

The Role of Creativity as a Mediating Mechanism Between Entrepreneurship Education and Innovation Performance

Budi Sunarso^{1*}, Jasi Suryanti², Nanda Kristia Santoso³

¹Universitas Islam Negeri Salatiga, Indonesia

²Institut Teknologi dan Bisnis Muhammadiyah Grobogan, Indonesia

³STIE Pembangunan Tanjungpinang, Indonesia

Email: sunarsobudi77@gmail.com

Abstract. This study aims to analyze the role of creativity as a mediating mechanism between entrepreneurship education and innovation performance through a literature review approach. The study is motivated by the increasing attention given to entrepreneurship education as a means of developing human resources capable of generating innovation in the era of the knowledge-based economy and digital transformation. The research employed a qualitative approach using a literature review design and descriptive analysis. Data were collected from Google Scholar and several reputable scientific databases, including ScienceDirect, SpringerLink, Emerald Insight, Wiley Online Library, Taylor & Francis, Frontiers, MDPI, and ResearchGate. The literature search covered articles published between 1964 and 2026. The initial search identified 50 articles, and after a rigorous screening process based on topic relevance, publication quality, methodological suitability, and full-text availability, 31 articles were selected for analysis. The findings indicate that entrepreneurship education contributes to enhancing creativity through experiential learning, entrepreneurial mindset development, and problem-solving exploration. Creativity subsequently functions as a mechanism that transforms entrepreneurial knowledge and skills into innovation in the form of new products, services, processes, and business models. The synthesis of various theories, including Human Capital Theory, Componential Theory of Creativity, Knowledge-Based View, Experiential Learning Theory, and Innovation Diffusion Theory, strengthens the argument that creativity serves as a mediating factor explaining the relationship between entrepreneurship education and innovation performance. Empirical studies and case studies further demonstrate that learning environments promoting creativity, collaboration, and practical experience are more likely to produce sustainable innovation. This study provides a conceptual contribution to the entrepreneurship literature and offers recommendations for higher education institutions and policymakers to strengthen entrepreneurship curricula that emphasize creativity development to improve innovation performance.

Keywords: Entrepreneurship Education, Creativity, Innovation Performance, Experiential Learning, Innovation.

1. Introduction

Entrepreneurship education is widely recognized as a learning approach designed to develop individuals' ability to identify opportunities, create value, and formulate solutions to continuously evolving business challenges. The growth of the knowledge-based economy has encouraged higher education institutions to shift their educational orientation from merely delivering theoretical knowledge toward learning experiences that emphasize idea exploration, problem solving, collaboration, and the development of real-world projects. Such learning models provide students with opportunities to connect academic concepts with entrepreneurial practice, making the learning process more contextual and meaningful. Interactive learning environments enhance critical thinking skills, decision-making confidence, and readiness to deal with uncertainty, which are fundamental characteristics of entrepreneurial activities. [1] argued that entrepreneurship education serves as a process for developing an entrepreneurial mindset that encourages opportunity creation, while [2], through a meta-analysis,

demonstrated that entrepreneurship education positively influences entrepreneurial competencies that serve as the foundation for innovation. These findings suggest that entrepreneurship education contributes significantly to developing individuals' capacity to generate valuable ideas and adapt effectively to changing business environments.

The quality of entrepreneurship education is strongly influenced by learning methods that actively engage students in the knowledge creation process. Approaches such as project-based learning, business simulation, design thinking, business incubation, and interdisciplinary collaboration provide students with experiences that broaden their perspectives in identifying problems and designing creative solutions. These activities foster reflective abilities because students are given opportunities to test ideas, evaluate outcomes, and refine their work based on the experiences gained throughout the learning process. Such experiences generate accumulated knowledge that strengthens analytical capabilities while increasing the willingness to experiment with new ideas. [3] found that the effectiveness of entrepreneurship education is positively associated with enhanced entrepreneurial creativity through learning processes that promote inspiration and empowerment. Likewise, [4] demonstrated that entrepreneurship education enhances creativity even within workplace settings by developing a more open career mindset. These findings indicate that the quality of learning experiences plays a decisive role in shaping students' creative capabilities.

Creativity refers to an individual's ability to generate original, relevant, and useful ideas for solving problems faced by organizations and society. Entrepreneurship literature regards creativity as the primary source of business opportunity creation because the establishment of new ventures always begins with the ability to recognize previously unexplored possibilities. Creative individuals generally possess greater cognitive flexibility, enabling them to combine knowledge, experience, and information into solutions that differ from existing practices. This process involves exploration, imagination, experimentation, and continuous evaluation, increasing the likelihood that generated ideas can be successfully implemented in business activities. [5] explained that creativity is a prerequisite for organizational innovation because it provides a wide range of ideas that can later be transformed into new products, services, and processes. Their work highlights the strategic role of creativity as an intellectual resource that enables organizations and individuals to create sustainable value through innovation.

The relationship between entrepreneurship education and creativity can be explained through learning processes that provide students with opportunities to explore ideas independently while learning from authentic experiences. Activities such as business model development, prototype creation, entrepreneurship competitions, and teamwork expand students' opportunities to develop divergent thinking and discover multiple approaches to solving complex problems. These experiences strengthen self-confidence in expressing new ideas while encouraging experimentation with various business opportunities. [3] demonstrated that entrepreneurship education significantly enhances students' entrepreneurial creativity through entrepreneurial inspiration as a psychological mechanism that reinforces this relationship. Similarly, [6] concluded that entrepreneurship education received during formal education has long-term effects on individuals' creativity within professional work environments. These empirical findings reinforce the argument that entrepreneurship education contributes substantially to developing creative capacities that support innovative activities across diverse organizational contexts.

Innovation performance reflects the ability of individuals and organizations to generate, develop, and implement ideas into products, services, work methods, or business models that create added value. This concept represents the success of innovation processes measured through the ability to introduce new ideas, improve quality, accelerate work processes, and establish sustainable competitive advantages. Organizations with high innovation performance generally respond more effectively to environmental changes because they are supported by individuals who continuously explore knowledge and develop new solutions. [7] explained that innovation results from a series of creative processes translated into practical organizational implementation, indicating that creativity and innovation complement one another. [8] further demonstrated that entrepreneurship education contributes to improving students' innovation capabilities through various psychological mechanisms developed during the learning process. These findings indicate that innovation performance is strongly influenced by the quality of competencies developed through education and learning experiences.

The relationship between creativity and innovation performance has received substantial empirical support because every innovation begins with the creation of new ideas that have the potential to become practical solutions. Individuals with higher creativity are more capable of identifying opportunities, designing alternative approaches, and combining available resources into innovations that generate both economic and social value. Creativity enhances adaptability to environmental change, enabling organizations to respond more effectively to increasingly competitive market dynamics. [9] argued that creativity represents the initial stage determining innovation success because the quality of ideas strongly influences the quality of subsequent implementation.

Studies on entrepreneurship education further demonstrate that improvements in creativity contribute significantly to producing more effective innovations, providing strong theoretical and empirical support for the relationship between creativity and innovation performance within the innovation management literature.

Various theoretical perspectives explain that creativity functions as the mechanism linking entrepreneurship education to innovation performance. Entrepreneurship education provides knowledge, experience, skills, and intellectual stimulation that expand students' thinking abilities, whereas creativity transforms these capacities into ideas with the potential to become innovative products, processes, and services. This mechanism suggests that innovation does not necessarily emerge immediately after individuals receive entrepreneurship education but develops through their ability to generate creative ideas that are eventually implemented as innovations. [3] explained that entrepreneurship learning enhances creativity through entrepreneurial inspiration, which serves as a mediating mechanism. Similarly, [10] found that creativity mediates the influence of entrepreneurship education on product innovation among Indonesian university students. These findings strengthen the argument that creativity occupies a central position in explaining how entrepreneurship education leads to improved innovation performance.

Empirical studies examining the relationships among entrepreneurship education, creativity, and innovation performance continue to expand, although research findings remain inconsistent due to differences in participant characteristics, learning approaches, institutional environments, and cultural contexts. Some studies have identified a direct influence of entrepreneurship education on innovation, whereas others suggest that creativity provides a more comprehensive explanation of the underlying mechanism. These variations create opportunities for developing conceptual models that position creativity as a mediating variable between entrepreneurship education and innovation performance, allowing the relationships among these variables to be explained more thoroughly. Such conceptual development is expected to enrich entrepreneurship, creativity, and innovation theories while offering practical recommendations for higher education institutions in designing learning processes capable of producing creative and innovative graduates who meet the demands of the knowledge-based economy.

1.1. Entrepreneurship Education

Entrepreneurship education is a learning process designed to develop entrepreneurial knowledge, skills, attitudes, and mindsets, enabling individuals to identify opportunities, manage risks, create value, and develop innovative solutions to various economic and social challenges. Entrepreneurship education no longer focuses solely on teaching business creation theories but integrates practical experiences through business model development, business simulations, business incubation, collaboration with industry, and real-world problem solving. This approach aims to foster creative, adaptive, and innovative thinking, preparing learners to respond effectively to dynamic business environments. From the perspective of Human Capital Theory proposed by [11], entrepreneurship education is regarded as an investment that enhances human capital by developing competencies capable of creating competitive advantage and stimulating innovation.

1.2. Creativity

Creativity refers to an individual's ability to generate original, useful, and relevant ideas, methods, or solutions for solving problems or identifying new opportunities. In the context of entrepreneurship, creativity serves as the primary foundation for innovation because every new product, service, or business model originates from ideas that differ from existing practices. According to the Componential Theory of Creativity developed by [12], creativity is influenced by a combination of domain-relevant knowledge, creative thinking skills, and intrinsic motivation. Creativity can be cultivated through learning environments that encourage freedom of exploration, practical experience, collaboration, and experimentation with alternative solutions. The higher an individual's level of creativity, the greater the capacity to generate innovations that create value for organizations and society.

1.3. Innovation Performance

Innovation performance refers to the ability of individuals or organizations to generate, develop, and implement new ideas into products, services, work processes, technologies, or business models that enhance value creation and competitiveness. It reflects the capability to transform knowledge into tangible outcomes that provide economic, social, and organizational benefits. Indicators of innovation performance include the development of new products, improvements in service quality, increased operational efficiency, adoption of new technologies, and successful commercialization of innovations. From the perspective of the Knowledge-Based View proposed by [13], innovation performance is considered the result of an organization's ability to

manage knowledge and transform it into competitive advantage through continuous creativity and organizational learning.

1.4. Experiential Learning

Experiential learning is an educational approach that positions direct experience as the primary source of knowledge acquisition and competency development. This concept is grounded in the Experiential Learning Theory proposed by [14], which explains that learning occurs through four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Within entrepreneurship education, this approach is implemented through business projects, internships, entrepreneurship competitions, business simulations, startup incubation programs, and collaboration with industry partners. Such experiences enable learners to develop critical thinking, creativity, communication skills, teamwork, and decision-making abilities based on real-life situations, making the learning process more effective in fostering innovative competencies.

1.5. Innovation

Innovation is the process of creating, developing, and implementing new ideas into products, services, processes, technologies, or business models that generate value for users and organizations. Innovation extends beyond idea generation by emphasizing the successful implementation of ideas to solve problems, improve efficiency, create market opportunities, and establish competitive advantage. Based on the Innovation Diffusion Theory developed by [15], innovation evolves through the processes of creation, diffusion, adoption, and utilization by individuals or organizations. In the entrepreneurial context, innovation is a critical determinant of business sustainability because it enables firms to adapt to technological advances, changing customer needs, and increasingly competitive markets. Successful innovation is strongly influenced by the quality of human resources, creativity, organizational support, and learning environments that encourage continuous knowledge development.

2. Method

This study employed a qualitative approach using a literature review method to identify, examine, compare, and synthesize previous studies concerning the relationships among entrepreneurship education, creativity, and innovation performance. This approach was selected because it provides a comprehensive understanding of theoretical developments, empirical findings, and existing research gaps within the field. Data were analyzed using descriptive qualitative analysis by systematically interpreting previous research findings to explain the relationships among variables, construct conceptual arguments, and develop scientific syntheses based on available evidence. A descriptive approach was considered appropriate because this study did not aim to test hypotheses through primary data collection but rather to establish a comprehensive understanding derived from published academic literature.

The data consisted of secondary sources collected through electronic literature searches using Google Scholar as the primary academic search engine. Retrieved publications were subsequently verified using articles published by reputable scientific publishers and databases, including ScienceDirect (Elsevier), SpringerLink, Wiley Online Library, Taylor & Francis Online, Emerald Insight, SAGE Journals, MDPI, Frontiers, and ResearchGate. These sources were selected because they provide peer-reviewed scientific publications that ensure academic credibility and research quality. The literature search covered publications issued between 1964 and 2026 to capture both the theoretical foundations and the most recent empirical developments related to entrepreneurship education, creativity, and innovation performance. The search strategy employed combinations of keywords such as entrepreneurship education, creativity, innovation performance, creative capability, entrepreneurial creativity, and innovation, using Boolean operators (AND and OR) to improve the relevance and comprehensiveness of the search results.

The literature selection process was conducted systematically following transparent screening procedures. The initial identification stage yielded 50 articles relevant to the research keywords. The screening stage then evaluated article titles, abstracts, and research scope. Articles that did not directly address the relationships among entrepreneurship education, creativity, and innovation performance, editorial papers, non-peer-reviewed conference proceedings, duplicate publications, articles without full-text availability, and publications outside the 1964–2026 period were excluded. The remaining studies underwent an eligibility assessment through full-text review to ensure methodological appropriateness, clarity of findings, and relevance to the objectives of this study. Following this rigorous selection process, 31 articles met all inclusion criteria and were retained as the primary sources for analysis. This number was considered sufficient because each selected article provided

empirical or conceptual evidence directly explaining the relationships among the investigated variables, thereby ensuring that the resulting synthesis was comprehensive, relevant, and supported by a strong scientific foundation.



Figure 1. Research Methodology Flowchart

3. Result and Discussion

Entrepreneurship education has evolved into one of the most strategic instruments for strengthening individuals' innovation capacity in the knowledge-based economy. Higher education institutions are no longer limited to transferring conceptual knowledge but increasingly focus on equipping students with the ability to identify opportunities, manage risks, solve problems, and create economic value through experiential learning activities. This perspective is consistent with Human Capital Theory proposed by [11], which argues that investment in education enhances human capital through the accumulation of productive knowledge, skills, and competencies. Within the entrepreneurial context, this human capital is reflected in the ability to develop business ideas that generate value and respond effectively to dynamic business environments. A systematic review conducted by [16] revealed that entrepreneurship education research has expanded rapidly over the past two decades, emphasizing entrepreneurial mindset, entrepreneurial learning, innovation capability, and entrepreneurial ecosystems. These findings indicate that entrepreneurship education has shifted from a theory-oriented approach toward learning models that emphasize creativity, collaboration, digital technology utilization, and innovation capability as essential graduate competencies. Similarly, [17] demonstrated that the effectiveness of entrepreneurship education is positively associated with improvements in students' entrepreneurial creativity, suggesting that learning quality plays a decisive role in developing individual innovation capacity. Collectively, these findings indicate that entrepreneurship education serves as the foundation for developing human capital capable of producing sustainable innovation through learning processes that encourage idea exploration and authentic experiences.

The relationship between entrepreneurship education and creativity can be further explained through the Experiential Learning Theory developed by [14]. This theory proposes that knowledge is constructed through a continuous cycle consisting of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Activities such as business model development, business simulations, entrepreneurship competitions, business incubation, and multidisciplinary collaboration enable students to experience every stage of this learning cycle repeatedly. Active learning experiences foster divergent thinking because students continuously evaluate multiple alternative solutions to complex business challenges. Creativity subsequently develops through the interaction of experience, knowledge, motivation, and supportive learning environments that encourage the exploration of new ideas. [3] examined 1,873 university students from 36 higher education institutions in China and found that entrepreneurship education significantly enhanced entrepreneurial creativity through the mediating role of entrepreneurial inspiration. Students who participated in richer experiential learning activities demonstrated substantially higher creativity than those exposed to conventional instructional methods. Likewise, [6] reported that entrepreneurship education received during university education positively

influenced employees' creativity after entering the workforce by strengthening adaptability and fostering a boundaryless mindset. These empirical findings reinforce the argument that well-designed experiential learning transforms entrepreneurial knowledge into creativity, which subsequently becomes the primary driver of innovation.

Creativity occupies a central position in the innovation process because every innovation begins with the generation of ideas that differ from existing practices. This perspective aligns with the Componential Theory of Creativity proposed by [12], which argues that creativity is determined by three essential components: domain-relevant skills, creativity-relevant skills, and intrinsic motivation. Entrepreneurship education contributes to all three components by enriching students' business knowledge, strengthening creative thinking skills, and encouraging intrinsic motivation to develop solutions with economic value. Individuals possessing these competencies are more capable of identifying emerging opportunities, integrating diverse sources of information, and producing ideas that respond effectively to market demands. [5] emphasized that creativity represents the initial stage of the innovation process because the quality of innovation largely depends on the quality of preceding ideas. This perspective suggests that creativity should not be regarded merely as an innate talent but as a competency that can be cultivated through supportive educational environments, institutional support, practical experience, and intensive social interaction. Recent literature examining entrepreneurial human capital and innovation further indicates that creativity functions as a mechanism linking individual capabilities to innovation performance, particularly in organizations operating within rapidly changing technological environments [18]. These findings demonstrate that creativity represents a strategic asset capable of strengthening both individual and organizational competitiveness in the digital economy.

The mediating role of creativity between entrepreneurship education and innovation performance receives strong conceptual support from the Knowledge-Based View (KBV). This perspective argues that knowledge becomes a strategic organizational resource only when it is successfully transformed into innovation capable of generating competitive advantage [13]. Entrepreneurship education provides both explicit and tacit knowledge, whereas creativity serves as the mechanism that converts this knowledge into ideas that can be implemented as new products, services, processes, or business models. This mechanism explains why knowledge acquisition alone does not automatically lead to innovation unless individuals possess sufficient creative capabilities to transform information into valuable solutions. [10] provided empirical support for this argument through a SEM-PLS analysis involving Indonesian university students. Their findings revealed that entrepreneurship education positively influences student creativity, creativity positively affects product innovation, and creativity significantly mediates the relationship between entrepreneurship education and product innovation. These findings indicate that educational processes capable of developing creativity produce stronger innovation outcomes than learning approaches focused solely on theoretical business knowledge. The synthesis of these studies confirms that creativity serves as the conceptual bridge connecting accumulated entrepreneurial knowledge with innovation that generates value for organizations and society.

An analysis of previous studies demonstrates that the relationship among entrepreneurship education, creativity, and innovation performance has attracted increasing scholarly attention as business environments continue to evolve rapidly due to digitalization, artificial intelligence, and technology-driven economic transformation. Contemporary entrepreneurship education increasingly emphasizes the development of adaptive, collaborative, and creative thinking to prepare graduates capable of producing sustainable innovation. Recent systematic reviews reveal that entrepreneurship education research is currently dominated by themes related to creativity, innovation, digital capability, and integrated entrepreneurial ecosystems. Research investigating entrepreneurial orientation within Indonesian higher education institutions further indicates that academic environments promoting entrepreneurial culture are positively associated with institutional innovation performance, reflected in higher numbers of scientific publications, patents, and university spin-off companies. These findings suggest that entrepreneurship education generates broader impacts than merely increasing entrepreneurial intention because high-quality learning processes contribute to establishing an innovation culture that supports long-term organizational development. Overall, the available evidence consistently demonstrates that creativity is the principal mechanism linking entrepreneurship education to innovation performance. Consequently, developing entrepreneurship curricula that encourage idea exploration, interdisciplinary collaboration, and experiential learning represents one of the most effective strategies for improving innovation performance at both individual and institutional levels.

Creativity and innovation performance can be better understood through the Innovation Diffusion Theory proposed by [15]. This theory explains that innovation results from the processes of creating, diffusing, and adopting new ideas, all of which are influenced by individual characteristics and organizational environments. Creativity plays a critical role during the early stage of innovation diffusion because the ability to generate original ideas determines the quality of innovations that are later implemented and adopted by users. Individuals

with higher levels of creativity are generally more capable of recognizing emerging opportunities, integrating diverse sources of information, and designing solutions that meet market needs. Such capabilities increase the likelihood of successful innovation because the development of products or services begins with ideas characterized by novelty and relevance. [5] argued that creativity represents the idea generation phase, whereas innovation represents the idea implementation phase, making both concepts inseparable components of the innovation process. [19] found that entrepreneurship education enhances students' innovation capability through improvements in creativity, entrepreneurial self-efficacy, and entrepreneurial competencies as interconnected psychological mechanisms. These findings indicate that creativity performs a strategic function by transforming the knowledge acquired through entrepreneurship education into innovations that strengthen individual and organizational competitiveness. Similar conclusions were reported by [20], who demonstrated that organizations fostering a creative culture achieve higher levels of innovation because employees are encouraged to explore new ideas without excessive structural constraints. Collectively, these studies confirm that creativity accelerates the transformation of knowledge into innovations that generate both economic and social value.

The theoretical relationship between entrepreneurship education, creativity, and innovation performance has received extensive empirical support from studies conducted across different countries. [10] found that creativity significantly mediates the relationship between entrepreneurship education and product innovation among Indonesian university students, indicating that improvements in entrepreneurship education produce stronger innovation outcomes when accompanied by the development of students' creative thinking abilities. Similarly, [3] demonstrated that entrepreneurial inspiration developed during entrepreneurship education strengthens students' creativity, which subsequently enhances their capacity to produce innovative solutions. A systematic review conducted by [16] covering international publications from 2002 to 2023 further revealed that creativity, innovation, and experiential learning have become dominant themes in entrepreneurship education research. These findings reflect a paradigm shift from theory-centered instruction toward learning approaches designed to cultivate innovation-oriented competencies. From the perspective of the Knowledge-Based View, knowledge contributes to competitive advantage only when it is transformed into valuable capabilities through creativity and innovation. The synthesis of previous studies therefore suggests that creativity functions as a dynamic capability, enabling individuals to utilize entrepreneurial knowledge more effectively in producing innovations that respond to changing market demands. As individuals' creative capabilities increase, the likelihood of generating innovations that strengthen organizational competitiveness also becomes substantially greater.

One of the most successful examples of experiential entrepreneurship education can be observed at the National University of Singapore (NUS) through NUS Enterprise, particularly the NUS Overseas Colleges (NOC) program. This initiative integrates academic learning with hands-on work experience in startup companies located within major global innovation hubs, including Silicon Valley, New York, Stockholm, Shanghai, Beijing, Singapore, and Jakarta. Students do not merely study entrepreneurship theories in classrooms but also participate in startup internships, receive mentoring from industry professionals, and develop business ideas through collaboration with entrepreneurs and investors. According to the official National University of Singapore (2024) report, the NOC program is one of the university's flagship initiatives for cultivating innovation through experiential learning and global entrepreneurial networks [21]. This educational model enables students to strengthen creativity by identifying real-world problems, validating market opportunities, developing prototypes, and refining business models through continuous experimentation. Such an approach is fully consistent with Experiential Learning Theory, which emphasizes that direct experience is fundamental to the development of creative competence and entrepreneurial capability. The success of the NOC program demonstrates that entrepreneurship education becomes substantially more effective when students are actively involved in authentic entrepreneurial environments rather than relying exclusively on classroom-based instruction.

Although numerous studies have demonstrated the positive effects of entrepreneurship education on creativity and innovation performance, several challenges continue to limit the effectiveness of this relationship, particularly in developing countries. Many universities still rely on instructor-centered learning approaches, where students passively receive theoretical knowledge instead of actively developing solutions to real-world problems. Limited business incubation facilities, insufficient collaboration with industry partners, and inadequate funding for student experimentation often prevent creative ideas from progressing beyond the conceptual stage into implementable innovations. [22] reported that countries possessing stronger educational innovation ecosystems achieve substantially higher levels of research commercialization and technology startup creation than countries that continue to rely primarily on conventional teaching methods. These findings indicate that creativity requires a supportive ecosystem to be successfully transformed into sustainable innovation. One practical solution is the integration of project-based entrepreneurship learning throughout the entrepreneurship

curriculum, enabling students to address authentic business challenges through collaboration with industry, government, and community stakeholders. Such an approach encourages students to develop creativity through direct experience, strengthens innovation capability, and increases the likelihood of producing commercially valuable products and services. Empirical evidence provided by [23] and [10] further confirms that experiential learning contributes far more significantly to creativity and innovation than traditional teaching methods focused primarily on theoretical knowledge.

One of the most prominent examples illustrating the relationship between entrepreneurship education, creativity, and innovation performance can be observed through the Stanford Technology Ventures Program (STVP) at Stanford University, United States [24]. The program adopts project-based learning, design thinking, multidisciplinary collaboration, and direct engagement with industry practitioners, investors, and technology entrepreneurs throughout the learning process. The impact of Stanford's entrepreneurial ecosystem is reflected in remarkable institutional achievements. According to the official Stanford University survey, approximately 39,900 active companies have been founded or led by Stanford alumni. These companies employ around 5.4 million people worldwide and generate approximately US\$2.7 trillion in annual revenue. If these companies were considered a single national economy, they would rank among the largest economies globally. These achievements demonstrate that entrepreneurship education providing opportunities for creative exploration can generate innovations with substantial economic and societal impact. This evidence is consistent with Entrepreneurial Ecosystem Theory, which explains that innovation emerges through interactions among education, innovation culture, industry networks, access to finance, and institutional support. [25] further emphasized that entrepreneurship education combined with practical experience produces long-term improvements in creativity, innovation, and entrepreneurial success.

An example of entrepreneurship education implementation in Indonesia can be observed through the Student Entrepreneurship Development Program (P2MW) organized by the Ministry of Education, Culture, Research, and Technology through the Directorate of Learning and Student Affairs. The program aims to strengthen the entrepreneurial ecosystem among university students by providing training, mentoring, business incubation, and financial support for promising business proposals. During the 2023 P2MW implementation, student business proposals submitted by universities across Indonesia underwent administrative screening, substantive evaluation, and budget justification before selected teams received funding and business mentoring [26]. The selection process demonstrates that creativity, product innovation, business model feasibility, and business sustainability are the primary evaluation criteria. Student teams that successfully obtained funding generally offered distinctive products or services, utilized digital technologies, and addressed real societal and market needs. These findings indicate that creativity transforms entrepreneurial knowledge into innovations capable of generating economic value. From the perspective of the Triple Helix model, collaboration among universities, government, and industry accelerates innovation development and increases the likelihood of entrepreneurial success emerging from academic institutions [27].

The third case study can be observed through the development of Gojek Indonesia, now operating within the GoTo Group ecosystem, which demonstrates how creativity transforms knowledge and market opportunities into innovations with significant economic and social impact. Established in 2010 as a motorcycle taxi booking service operating through a call center, Gojek has evolved into a leading technology company offering digital transportation, electronic payment, logistics, and food delivery services. According to the GoTo Annual Report 2024, the GoTo ecosystem serves more than 3 million driver partners and over 20 million registered merchants, while achieving a Gross Transaction Value (GTV) of approximately IDR 519.8 trillion in 2024 [28], [29]. These achievements indicate that GoTo's success has been driven not only by technological advancement but also by the organization's ability to apply creativity in understanding changing consumer behavior, integrating multiple digital services, and developing an ecosystem-based business model. From the perspective of Dynamic Capability Theory, organizations capable of continuously building, integrating, and reconfiguring their resources possess stronger innovation capabilities than organizations relying solely on existing resources [30]. Gojek's experience demonstrates that creativity functions as a dynamic capability enabling continuous innovation through adaptation to technological change and evolving societal needs. This case highlights the importance of integrating digital entrepreneurship, design thinking, artificial intelligence, and problem-based learning into entrepreneurship curricula to cultivate students' creativity and technology-oriented innovation capabilities. These findings are consistent with [31], who reported that integrating digital technologies into entrepreneurship education significantly enhances creativity, innovation capability, and graduates' readiness to respond to increasingly dynamic business environments.

Overall, the findings consistently demonstrate that creativity occupies a pivotal position as the mechanism connecting entrepreneurship education and innovation performance. Human Capital Theory explains that education enhances human capital by developing competencies and skills, while the Componential Theory of

Creativity explains how knowledge, creative thinking skills, and intrinsic motivation generate valuable ideas. The Knowledge-Based View further suggests that knowledge becomes a source of competitive advantage only when transformed into innovation through creativity, whereas the Innovation Diffusion Theory explains how creative ideas evolve into innovations that are ultimately adopted by society and the marketplace. These theoretical perspectives are consistently supported by empirical evidence showing that creativity mediates the relationship between entrepreneurship education and innovation performance. Case studies from Stanford University, the National University of Singapore, Indonesia's Student Entrepreneurship Development Program (P2MW), and the innovative transformation of Gojek demonstrate that successful innovation is consistently preceded by learning environments that encourage creativity through authentic experience, collaboration, idea exploration, and experimentation. This synthesis suggests that entrepreneurship education should prioritize the development of learning ecosystems that provide students with opportunities to think creatively, solve real-world problems, utilize digital technologies, and collaborate with multiple stakeholders. Such an approach is expected to produce graduates who possess not only entrepreneurial knowledge but also sustainable innovation capabilities capable of generating economic, social, and technological value while strengthening organizational competitiveness and national economic development.

Table 1. Summary of the Main Findings of the Literature Review

No.	Topic	Main Findings	Supporting Theory
1	Entrepreneurship Education	Entrepreneurship education has evolved from theory-oriented instruction to experiential learning that develops opportunity recognition, problem-solving, collaboration, digital competencies, and innovation capabilities. It serves as the foundation for strengthening human capital and sustainable innovation.	Human Capital Theory
2	Entrepreneurship Education → Creativity	Experiential learning activities, such as business simulations, project-based learning, business incubation, and multidisciplinary collaboration, significantly enhance students' entrepreneurial creativity by promoting divergent thinking and entrepreneurial inspiration.	Experiential Learning Theory
3	Creativity as a Strategic Capability	Creativity is a competency that can be developed through education, institutional support, practical experience, and intrinsic motivation. It enables individuals to recognize opportunities, combine knowledge, and generate valuable business ideas.	Componential Theory of Creativity
4	Creativity as a Mediator	Creativity functions as the conceptual bridge between entrepreneurship education and innovation performance by transforming entrepreneurial knowledge into innovative products, services, processes, and business models.	Knowledge-Based View
5	Innovation Performance	Innovation performance depends on the successful transformation of knowledge into implementable innovations. Creativity accelerates the conversion of entrepreneurial competencies into competitive innovations.	Innovation Diffusion Theory
6	Empirical Evidence	Cross-country empirical studies consistently demonstrate that creativity significantly mediates the relationship between entrepreneurship education and innovation performance, producing stronger innovation outcomes than conventional learning approaches.	-
7	International Best Practice (NUS)	The NUS Overseas Colleges (NOC) program successfully integrates academic learning, startup internships, mentoring, and global entrepreneurial networks, strengthening students' creativity through authentic entrepreneurial experiences.	Experiential Learning Theory
8	International Best Practice (Stanford)	Stanford Technology Ventures Program (STVP) demonstrates that project-based entrepreneurship education, design thinking, and industry collaboration contribute to world-class innovation outcomes, including thousands of successful companies founded by alumni.	Entrepreneurial Ecosystem Theory

9	Indonesian Best Practice (P2MW)	Indonesia's Student Entrepreneurship Development Program (P2MW) emphasizes creativity, innovation, business feasibility, and sustainability as core evaluation criteria, illustrating how entrepreneurship education supports innovation through collaboration among universities, government, and industry.	Triple Helix Model
10	Industry Case (GoTo/Gojek)	GoTo's transformation illustrates that creativity combined with dynamic capabilities enables organizations to adapt to technological change, integrate digital services, and achieve sustainable innovation and competitive advantage.	Dynamic Capability Theory
11	Current Challenges	The effectiveness of entrepreneurship education remains constrained by teacher-centered learning, limited business incubation facilities, weak university–industry collaboration, and insufficient funding for innovation activities.	-
12	Practical Recommendations	Universities should strengthen project-based learning, business incubation, digital entrepreneurship, artificial intelligence, design thinking, and collaboration with government and industry to foster creativity and improve innovation performance.	-

4. Conclusion

The findings of this literature review demonstrate that creativity plays a significant mediating role in the relationship between entrepreneurship education and innovation performance. Entrepreneurship education contributes to the development of entrepreneurial knowledge, skills, mindsets, and opportunity recognition capabilities, while creativity transforms these competencies into innovative ideas that can be implemented as new products, services, processes, and business models. The synthesis of Human Capital Theory, Componential Theory of Creativity, Knowledge-Based View, Experiential Learning Theory, and Innovation Diffusion Theory, together with evidence from empirical studies and international case studies, indicates that entrepreneurship education generates stronger innovation performance when learning processes actively cultivate students' creativity. These findings confirm that creativity represents the principal mechanism explaining how entrepreneurship education produces sustainable innovation and strengthens the competitiveness of individuals and organizations.

This study offers both theoretical and practical implications for the advancement of entrepreneurship education and innovation research. From a theoretical perspective, the findings reinforce the understanding that creativity functions as a mediating variable linking entrepreneurship education and innovation performance, thereby extending the application of human capital, creativity, and knowledge management theories within entrepreneurship research. From a practical perspective, higher education institutions should redesign entrepreneurship curricula by emphasizing project-based learning, design thinking, business incubation, collaboration with industry, and digital technology integration to provide students with authentic learning experiences that foster creativity and innovation capability. Governments and industry stakeholders should also strengthen entrepreneurial ecosystems through innovation funding, business mentoring, strategic partnerships, and broader industry networks to facilitate the transformation of entrepreneurship education outcomes into innovations that generate meaningful economic and social impact.

This study has several limitations that should be considered when interpreting its findings. First, the research employed a qualitative literature review approach; therefore, the discussion is based entirely on the synthesis of previous studies without collecting primary data or conducting empirical hypothesis testing. Second, the reviewed literature was limited to publications issued between 1964 and 2026, retrieved from Google Scholar and reputable scientific databases, including ScienceDirect, SpringerLink, Emerald Insight, Wiley Online Library, Taylor & Francis, Frontiers, MDPI, and ResearchGate. Consequently, relevant studies published outside this period or indexed in other databases may not have been included. Finally, this review did not differentiate findings according to respondent characteristics, industrial sectors, or geographical contexts, making it difficult to explain how the mediating role of creativity may vary across different settings.

Future studies are encouraged to empirically examine the mediating role of creativity between entrepreneurship education and innovation performance using quantitative approaches such as Structural Equation Modeling (SEM) or SEM-PLS across diverse respondent groups and industrial sectors. Future research

may also expand the conceptual framework by incorporating additional variables such as entrepreneurial mindset, digital literacy, innovation capability, self-efficacy, and knowledge sharing to provide a more comprehensive explanation of the innovation process. Higher education institutions should strengthen the implementation of experiential learning, business incubation, industry collaboration, and the integration of digital technologies and artificial intelligence within entrepreneurship curricula to maximize students' creative potential. Policymakers and other stakeholders should further reinforce national innovation ecosystems by expanding innovation funding, mentorship opportunities, industrial partnerships, and commercialization programs, thereby enabling university graduates to develop highly competitive innovations that contribute to knowledge-based economic development.

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