The Institution Factor: Exploring Its Moderating Effect On Entrepreneurial Competence And Social Innovation Among Engineering Students

Discipline: Commerce

Badusha Muhammed
Research Scholar, PG & Research Department of Commerce, St. Michael's College, Cherthala, Alappuzha, Kerala, India, Email: badushamuhammed@stmcc.in

Received: 20 Nov 2024| Revised Submission: 05 Jan 2025 | Accepted: 01 Feb 2025| Available Online: 31 Mar 2025

Abstract

With the growing emphasis on entrepreneurship education in India, technical institutions are evolving to equip students with the skills needed to address real-world challenges. This study examines the moderating role of institutional type in the relationship between entrepreneurial competence and social innovation among engineering students. A survey of 390 final-year engineering students from Kerala was conducted, and data were analyzed using Covariance-Based Structural Equation Modeling (CB-SEM) and moderation analysis in AMOS. The results confirm that entrepreneurship training significantly enhances entrepreneurial competence, which in turn fosters social innovation. However, the moderating effect of institutional type reveals that students from direct or autonomous institutions exhibit a stronger relationship between entrepreneurial competence and social innovation compared to those from affiliated colleges. These findings highlight the need for institutions to tailor entrepreneurship education based on institutional structure, ensuring a more effective ecosystem for fostering social innovation. Aligning with Sustainable Development Goals (SDG-4 and SDG-9), this study emphasizes the importance of institutional support in shaping future social entrepreneurs.

Keywords:

Entrepreneurship Training, Social Innovation, Entrepreneurial Competence, Sustainable Development Goals (SDGs), Institutional influence

Introduction

Entrepreneurship is important for driving social change and boosting the economy by creating a good career for the young generation and ensuring the wealth of a nation. It is essential to address the entrepreneurial traits of budding young business visionaries nurtured in educational institutions for a nation's long-term development. As the modern, competitive world demands graduates with strong entrepreneurial skills and knowledge, higher education institutions play a crucial role in fostering entrepreneurship and supporting social innovation among students. These skills are essential not only for

launching and sustaining ventures but also for ensuring their long-term success and societal impact.

Entrepreneurship training has been found to significantly enhance students' ability to engage in social innovation, with entrepreneurial competence serving as a key mediating factor. Additionally, the moderating role of institutional affiliation highlights the need for policy interventions that strengthen entrepreneurial ecosystems in technical institutions. Artificial Intelligence further supports this process by assisting students in practical entrepreneurial tasks such as market research, competitor analysis, and legal aspects, thereby improving their productivity and efficiency (Gupta & Singh, 2024). These insights align with SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure), emphasizing the importance of integrating entrepreneurship education with social innovation to drive economic growth and sustainable development.

Entrepreneurship is vital for economic growth and social change, yet there is a gap in understanding how technical educational institutions equip students with the necessary skills for sustainable entrepreneurship. While entrepreneurship training aims to enhance competence and foster social innovation, the effectiveness of these programs in technical institutions remains unclear. Additionally, the role of institutional factors, such as differences between government and private institutions, in shaping entrepreneurial competence and social innovation has not been adequately explored. Given the increasing demand for entrepreneurial skills in the modern economy, it is crucial to assess whether these institutions are effectively preparing students to meet real-world challenges. This study aims to bridge this gap by examining the impact of entrepreneurship training on entrepreneurial competence, its role in fostering social innovation, and how institutional differences influence this relationship, aligning with the broader goals of education and industry development.

Literature Review

Entrepreneurship is an active process led by an individual who seeks to harness economic innovation to create new value in the market to meet a specific need(McClelland, 1961). Entrepreneurial training and development are processes that help individuals gain the skills needed to save and build the confidence to explore profitable business ideas and market opportunities for their products or services (Kimwolo, Saina, & Cheserek, 2012).Studies on sustainable entrepreneurship training has shown that it boosts young entrepreneurs' confidence, competence and supports them in starting social enterprises(Hockerts, 2015; Kummitha & Majumdar, 2015; Smith & Woodworth, 2012). Understanding the required competencies of a social entrepreneur allows educational institutions to tailor programs that effectively prepare

students for the challenges of social entrepreneurship, nurturing both entrepreneurial spirit and social innovation skills(Cruz-Sandoval et al., 2022).

Higher education institutions play a pivotal role in nurturing entrepreneurial intentions through quality content, skilled instructors, and an entrepreneurial environment(Saranya, 2023). Social entrepreneurial initiatives within colleges and universities significantly impact students' skill development and their sense of social responsibility. These initiatives often integrate digital technology, enhancing students' capabilities and academic performance(Malhotra et al., 2023). The social entrepreneurship ecosystem in India benefits from strong support structures, including training, funding, incubation, and mentoring. Higher education institutions are integral to this ecosystem, providing resources and fostering an environment conducive to entrepreneurial growth(Izzati, Tamyez, & Kumar, 2023)

Government institutions are benefit from state support in creating incubation infrastructure, which is crucial for fostering entrepreneurship(Loganathan & Subrahmanya, 2025), while private institutions may not be as extensive or structured as in government institutions(Patil & Sathiyanarayanan, 2023). Institutions that lack structured support systems, both financially and in terms of concept development, are less effective those that focus primarily on traditional job preparation rather than entrepreneurial skills(Sharma, 2017). Artificial Intelligence assists students in practical entrepreneurial tasks such as market research, competitor analysis, and legal aspects, thereby improving their productivity and efficiency(Gupta & Singh, 2024).

Entrepreneurship is an active process driven by individuals who seek to harness economic innovation to create new value in the market to meet specific needs(McClelland, 1961). Entrepreneurial training and development equip individuals with the necessary skills and confidence to explore profitable business ideas and identify market opportunities for their products or services(Kimwolo, Saina, & Cheserek, 2012). Research has highlighted that structured entrepreneurship training enhances entrepreneurial competence by fostering creativity, problem-solving skills, and risk-taking behavior, which are essential for entrepreneurial success (Hockerts, 2015). Sustainable entrepreneurship training has been found to boost young entrepreneurs' confidence and competence while providing the necessary support to help them establish social enterprises(Kummitha & Majumdar, 2015; Smith & Woodworth, 2012). Moreover, higher education institutions play a crucial role in shaping entrepreneurial intentions through quality content, experienced instructors, and an environment that nurtures innovation(Saranya, 2023). Institutions that actively engage students in entrepreneurial learning create a strong foundation for venture creation and social impact initiatives.

Understanding the competencies required for social entrepreneurship allows educational institutions to design programs that effectively prepare students for the challenges of launching and sustaining social enterprises (Cruz-Sandoval et al., 2022). Social entrepreneurial initiatives within universities provide students with practical exposure and enhance their sense of social responsibility. Such programs often incorporate digital technology to improve entrepreneurial capabilities and academic performance(Malhotra et al., 2023). The social entrepreneurship ecosystem in India is strengthened by institutional support structures, including training programs, funding opportunities, incubation centers, and mentorship initiatives(Izzati, Tamyez, & Kumar, 2023). Government-supported institutions benefit from extensive incubation infrastructure that fosters entrepreneurship, whereas private institutions may lack structured support systems(Loganathan & Subrahmanya, 2025). Research suggests that institutions focusing primarily on traditional job preparation rather than entrepreneurial skills may be less effective in developing social entrepreneurs (Sharma, 2017).

In addition to structured entrepreneurship training, technology, particularly Artificial Intelligence (AI), is playing an increasingly important role in supporting student entrepreneurs. AI assists students in practical entrepreneurial tasks such as market research, competitor analysis, and legal documentation, thereby improving their productivity and efficiency (Gupta & Singh, 2024). Given the importance of entrepreneurial competence in fostering social innovation, it is critical to explore its mediating role in the relationship between entrepreneurship training and social innovation. Additionally, the type of institution may moderate the impact of entrepreneurial competence on students' ability to innovate socially, as support structures and resources differ between public and private institutions. Based on this literature, we hypothesize the following:

H1: Entrepreneurial competence is influenced by entrepreneurship training

H2: Social innovation is influenced by entrepreneurial competence

H3: Social innovation is influenced by entrepreneurship training

H4: The effect of entrepreneurship training on the social innovation of the students is mediated by entrepreneurial competence.

H5: The effect of entrepreneurial competence on the social innovation of the students is moderated by the type of institutions.

Methodology

Data

Our research targets final-year engineering students at Kerala Technical University who are enrolled in an Entrepreneurship core course and training programs. To ensure diversity, we used cluster sampling and the sample was drawn from fourth-year students across various engineering disciplines. Initially, we formed four clusters: University institutes, Autonomous Colleges, Aided Colleges, and Self-Financing Colleges. We then randomly selected one college from each cluster and listed all final-year students using the admission databanks. Ultimately, we randomly selected students from these colleges, resulting in a total sample size of 390.

Measure

The perception of students regarding entrepreneurship training was assessed using six items adapted from Adekiya and Ibrahim (2016). The perceived entrepreneurial competency level was evaluated through two constructs—Operations and Marketing Competencies (OMC) with five items, and Competencies in Socio-Business and Legal Organization (CSBLO) with four items—based on the work of Cárdenas-Gutiérrez et al., (2021). Additionally, the attitude towards social innovation was measured using five items adapted fromCruz-Sandoval et al., (2022) andGarcía-González et al., (2020). A Likert scale from 1 to 5 was used to evaluate all these constructs.

Analysis

Analysisofnormalityand Commonmethod Bias

Results from the normality test indicate that all factors (Entrepreneurship Training, Organizational Management Competency, CSBLO, Social Innovation, and Entrepreneurship Competency) exhibit skewness values within the acceptable limit for a normal distribution, with skewness values of -0.506, -1.013, -0.279, -0.104, and -0.737, meeting the recommended threshold of -2 to +2 range indicated byGeorge & Mallery, (2010). These findings support the appropriateness of utilizing parametric tests for hypothesis testing. The Harman's Single Factor test results, elucidating only 47.867% of the variance with a single factor, sink below the recommended 50% threshold(Cooper et al., 2020). This indicates that there is no common method bias in the data.

Reliability

The Alpha values for all four factors, ET (.939), OMC (.855), CSBLO (.810) and SI (.872), surpass 0.70, a threshold recommended byNunnally & Bernstein, (1994). This indicates that the scale demonstrates internal consistency and reliability, implying that the items within it effectively measure their intended constructs.

Validity

Based on the EFA results, the Kaiser-Meyer-Olkin (KMO) value of 0.946 indicates excellent sampling adequacy, and Bartlett's Test of Sphericity is significant ($\div^2 = 5247.900$, df = 190, $p < 0.001$), supporting the factorability of the data. The rotated component matrix reveals a clear four-factor structure, with each item loading strongly on its respective component, confirming the construct validity of the measured factors (Entrepreneurship Training, Organizational Management Competency, CSBLO, and Social Innovation).

Table 1 :Discriminant and Convergent Validity

Construct	CR	AVE	MSV	MaxR(H)	ET	SI	EC
ET	0.940	0.724	0.697	0.943	**0.851**		
SI	0.884	0.611	0.379	0.918	0.616	**0.781**	
EC	0.868	0.767	0.697	0.871	0.835	0.610	**0.876**

All AVE values are larger than the MSV values, indicating a high level of discriminant validity among the constructs(Fornell, C., & Larcker, 2016). Convergent validity is supported when the AVE for each construct is greater than 0.50(Chin et al., 1998; Ding et al., 1995).

Table 2: Goodness of fit

Measure	Estimate	Threshold	Source	Interpretation
CMIN/DF	1.856	Between 1 & 3	(Kenny et al., 2015)	Acceptable
GFI	0.928	>0.90	(Hair et al., 2010)	Acceptable
CFI	0.973	>0.95	(Hu & Bentler, 1999)	Acceptable
SRMR	0.041	<0.08	(Hu & Bentler, 1999)	Acceptable
RMSEA	0.047	<0.06	(Hu & Bentler, 1999)	Acceptable

The model fit indices reported in Table 4 indicate that the measurement model demonstrates an overall good fit with the data. The CMIN/DF value of 1.856 falls within the acceptable range of 1 to 3, suggesting good model parsimony and fit to the sample data(Kenny et al., 2015). The GFI value of 0.928 exceeds the recommended threshold of 0.90, indicating that the model adequately represents the observed covariance matrix(Hair et al., 2010). Additionally, the CFI value of 0.973 surpasses the cutoff of 0.95, confirming a strong comparative fit with the baseline model(Hu & Bentler, 1999). The SRMR (0.041) and RMSEA (0.047) are both below their respective

thresholds of 0.08 and 0.06, reflecting excellent fit with minimal residual errors (Hu & Bentler, 1999). Overall, these indices confirm that the model exhibits strong and acceptable goodness-of-fit, supporting the validity of the measurement model.

Results & Discussions

Figure 1: CB-SEM Model

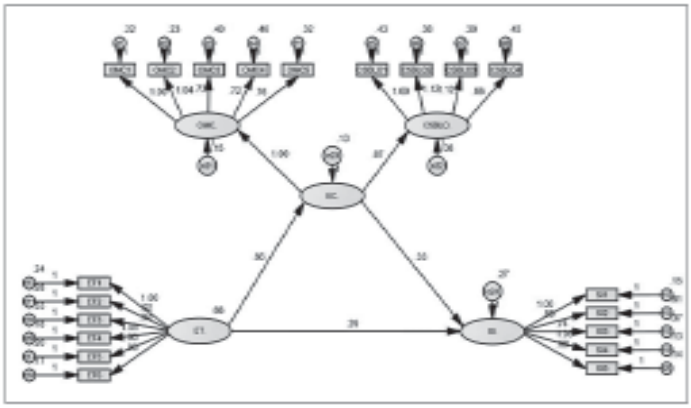

Table 3: Influence of independent variable on dependent variable

From	To	â	p value	Description
Entrepreneurship Training	Entrepreneurial Competence	0.835	<.001	Significant
Entrepreneurial Competence	Social Innovation	0.316	<.01	Significant
Entrepreneurship Training	Social Innovation	0.352	<.01	Significant

The results indicate that entrepreneurship training has a significant and positive impact on entrepreneurial competence (â = 0.835, p < .001), suggesting that structured training programs effectively enhance students' ability to develop entrepreneurial skills. Additionally, entrepreneurial competence significantly influences social innovation (â = 0.316, p < .01), demonstrating that students who acquire entrepreneurial skills are more likely to engage in innovative solutions to social challenges. Furthermore, entrepreneurship training directly impacts social innovation (â = 0.352, p < .01), highlighting that educational interventions not only build competence but also foster students' capacity for social impact. These findings support the argument that

entrepreneurship education plays a crucial role in equipping students with the skills necessary to drive innovation and address societal needs.

Table 4: Mediation Analysis

Path	Direct effect	Indirect effect	Total effect	p value	VAF
ET > EC > SI	0.352	0.264	0.616	<.001	0.750

The mediation analysis results indicate that entrepreneurship training significantly enhances entrepreneurial competence (â = 0.835, p< .001), supporting the hypothesis that structured training programs improve students' entrepreneurial capabilities. Furthermore, entrepreneurial competence positively influences social innovation (â = 0.316, p< .01), confirming that students with strong entrepreneurial skills are more likely to engage in socially innovative activities. Additionally, entrepreneurship training has a direct positive impact on social innovation (â = 0.352, p< .01), suggesting that both direct and indirect effects contribute to fostering social innovation among students. These findings align with previous research emphasizing that entrepreneurship education equips students with the skills to initiate innovative and socially impactful ventures (Kimwolo, Saina, & Cheserek, 2012; Hockerts, 2015). The significant mediation effect further supports the argument that entrepreneurial competence acts as a crucial mechanism through which entrepreneurship training fosters social innovation, consistent with studies highlighting the role of entrepreneurial education in building confidence and competency for sustainable entrepreneurship (Cruz-Sandoval et al., 2022). Thus, the hypothesis that entrepreneurial competence mediates the relationship between entrepreneurship training and social innovation is accepted.

Figure 2: Moderation

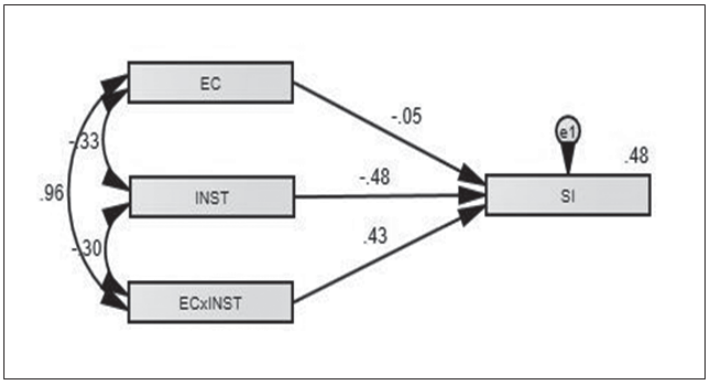

Table 5: Moderation analysis

Path	Estimate (â)	S.E.	C.R.	p-value	Significance
SI <— EC	-0.057	0.141	-0.405	0.685	Not Significant
SI <— INST	-0.646	0.052	-12.395	<.001	Significant ***
SI <— EC × INST	0.171	0.053	3.223	0.001	Significant **

The moderation analysis indicates that institution type significantly moderates the relationship between entrepreneurial competence and social innovation, as shown by the interaction effect (â = 0.171, *p* = .001). Students from Direct/Autonomous institutions exhibit higher entrepreneurial competence (M = 3.51) and social innovation levels (M = 3.08) compared to those from Affiliated colleges (entrepreneurial competence: M = 3.10; social innovation: M = 2.28). This finding suggests that structured institutional support, such as incubation, mentoring, and funding, enhances students' ability to translate entrepreneurial competence into social innovation (Saranya, 2023; Izzati et al., 2023). Consequently, the hypothesis that institution type moderates the effect of entrepreneurial competence on social innovation is supported. Interestingly, the direct effect of entrepreneurial competence on social innovation becomes negative in the moderation model (â = -0.057, *p* = .685), though it is not statistically significant. This result suggests that without adequate institutional support, entrepreneurial competence alone may not be sufficient to drive social innovation. Previous research similarly highlights that government-supported institutions have stronger entrepreneurial ecosystems than private or affiliated colleges, where structured support is often lacking (Loganathan & Subrahmanya, 2025; Patil &Sathiyanarayanan, 2023). These findings underscore the importance of strengthening entrepreneurship-focused policies and institutional support mechanisms, particularly in affiliated colleges, to bridge the gap in fostering social innovation skills among students.

Conclusion

This study underscores the significant role of entrepreneurship training in fostering entrepreneurial competence and social innovation among students in technical institutions. By equipping students with the necessary skills to create and implement innovative solutions, entrepreneurship education directly contributes to the objectives of Sustainable Development Goal 4 (Quality Education) and Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure). The findings indicate that structured entrepreneurship training enhances students' ability to identify and address social challenges, reinforcing the importance of integrating social innovation into entrepreneurship curricula.

Furthermore, the study highlights how institutional support mechanisms, such as incubation centers, mentoring, and funding opportunities, can significantly impact students' entrepreneurial success. Strengthening these support systems, especially in affiliated institutions, can help bridge the gap in fostering social innovation and ensuring that students receive holistic entrepreneurial education.

Future research could examine the long-term impact of entrepreneurship training on students' career trajectories, particularly in sustaining business ventures and driving social innovation beyond graduation. Investigating how cultural, economic, and institutional factors influence the effectiveness of entrepreneurship training programs would provide deeper insights into optimizing these programs across different contexts. Additionally, expanding research to include diverse educational settings, such as vocational training institutions and interdisciplinary programs, could offer a broader understanding of how entrepreneurship education can be tailored to varying student needs. Future studies could also assess the effectiveness of integrating experiential learning methods, such as real-world entrepreneurial projects and industry collaborations, in enhancing both entrepreneurial competence and social innovation skills. Strengthening these aspects in entrepreneurship education will ensure that students are well-equipped to contribute to sustainable economic and social development.

Managerial Implications

The findings suggest several key managerial implications for policymakers, educators, and institutional leaders. First, strengthening institutional support through incubation centers, mentorship programs, and structured entrepreneurial ecosystems can enhance students' entrepreneurial competence and social innovation capabilities. Second, governments must bridge the institutional gap by ensuring equitable access to resources, funding, and infrastructure, enabling students across diverse institutions to benefit from entrepreneurship training. Third, universities should integrate social entrepreneurship modules and leverage digital tools, including AI-based training, to enhance skill development for social innovation. Fourth, fostering an entrepreneurial mindset through workshops, resilience training, and psychological support can help students overcome risk aversion and develop a proactive approach to entrepreneurship. Lastly, collaboration between institutions and stakeholders is essential to create a holistic entrepreneurial ecosystem that nurtures young entrepreneurs and promotes sustainable business models.

References

1. Cárdenas-Gutiérrez, A. R., Bernal-Guerrero, A., & Montoro-Fernández, E. (2021). Construction and validation of the Basic Scale of Entrepreneurial Competencies for the Secondary Education level. A study conducted in Spain. *PLoS ONE*, *16*(4 April), 1–21. https://doi.org/10.1371/journal.pone.0249903

2. Chin, W. W., Chinn, W. W., & Chin, W. W. (1998). The partial least squares approach to structural equation modelling. In Marcoulides G. A. (Ed.). *Modern Methods for Business Research*, *295*(2), 295–336.

3. Cooper, B., Eva, N., Zarea Fazlelahi, F., Newman, A., Lee, A., & Obschonka, M. (2020). Addressing common method variance and endogeneity in vocational behavior research: A review of the literature and suggestions for future research. *Journal of Vocational Behavior*, *121*(July), 103472. https://doi.org/10.1016/j.jvb.2020.103472

4. Cruz-Sandoval, M., Vázquez-Parra, J. C., & Alonso-Galicia, P. E. (2022). Student Perception of Competencies and Skills for Social Entrepreneurship in Complex Environments: An Approach with Mexican University Students. *Social Sciences*, *11*(7). https://doi.org/10.3390/socsci11070314

5. Ding, L., Velicer, W. F., & Harlow, L. L. (1995). Effects of Estimation Methods, Number of Indicators per Factor, and Improper Solutions on Structural Equation Modeling Fit Indices. *Structural Equation Modeling: A Multidisciplinary Journal*, *2*(2), 119–143. https://doi.org/10.1080/10705519509540000

6. Fornell, C., & Larcker, D. F. (2016). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50.

7. García-González, A., Ramírez-Montoya, M. S., de León, G., & Aragón, S. (2020). Social entrepreneurship as a transversal competency: Construction and validation of an assessment instrument in the university context. *REVESCO Revista de Estudios Cooperativos*, *136*(136), 1–16. https://doi.org/10.5209/REVE.71862

8. George, D., & Mallery, M. (2010). *Testing normality including skewness and kurtosis*.

9. Gupta, M., & Singh, M. (2024). The Impact of Artificial Intelligence for Advancement in Entrepreneurial Education. *European Conference on Innovation and Entrepreneurship*, 218–224.

10. Hair, Joseph, F., Black, W. C., Babin, B. J., & E., A. R. (2010). Multivariate data analysis. *In Multivariate Data Analysis*, 785–785.

11. Hockerts, K. (2015). The Social Entrepreneurial Antecedents Scale (SEAS): a validation study. *Social Enterprise Journal*, *11*(3), 260–280. https://doi.org/10.1108/sej-05-2014-0026

12. Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

13. Izzati, N., Tamyez, P., & Kumar, S. (2023). Cross-country Analysis of Social Entrepreneurship Ecosystem and Support System in India and Malaysia. *SCMS Journal of Indian Management*.

14. Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The Performance of RMSEA in Models With Small Degrees of Freedom. *Sociological Methods and Research*, *44*(3), 486–507. https://doi.org/10.1177/0049124114543236

15. Kimwolo, A., Saina, C., & Cheserek, G. (2012). Effects of credit training skills on sales performance among women entrepreneurs in Elgeiyo Marakwet County, Kenya. *Journal of Emerging Trends in Economics and Management Sciences*, 945-950.

16. Kummitha, R. K. R., & Majumdar, S. (2015). Dynamic curriculum development on social entrepreneurship - A case study of TISS. *International Journal of Management Education*, *13*(3), 260–267. https://doi.org/10.1016/j.ijme.2015.05.005

17. Loganathan, M., & Subrahmanya, M. H. B. (2025). Assessment of the impact of government support to technology business incubators in India. *Innovation: The European Journal of Social Science Research*, 1–19. https://doi.org/10.1080/13511610.2024.2446534

18. Malhotra, S., Anil, K., & Kaur, A. (2023). Impact of Social Entrepreneurship on Digital Technology and Students ' Skill Set in Higher Education Institutions/ : A Structured Equation Model. *International Journal of Experimental Research and Review*, *35*, 54–61.

19. McClelland, D. C. (1961). *The Achieving Society.* New York: Van Norstrand Co Inc.

20. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory*. McGraw-Hill.

21. Patil, K. K., & Sathiyanarayanan, M. (2023). I5 Framework/ : Institutions-Industries-Interactions Innovations-Incubators for Strengthening Start-up Ecosystem in Higher Education Institutions. *International Journal of Emerging Technologies in Learning*, *18*, 148–163.

22. Saranya, S. P. R. (2023). Empirical study on the role of passion , individual differences , and innovativeness between entrepreneurship education in higher education institutions and entrepreneurial intention/ : A moderated mediating model. *Review of Education*, *July*, 1–27. https://doi.org/10.1002/rev3.3412

23. Sharma, L. (2017). Teachers ' perspective on inûitutional barriers to academic entrepreneurship – a case of Uttarakhand. *Teachers and Teaching: Theory and Practice*, *0602*, 1–15. https://doi.org/10.1080/13540602.2016.1205017

24. Smith, I. H., & Woodworth, W. P. (2012). Developing social entrepreneurs and social innovators: A social identity and self-efficacy approach. *Academy of Management Learning and Education*, *11*(3), 390–407. https://doi.org/10.5465/amle.2011.0016