INNOVATION MANAGEMENT FACTORS INFLUENCING ENTREPRENEURSHIP EDUCATION MANAGEMENT OF UNIVERSITIES IN HENAN PROVINCE*

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Abstract

Innovation and entrepreneurship education has become a strategic priority for universities, particularly in developing regions where institutional innovation systems are still evolving. This study examines how innovation management factors influence entrepreneurship education management in universities in Henan Province, China. A mixed-methods research design was employed, combining a questionnaire survey of 506 respondents, including university teachers and undergraduate students, with qualitative interviews to provide contextual insights. Descriptive statistics, Pearson correlation, and stepwise multiple regression analyses were conducted to identify significant institutional predictors.

The findings indicate that innovation management factors were perceived at a high level, and entrepreneurship education management outcomes also demonstrated strong performance. Significant predictors included institutional

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resources, strategic management policies, faculty support, industry collaboration, government support, and technological infrastructure. Correlation results revealed strong positive relationships among innovation management variables, suggesting that institutional innovation operates as an integrated system rather than isolated practices. Based on the empirical findings, a strategic development model was proposed to illustrate how institutional challenges evolve into coordinated governance strategies and system-level innovation outcomes. This study contributes to innovation management and entrepreneurship education literature by integrating the Technology–Organization–Environment framework and the Triple Helix perspective to explain institutional mechanisms supporting entrepreneurship education development in policy-driven higher education contexts.

Keywords: Innovation management, entrepreneurship education, higher education

Introduction

Innovation and entrepreneurship education has become a strategic priority for universities as higher education institutions increasingly contribute to regional innovation and economic development. Beyond traditional teaching and research roles, universities are now expected to cultivate entrepreneurial competencies through integrated institutional management, industry collaboration, and digital innovation practices (Abreu et al., 2024; Sun et al., 2023).

International research suggests that effective entrepreneurship education depends not only on curriculum design but also on broader innovation management systems that align resources, governance structures, and external partnerships (Bocken, 2025; Du & Li, 2024). From a theoretical perspective, Diffusion of Innovation Theory explains how entrepreneurial practices spread

within academic environments (Rogers, 2003), while the Triple Helix framework emphasizes collaboration among universities, industry, and government (Etzkowitz & Leydesdorff, 2000). Organizational Learning Theory highlights continuous institutional adaptation (Argote, 2013), and the Technology–Organization–Environment (TOE) framework provides a holistic lens for understanding how technological readiness, organizational structures, and policy environments shape innovation implementation (Tornatzky & Fleischer, 1990).

Despite growing global attention, significant disparities remain between developed and developing regions. Many existing studies focus on mature innovation ecosystems in advanced economies, whereas less attention has been given to policy-driven contexts where institutional capacities and industry linkages are uneven (Chen & Xu, 2023). In China, national initiatives such as “Mass Entrepreneurship and Innovation” have accelerated entrepreneurship education development, yet regional differences persist (Deng, 2024). Provinces like Henan face challenges including limited resources, fragmented stakeholder collaboration, and gaps between policy expectations and institutional practices.

Henan Province represents a typical developing-region context with a large student population and increasing pressure to align higher education with regional innovation strategies. Universities in this region must adapt national policies to local socio-economic conditions, where traditional industries and emerging digital transformation coexist (Sun & Zhao, 2022). Understanding how institutional innovation management factors influence entrepreneurship education management is therefore essential for improving educational effectiveness and regional development outcomes.

Although prior studies acknowledge the importance of innovation management, empirical research rarely examines multiple institutional factors within a unified framework. The combined influence of institutional resources, strategic management policies, faculty support, industry collaboration,

government support, digital infrastructure, entrepreneurship curriculum, and stakeholder engagement remains underexplored, particularly in developing-region universities (Kuckertz et al., 2024).

Therefore, this study investigates how innovation management factors influence entrepreneurship education management in universities in Henan Province. By integrating theoretical perspectives with mixed-methods analysis, the research aims to provide empirical evidence and practical insights for strengthening innovation-driven educational management in higher education contexts.

Objectives

1. To study the level of innovation management factors of universities in Henan Province.

2. To study the level of entrepreneurship education management of universities in Henan Province.

3. To examine the relationship between innovation management factors and entrepreneurship education management of universities in Henan Province.

4. To analyze the innovation management factors influencing entrepreneurship education management of universities in Henan Province.

5. To propose guidelines for developing entrepreneurship education management in universities in Henan Province.

Literature Review

Innovation Management in Higher Education

Innovation management has increasingly been recognized as a critical mechanism for enhancing university performance and fostering entrepreneurship education. Rather than representing isolated initiatives, innovation management refers to the systematic coordination of institutional resources, strategic

governance, technological infrastructure, and stakeholder collaboration to support innovation-driven activities (Bocken, 2025). In higher education contexts, innovation management provides the structural foundation through which entrepreneurship education programs are planned, implemented, and evaluated.

From a theoretical perspective, Diffusion of Innovation Theory explains how new educational practices and entrepreneurial initiatives spread within universities through communication channels and social adoption processes (Rogers, 2003). Complementing this perspective, Organizational Learning Theory emphasizes that universities function as adaptive systems where knowledge sharing and continuous improvement shape innovation capacity (Argote, 2013). These frameworks suggest that institutional innovation management is not merely administrative but involves dynamic processes that influence how entrepreneurship education evolves over time.

Recent empirical studies highlight that innovation management factors such as institutional resources, faculty support, and technological infrastructure significantly shape entrepreneurial outcomes in universities (Abreu et al., 2024). However, existing research often examines these elements separately rather than as an integrated system, creating a need for a comprehensive framework that captures multiple institutional dimensions simultaneously.

Entrepreneurship Education and Institutional Ecosystems

Entrepreneurship education has shifted from traditional classroom-based instruction toward experiential and ecosystem-oriented learning models. Scholars emphasize that entrepreneurship education effectiveness depends on interactions among universities, industry, and government rather than curriculum design alone (Du & Li, 2024). The Triple Helix model conceptualizes this interaction as a collaborative innovation system where universities generate knowledge, industry provides application opportunities, and government offers policy support (Etzkowitz & Leydesdorff, 2000). This perspective aligns with

research suggesting that strong stakeholder engagement and external collaboration enhance student participation and entrepreneurial competency development.

Moreover, digital transformation has introduced new dimensions to entrepreneurship education management. Digital infrastructure enables data-driven evaluation, online collaboration, and innovative teaching practices, which expand access to entrepreneurial learning environments (Chen & Xu, 2023). These developments demonstrate that institutional innovation management increasingly relies on technological readiness alongside traditional governance structures.

Innovation Management Factors Influencing Entrepreneurship Education

Building upon innovation management theories and prior empirical research, several institutional factors have been identified as critical drivers of entrepreneurship education management. Institutional resources and strategic management policies provide structural support for innovation activities, while faculty mentorship and industry collaboration contribute to practical learning experiences. Government support and digital infrastructure further create enabling environments that facilitate entrepreneurial initiatives.

The Technology–Organization–Environment (TOE) framework provides an integrative lens for understanding these relationships by highlighting how technological conditions, organizational strategies, and external policy environments jointly influence innovation adoption (Tornatzky & Fleischer, 1990). Within this framework, entrepreneurship curriculum design and stakeholder engagement represent mechanisms that translate institutional strategies into student-level outcomes, such as innovation capacity development and start-up success.

Although previous studies acknowledge individual innovation management factors, few empirical investigations examine how multiple

institutional elements interact simultaneously to influence entrepreneurship education management, particularly in developing-region universities (Kuckertz et al., 2024). This gap suggests the need for a holistic analytical approach that integrates strategic, organizational, and environmental dimensions.

Research Gap and Conceptual Positioning

Existing literature largely focuses on entrepreneurial universities in developed economies where innovation ecosystems evolve organically through long-term collaboration. In contrast, developing-region contexts such as Henan Province often rely on policy-driven innovation strategies, which may produce different institutional dynamics. Limited research has examined how innovation management factors collectively shape entrepreneurship education management under such conditions.

Therefore, this study integrates innovation management theories with entrepreneurship education literature to develop a conceptual framework that links institutional resources, strategic governance, stakeholder collaboration, and technological infrastructure with entrepreneurship education outcomes. By addressing the interaction among these factors, the research contributes to a deeper understanding of innovation-driven educational management within developing higher education systems.

Conceptual Framework

This study develops a conceptual framework that integrates innovation management theories with entrepreneurship education research to explain how institutional factors influence entrepreneurship education management in universities. The framework positions innovation management as a multidimensional institutional system that shapes educational outcomes through strategic, organizational, and environmental mechanisms.

The conceptual model is grounded in several complementary theoretical perspectives. Diffusion of Innovation Theory explains how innovation-oriented educational practices are adopted and disseminated within universities (Rogers, 2003). The Triple Helix framework highlights the collaborative relationships among universities, industry, and government, emphasizing the role of external partnerships in fostering entrepreneurial ecosystems (Etzkowitz & Leydesdorff, 2000). Organizational Learning Theory supports the inclusion of faculty support and stakeholder engagement by viewing universities as adaptive systems driven by knowledge exchange and continuous improvement (Argote, 2013). In addition, the Technology–Organization–Environment (TOE) framework provides an integrative lens for understanding how technological infrastructure, institutional strategies, and external policy environments jointly influence innovation adoption (Tornatzky & Fleischer, 1990).

Based on these theoretical foundations and synthesized literature, innovation management factors are conceptualized as independent variables influencing entrepreneurship education management outcomes. The framework includes eight institutional dimensions: institutional resources, strategic management policies, faculty support, industry collaboration, government support, digital infrastructure, entrepreneurship curriculum, and stakeholder engagement. These factors represent the structural and operational conditions through which innovation management is implemented in higher education institutions.

Entrepreneurship education management is conceptualized as the dependent construct, reflecting the effectiveness of institutional innovation practices in supporting student development. It is operationalized through three key outcome dimensions: student participation, start-up success, and innovation capacity development. By structuring the model in this way, the study emphasizes that entrepreneurship education outcomes are not solely driven by

individual student characteristics but are embedded within broader institutional innovation systems.

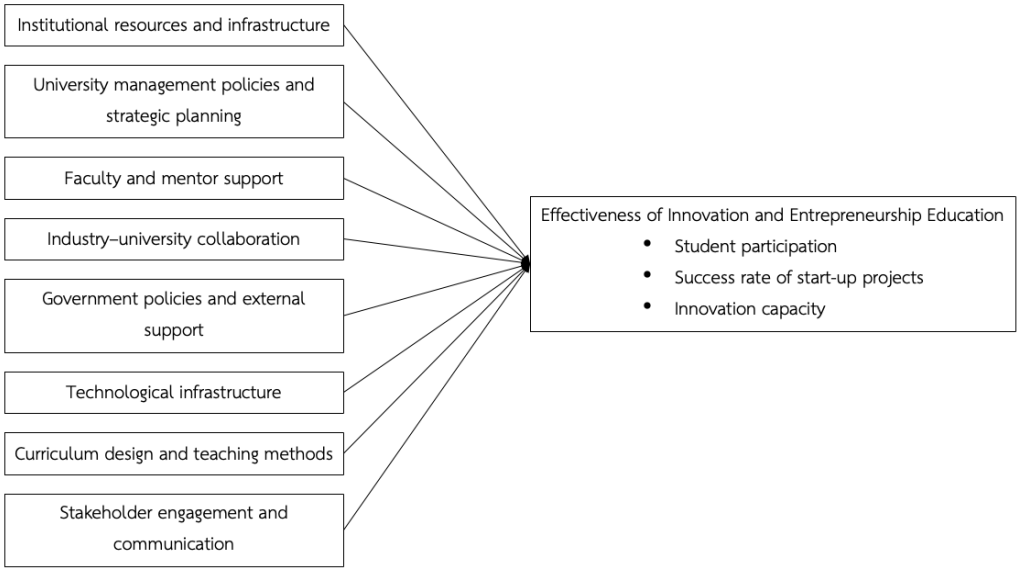


Figure 1 Research Conceptual Framework

Figure 1 presents the conceptual framework guiding this research. The model proposes that innovation management factors collectively influence entrepreneurship education management, while theoretical perspectives provide explanatory mechanisms for understanding these relationships within developing-region higher education contexts.

Methodology

This study adopts a mixed-methods research design combining quantitative and qualitative approaches to examine the influence of innovation management factors on entrepreneurship education management in universities. The quantitative component focuses on testing hypothesized relationships between institutional factors and entrepreneurship education outcomes, while

qualitative interviews provide contextual insights that support the interpretation of statistical findings.

The research was conducted in universities located in Henan Province, China, where entrepreneurship education has expanded rapidly under national innovation policies. The primary unit of analysis is institutional innovation management practices rather than individual entrepreneurial behavior. Although data were collected from both university teachers and undergraduate students, these groups represent different stakeholder perspectives within the same institutional environment. Teachers and students were treated as distinct respondent categories during analysis to reduce potential bias arising from role differences in innovation management perception.

The research population consisted of universities in Henan Province that actively implement entrepreneurship education programs. A structured sampling approach was applied based on a finite population of institutions. The sample size was determined using the Krejcie and Morgan (1970) table, ensuring adequate representation for multivariate statistical analysis.

A total of 506 respondents participated in the survey, including 189 university teachers and 317 undergraduate students. This sample size exceeds the recommended threshold for factor-based and regression analysis, supporting statistical reliability (Comrey & Lee, 1992).

Data were collected using two primary instruments. The questionnaire was developed based on synthesized innovation management variables derived from theoretical frameworks and prior literature. It measured eight innovation management factors and entrepreneurship education management outcomes using a five-point Likert scale. Qualitative data were obtained from nine key informants, including university administrators, experienced faculty members, and experts in innovation management. Interview findings were used to contextualize quantitative results and strengthen interpretative validity.

Content validity of the questionnaire was established through an expert validation process prior to data collection. Five experts in innovation management, entrepreneurship education, higher education policy, and industry–university collaboration evaluated the alignment between questionnaire items and research objectives. The Index of Item–Objective Congruence (IOC) was used to assess content validity, and all items achieved IOC values ranging from 0.80 to 1.00, indicating strong consistency between the measurement items and the intended constructs.

To ensure reliability, internal consistency of the measurement scales was examined using Cronbach's alpha coefficient. The overall reliability value of the questionnaire was 0.87, demonstrating good internal consistency and confirming that the instrument was suitable for measuring innovation management factors and entrepreneurship education management in higher education contexts.

The questionnaire development followed a rigorous multi-stage process, including literature synthesis, advisor review, and expert evaluation, which further strengthened the methodological rigor and measurement accuracy of the study.

Data collection was conducted during the 2025 academic year. Questionnaires were distributed to teachers and students involved in entrepreneurship education activities across selected universities. Participation was voluntary, and ethical considerations such as informed consent and confidentiality were maintained throughout the research process.

Quantitative data were analyzed using statistical software following the research objectives. Descriptive statistics were used to examine the levels of innovation management factors and entrepreneurship education management. Pearson product–moment correlation analysis assessed relationships among variables. Stepwise multiple regression analysis was conducted to identify significant innovation management factors influencing entrepreneurship education management. Prior to regression analysis, assumptions related to

multicollinearity were examined to ensure that independent variables did not excessively overlap, thereby improving model reliability.

Qualitative interview data were analyzed using content analysis to identify recurring themes and to support interpretation of quantitative findings through methodological triangulation.

Results

Objective 1: Level of Innovation Management Factors

Descriptive analysis indicated that innovation management factors were perceived at a high level among universities in Henan Province, with an overall mean score of 3.579 (SD = 0.97), suggesting that institutional innovation practices were generally well established.

Table 1 Level of Innovation Management Factors (N = 506)

Innovation Management Factor	Mean	SD	Interpretation
Institutional Resources & Infrastructure	3.58	0.94	High
University Management Policies & Strategic Planning	3.56	0.98	High
Faculty Mentor Support	3.61	0.95	High
Industry–University Collaboration	3.64	0.92	High
Government Policies & External Support	3.53	0.93	High
Technological Infrastructure	3.62	0.89	High
Curriculum Design & Teaching Method	3.60	0.90	High
Stakeholder Engagement & Communication	3.58	0.91	High
Overall	**3.579**	**0.97**	**High**

Objective 2 Level of Entrepreneurship Education Management

Entrepreneurship education management outcomes were also perceived at a high level. Innovation capacity showed an overall mean of 3.60 (SD = 0.90), indicating strong development of student innovation competence.

Table 2 Level of Entrepreneurship Education Management

Factor	Mean	SD	Interpretation
Student Participation	3.61	0.91	High
Success Rate of Start-up Projects	3.65	0.92	High
Innovation Capacity	3.60	0.90	High
Overall	**3.62**	**0.90**	**High**

Objective 3 Correlation Analysis

Pearson correlation analysis demonstrated strong positive relationships between innovation management factors and entrepreneurship education effectiveness. Correlation coefficients ranged from 0.937 to 0.945 ($p < .01$), indicating a high level of association.

Table 3 Correlation Between Innovation Management Factors

Variable	R	Relationship Level
X_1 Institutional Resources	0.937**	High
X_2 Strategic Policies	0.937**	High
X_3 Faculty Support	0.942**	High
X_4 Industry Collaboration	0.945**	High
X_5 Government Support	0.941**	High

Variable	R	Relationship Level
X_6 Technological Infrastructure	0.942**	High
X_7 Curriculum Design	0.942**	High
X_8 Stakeholder Engagement	0.938**	High

p < .01

Objective 4 Stepwise Multiple Regression Analysis

Stepwise regression analysis identified key innovation management factors that significantly predicted entrepreneurship education effectiveness. Institutional resources, strategic policies, faculty support, industry collaboration, government support, and technological infrastructure demonstrated significant predictive power.

Table 4 Stepwise Multiple Regression Analysis

Predictor	B	SE	β	t	p
Constant	0.030	0.045	—	0.664	.507
Model 1	0.186	0.045	0.185	4.111	< .001
Model 2	0.167	0.044	0.166	3.833	< .001
Model 3	0.148	0.041	0.148	3.571	< .001
Model 4	0.170	0.043	0.168	3.991	< .001
Model 5	0.166	0.044	0.163	3.750	< .001
Model 6	0.159	0.043	0.162	3.698	< .001

All retained predictors are statistically significant at p < .001.

Objective 5 Development of Strategic Guidelines

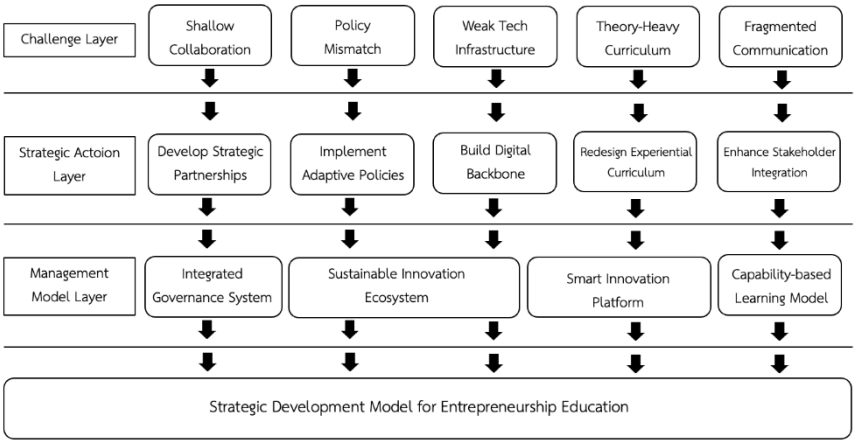


Figure 2 Strategic Development Model for Entrepreneurship

The Strategic Development Model presented in Figure 2 is not merely a summary of recommendations but represents a structured transformation pathway derived from the empirical findings of this study. The model illustrates how innovation management challenges identified in universities evolve into strategic actions and ultimately reshape the institutional management system that supports entrepreneurship education.

At its core, the model reflects a progressive logic rather than a static framework. The first layer, labeled as the Challenge Layer, captures structural tensions within universities. These challenges—such as fragmented stakeholder communication, limited depth of industry collaboration, and curriculum designs that remain heavily theory-oriented—are not isolated problems. Instead, they reveal underlying misalignments between institutional innovation goals and operational practices. From a conceptual perspective, this layer demonstrates that innovation management issues originate from systemic conditions rather

than individual shortcomings. The second layer, the Strategic Action Layer, represents the turning point where institutions move from problem recognition to intentional change. What is significant here is that the strategies are not generic solutions but are closely aligned with the innovation management factors identified through regression analysis. For example, strengthening digital infrastructure is not simply a technological upgrade; it acts as an enabling mechanism that connects policy implementation, teaching innovation, and collaboration practices. Similarly, redesigning entrepreneurship curricula toward experiential learning reflects the idea that educational transformation must be embedded within broader institutional strategy rather than treated as a standalone pedagogical reform. The final layer, the Management Model Layer, illustrates the long-term implications of these strategic actions. Rather than focusing on short-term improvements, the model emphasizes system-level transformation. Integrated governance structures, sustainable innovation ecosystems, and capability-based learning models emerge as outcomes of coordinated institutional change. Conceptually, this layer positions innovation management as a dynamic process that reshapes how universities organize resources, collaborate with external actors, and support student innovation capacity.

The three-layer structure suggests that effective entrepreneurship education management cannot be achieved through isolated interventions. Instead, it requires a continuous progression from diagnosing institutional challenges to implementing strategic actions and ultimately redesigning the overall management system. This interpretation reinforces the study’s central argument that innovation management functions as a mediating mechanism linking institutional conditions with educational outcomes.

Discussion

This study demonstrates that innovation management factors significantly influence entrepreneurship education management in universities. Institutional resources, strategic policies, faculty support, industry collaboration, government support, and technological infrastructure were identified as key predictors, indicating that entrepreneurship education outcomes are shaped by integrated institutional systems rather than isolated practices. The findings are consistent with the Technology–Organization–Environment framework, which suggests that innovation adoption emerges from the interaction between organizational capacity, technological readiness, and external environmental support. Industry–university collaboration showed particularly strong influence, reinforcing the Triple Helix perspective that emphasizes the role of external ecosystems in fostering innovation.

High correlations among innovation management variables indicate that these factors function collectively. From a Diffusion of Innovation perspective, institutional policies and technological infrastructure can be viewed as channels through which innovation-oriented teaching practices spread across universities. Differences between teacher and student perspectives suggest that innovation management is experienced differently across institutional roles, highlighting the need to balance governance priorities with learner-centered innovation environments. The strategic development model illustrates that improving entrepreneurship education requires coordinated adjustments across governance, technology, curriculum design, and stakeholder engagement rather than isolated interventions.

This study provides empirical evidence that entrepreneurship education management is strongly influenced by institutional innovation systems. Governance structures, technological infrastructure, and external collaboration jointly shape entrepreneurship education outcomes within higher education

institutions. By integrating the TOE framework and Triple Helix perspective, the research highlights innovation management as a dynamic institutional process linking policy environments with educational transformation.The proposed strategic development model offers a structured pathway for universities to align institutional strategies, technological capabilities, and stakeholder collaboration in order to support sustainable entrepreneurship education development.

Recommendation

1. Policy Recommendations

1.1 Universities should establish comprehensive innovation management policies that integrate entrepreneurship education into institutional strategic plans. Clear governance structures and long-term development strategies are necessary to ensure sustainability and consistency in entrepreneurship education management.

1.2 Government agencies should strengthen financial and policy support for universities in developing regions such as Henan Province. Funding mechanisms, innovation grants, and industry partnership incentives should be expanded to enhance institutional innovation capacity.

1.3 Higher education policymakers should encourage stronger collaboration among universities, industries, and government sectors through regional innovation networks and entrepreneurship ecosystems based on the Triple Helix approach.

2. Practical Recommendations for Universities

2.1 Universities should improve technological infrastructure and digital learning platforms to support innovation-oriented teaching and entrepreneurial activities. Digital transformation should be integrated into both management systems and instructional practices.

2.2 Faculty development programs should be enhanced to strengthen teachers' entrepreneurial knowledge, mentoring capability, and innovation-oriented teaching skills. Continuous professional training and industry exposure are essential.

2.3 Universities should redesign entrepreneurship curricula toward experiential and practice-based learning approaches, including business incubation, project-based learning, internships, and start-up simulation activities.

2.4 Stronger industry–university collaboration should be promoted through cooperative projects, entrepreneurship competitions, mentorship programs, and innovation laboratories to provide students with real-world entrepreneurial experiences.

2.5 Universities should establish effective stakeholder communication systems to improve coordination among administrators, faculty members, students, industries, and external partners involved in entrepreneurship education.

3. Recommendations for Future Research

3.1 Future studies should expand the research area to other provinces or countries in order to compare regional differences in innovation management and entrepreneurship education systems.

3.2 Additional variables such as organizational culture, leadership style, digital competency, and entrepreneurial mindset should be examined to develop broader explanatory models.

3.3 Future researchers should apply longitudinal research designs to investigate how innovation management systems influence entrepreneurship education outcomes over time.

3.4 Qualitative or case study approaches should be conducted to gain deeper understanding of institutional innovation practices and successful entrepreneurship education models in higher education institutions.

3.5 Comparative studies between public and private universities may provide further insights into differences in innovation management effectiveness and entrepreneurship education performance.

References

Abreu, M., Demirel, P., Grinevich, V., & Karataş-Özkan, M. (2024). The entrepreneurial university: Strategies, processes, and practices. Journal of Technology Transfer.

Anubhav, K., Pal, D., & Gupta, S. (2024). A technology-empowered systematic literature review of entrepreneurship education. The International Journal of Management Education, 22(2), 100882.

Argote, L. (2013). Organizational learning: Creating, retaining and transferring knowledge. Springer.

Bocken, N. M. P. (2025). Systematic innovation processes for sustainable value creation in higher education institutions. Technovation, 138, 102658.

Chen, S., & Xu, L. (2023). Government policies and university entrepreneurship education in China: A strategic approach. Asia Pacific Journal of Education, 43(3), 401–419.

Deng, Q. (2024). Entrepreneurial education and student motivation in China. Studies in Higher Education, 49(2), 212–229.

Du, X., & Li, M. (2024). Industry–university collaboration in student start-ups: Opportunities and challenges. Journal of Entrepreneurship in Emerging Economies, 16(1), 92–110.

Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and “Mode 2” to a triple helix of university–industry–government relations. Research Policy, 29(2), 109–123.

Kuckertz, A., Berger, E. S. C., & Hechler, N. (2024). Unveiling the role of entrepreneurship in bolstering academic careers. Industrial Marketing Management, 120, 191–205.

Monllor, J. (2024). Pivoting an entrepreneurship experiential learning module online: A concrete experience framework. Entrepreneurship Education and Pedagogy, 7(3), 627–647.

Rogers, E. M. (2003). Diffusion of innovations (5th ed.). Free Press.

Sun, J., Lo, C. T., & Liang, J. (2023). From entrepreneurship education to entrepreneurial intention: The mediating role of entrepreneurial mindset. Frontiers in Psychology, 14, 954118.

Tornatzky, L. G., & Fleischer, M. (1990). The processes of technological innovation. Lexington Books.