations and Motivations*
  - Nearly half (48.33%) of the respondents aspire to become job seekers, while 43.33% aim to be job providers (entrepreneurs).
  - Motivations for participating in entrepreneurial activities include enhancing employability (21.67%), personal interest (19.17%), and passion for entrepreneurship (1.50%).
  - Over 51.67% frequently engage in extracurricular or academic entrepreneurship activities, and 86.66% believe such participation positively influences their career goals.

- *Chi-Square Test on Gender and Sustainability Awareness*
  - A significant gender disparity exists in awareness of the importance of sustainability in entrepreneurship (p-value < 0.001).
  - 76.4% of male respondents are aware, compared to only 28.2% of female respondents.
- *Factor Analysis*
  - *KMO and Bartlett's Test:* A Kaiser-Meyer-Olkin (KMO) value of 0.753 and a highly significant result from Bartlett's Test (p < 0.001) indicate the data's appropriateness for factor analysis. These results highlight adequate sampling adequacy and strong interrelationships among the variables.
  - *Institutional Support Factors:* High communalities were observed for variables like Institutional Initiative Encouragement (0.927), Cultural Awareness Promotion (0.917), and Social Community Norms (0.858), suggesting these factors significantly influence sustainable entrepreneurship.
  - *Variance Explained:* PCA identified four key components explaining 70.31% of the total variance, with the first component accounting for 36.28% of the variance. These components represent critical dimensions of institutional support and sustainability-focused entrepreneurship.

Conclusion

This study highlights the direct effects and collaborative interaction between sustainability practices and entrepreneurial intentions among higher education students, providing critical insights into sustainable entrepreneurship education. The results, obtained from a quantitative analysis of 120 final-year post graduate students in the management department of Alagappa University, demonstrate that competence-based education and university support play an important role in nurturing students' entrepreneurial intentions and encouraging active participation in sustainable entrepreneurship activities. The inclusion of constructs such as sustainability practices, entrepreneurial intentions, and demographic variables offers a comprehensive understanding of factors influencing students' readiness to engage in sustainability-driven entrepreneurship.

Future Implications

The future implications of this research highlight the necessity for universities to strongly integrate sustainability-focused activities into their curricula. Institutions can create competency-driven programmes that foster an attitude aligned with sustainable development objectives in addition to developing entrepreneurial abilities. Additionally, cooperation between academic institutions, businesses, and policymakers can improve institutional support and offer useful forums for students to participate in sustainable entrepreneurship in real-world contexts. This study could be expanded in the future by examining how cultural and regional variations affect sustainable entrepreneurial ecosystems in higher education or by adding longitudinal data to measure changes in entrepreneurial goals over time.

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