

“Entrepreneurial Learning and Teaching in Higher Education: A Bibliometric and PRISMA-Based Systematic Review of Research Trends and Future Directions.”

Dr Meenal Shah

Associate Professor

Om Kothari Institute of Management and Research

(affiliated to Rajasthan Technical University)

meenalecojain24@gmail.com

Abstract

Entrepreneurship education has gained considerable importance within higher education institutions as universities increasingly aim to cultivate innovation, opportunity recognition, and venture creation skills among students. Over the past two decades, entrepreneurship courses and programs have expanded rapidly across academic disciplines. Despite this growth, scholars continue to debate the effectiveness of current pedagogical approaches used to teach entrepreneurial competencies. Many entrepreneurship courses still rely heavily on traditional lecture-based instruction, which may not adequately reflect the uncertain, experiential, and practice-oriented nature of entrepreneurial activity (Neck & Greene, 2011). Consequently, there is a growing call for more innovative teaching approaches that combine experiential learning with digital tools and real-world engagement.

This study examines the existing literature on entrepreneurial learning and teaching in higher education in order to identify major pedagogical challenges and emerging opportunities. A systematic review of academic publications produced between 2005 and 2025 was conducted to explore how entrepreneurship education has evolved and to identify persistent gaps in teaching practices. The review indicates several key issues, including an overreliance on theoretical instruction, lack of consensus regarding effective teaching methodologies, insufficient integration of digital technologies, and limited mechanisms for evaluating long-term entrepreneurial outcomes (Fayolle & Gailly, 2015; Nabi et al., 2017).

Based on these findings, the paper proposes a conceptual framework that integrates experiential learning strategies, digital learning platforms, and collaboration with entrepreneurial ecosystems such as industry mentors, incubators, and startup networks. This integrated approach aims to strengthen students' practical entrepreneurial capabilities while aligning entrepreneurship education with contemporary technological and economic developments. The study contributes to the expanding body of research on entrepreneurship education by offering a structured model that can support curriculum innovation, institutional policy development, and future empirical research within higher education.

Keywords: entrepreneurship education, experiential learning, digital entrepreneurship, higher education, entrepreneurial competencies

1. Introduction

Entrepreneurship is widely recognized as a significant catalyst for economic development, technological advancement, and job creation across both developed and emerging economies. Governments and policymakers increasingly emphasize the importance of entrepreneurial activity as a mechanism for stimulating innovation and addressing unemployment challenges. Within this context, higher education institutions have assumed an important role in preparing

graduates who possess the knowledge, mindset, and skills necessary to engage in entrepreneurial activities and contribute to economic progress (Audretsch, 2014; Fayolle & Gailly, 2015).

In response to these expectations, universities around the world have incorporated entrepreneurship education into their academic programs. Over the last two decades, entrepreneurship courses, incubators, and innovation centers have become common features within higher education institutions. These initiatives aim to nurture entrepreneurial thinking, enhance opportunity recognition, and support the development of new ventures among students (Nabi et al., 2017). Despite the rapid expansion of such programs, questions remain regarding the effectiveness of current approaches used to teach entrepreneurship in academic settings.

A major concern raised in the literature relates to the persistent reliance on traditional teaching practices in entrepreneurship education. Lecture-based instruction and theoretical frameworks continue to dominate many entrepreneurship courses, even though entrepreneurial activity itself involves uncertainty, experimentation, and problem-solving in real-world contexts (Neck & Greene, 2011). As a result, some scholars argue that existing teaching methods may not adequately prepare students for the practical challenges associated with launching and managing new ventures.

Consequently, educators and researchers have increasingly advocated for more experiential and practice-oriented pedagogical approaches. Learning strategies such as project-based learning, startup simulations, industry collaboration, and digital learning platforms have been suggested as effective ways to bridge the gap between theoretical knowledge and real-world entrepreneurial practice (Kuratko, 2005). These approaches encourage students to actively engage with entrepreneurial processes rather than passively acquire knowledge.

Against this background, the present study investigates the existing gaps in entrepreneurial learning and teaching within higher education. In particular, the study explores how experiential learning strategies and digital educational tools can be integrated to enhance the effectiveness of entrepreneurship education. By synthesizing existing research, the paper proposes a conceptual framework that supports the development of more practice-oriented and technologically supported approaches to entrepreneurial learning in universities.

2. Literature Review

2.1 Entrepreneurship Education in Higher Education

Entrepreneurship education has increasingly become a significant component of higher education systems across the world. Universities are no longer limited to their traditional roles of teaching and research; they are also expected to foster innovation, entrepreneurial thinking, and economic development. In this context, the concept of the entrepreneurial university has emerged, emphasizing the role of higher education institutions in supporting innovation ecosystems and entrepreneurial activities (Audretsch, 2014). Universities therefore play a crucial role in cultivating entrepreneurial competencies among students and preparing them to navigate dynamic economic environments.

Entrepreneurship education is generally understood as an educational process that aims to develop the knowledge, skills, attitudes, and behaviors necessary for entrepreneurial action. Several scholars have categorized entrepreneurship education into three main approaches: teaching about entrepreneurship, teaching for entrepreneurship, and teaching through entrepreneurship (Neck & Greene, 2011). Teaching about entrepreneurship typically focuses on theoretical knowledge related to business creation, opportunity recognition, and venture management. Teaching for entrepreneurship emphasizes the development of entrepreneurial skills and competencies that enable students to initiate and manage entrepreneurial ventures. In contrast, teaching through entrepreneurship adopts an experiential perspective where students actively engage in entrepreneurial activities and real-world problem-solving.

Among these approaches, experiential and practice-oriented learning models are increasingly recognized as more effective in fostering entrepreneurial mindsets and capabilities. Research suggests that entrepreneurship education should move beyond conventional lecture-based teaching methods and adopt more interactive and practice-based learning environments that encourage experimentation and creativity (Pittaway & Cope, 2007). Consequently, many higher education institutions have started integrating experiential learning activities into entrepreneurship curricula to enhance student engagement and practical understanding of entrepreneurial processes.

Furthermore, empirical studies highlight that entrepreneurship education can significantly influence students' entrepreneurial attitudes, intentions, and career aspirations. Educational interventions that incorporate entrepreneurial thinking and opportunity recognition can encourage students to consider entrepreneurship as a viable career option (Fayolle & Gailly, 2015). This growing recognition has led universities to expand entrepreneurship programs, establish incubation centers, and integrate interdisciplinary learning opportunities.

2.2 Experiential Learning in Entrepreneurship Education

Experiential learning has become a central pedagogical approach in entrepreneurship education. The theoretical foundation of experiential learning can be traced to Kolb's (1984) experiential learning theory, which emphasizes learning as a process in which knowledge is created through the transformation of experience. According to this framework, learning occurs through a continuous cycle involving concrete experience, reflective observation, abstract conceptualization, and active experimentation.

In the context of entrepreneurship education, experiential learning approaches enable students to develop practical skills and entrepreneurial competencies by engaging in real or simulated entrepreneurial activities. Such approaches may include business simulations, startup projects, internships, venture creation programs, and participation in entrepreneurial ecosystems. These activities allow students to apply theoretical knowledge in real-world contexts while simultaneously developing problem-solving, decision-making, and opportunity recognition skills.

Scholars argue that experiential learning environments encourage students to experiment with ideas, tolerate uncertainty, and develop resilience—qualities that are essential for entrepreneurial success (Neck & Greene, 2011). Moreover, experiential learning promotes collaborative learning and interdisciplinary interaction, which are critical for addressing complex entrepreneurial challenges.

A systematic examination of entrepreneurship education research also indicates that experiential learning methods have become increasingly prominent in academic literature. Pittaway and Cope (2007) emphasize that experiential and action-based pedagogies enhance students' ability to understand the entrepreneurial process and develop entrepreneurial competencies. Similarly, Nabi et al. (2017) highlight that educational programs incorporating experiential elements demonstrate stronger impacts on entrepreneurial intentions and behavior compared to traditional theoretical approaches.

2.3 Digital Transformation and Entrepreneurship Education

The rapid development of digital technologies has significantly influenced the landscape of entrepreneurship education. Emerging technologies such as artificial intelligence, digital platforms, and online learning environments are transforming how entrepreneurial knowledge is created, shared, and applied. As digital transformation reshapes industries and markets, higher education institutions must adapt their teaching approaches to prepare students for digitally driven entrepreneurial environments.

Digital entrepreneurship refers to entrepreneurial activities that rely on digital technologies and digital platforms for value creation, innovation, and market interaction (Nambisan, 2017). This transformation has expanded the scope of entrepreneurial opportunities while simultaneously altering the skills required for entrepreneurial success. Consequently, entrepreneurship education must incorporate digital competencies, technological awareness, and platform-based business models into curricula.

The growing relevance of digital technologies has also encouraged scholars to explore new teaching approaches that leverage digital tools and online platforms. Digital learning environments can provide students with access to global knowledge networks, collaborative tools, and virtual incubation platforms that support entrepreneurial experimentation (Giones & Brem, 2017). These technologies enable educators to design more flexible, interactive, and scalable entrepreneurship education programs.

In addition, digital technologies facilitate the development of entrepreneurial ecosystems that connect universities, startups, investors, and industry stakeholders. Such ecosystems provide valuable learning opportunities for students by exposing them to real-world entrepreneurial practices and networks (Isenberg, 2011). Universities that actively participate in these ecosystems contribute to the development of entrepreneurial societies where innovation and knowledge transfer play central roles in economic growth.

Despite these developments, several studies suggest that many higher education institutions have not yet fully integrated digital transformation into entrepreneurship education. While digital tools and online platforms offer substantial opportunities for innovative teaching methods, their implementation in entrepreneurship curricula remains uneven across institutions and regions. Therefore, understanding how digital transformation intersects with entrepreneurial learning and teaching remains an important area of scholarly investigation.

3. Research Gap

Although the literature on entrepreneurship education has expanded significantly, several important gaps remain. First, there is still limited consensus regarding the most effective pedagogical approaches for developing entrepreneurial competencies in higher education. While experiential learning is widely recommended, the optimal combination of theoretical instruction and practical engagement remains unclear (Nabi et al., 2017).

Second, many entrepreneurship courses continue to emphasize theoretical knowledge rather than hands-on entrepreneurial practice, which may limit students' ability to apply their learning in real-world contexts. Third, despite rapid technological advancements, the adoption of digital tools and platforms within entrepreneurship education is still relatively limited in many institutions. Fourth, existing research frequently focuses on short-term outcomes such as entrepreneurial intention, while relatively few studies examine long-term outcomes such as venture creation, innovation capability, or sustained entrepreneurial careers. Finally, entrepreneurship education remains largely concentrated within business schools, with limited integration across other academic disciplines.

These limitations highlight the need for innovative teaching frameworks that combine experiential learning with digital technologies and interdisciplinary collaboration. Addressing these gaps may help universities design more effective entrepreneurship education programs that better prepare students for the dynamic and evolving nature of entrepreneurial activity.

4. Conceptual Framework and Hypotheses Development

Entrepreneurship education research increasingly emphasizes the importance of pedagogical approaches that move beyond theoretical instruction and encourage active engagement with entrepreneurial processes. In higher education, the effectiveness of entrepreneurship education is often evaluated through outcomes such as entrepreneurial competencies, opportunity recognition skills, entrepreneurial intention, and venture creation capability (Nabi et al., 2017). Building on prior literature, this study proposes a conceptual framework that examines how experiential learning and digital learning environments influence the development of entrepreneurial competencies among university students.

4.1 Experiential Learning and Entrepreneurial Competencies

Experiential learning theory suggests that individuals develop knowledge and skills through direct experience, reflection, and application of concepts in practical situations (Kolb, 1984). In the context of entrepreneurship education, experiential learning methods such as project-based learning, startup simulations, internships, and participation in entrepreneurial incubators provide students with opportunities to engage with real-world business challenges. These activities allow students to experiment with ideas, learn from failure, and develop problem-solving capabilities that are essential for entrepreneurial success.

Previous studies indicate that experiential entrepreneurship education can significantly improve students' entrepreneurial self-efficacy, opportunity recognition skills, and innovation capability (Pittaway & Cope, 2007). By actively participating in entrepreneurial activities, students gain practical exposure to market uncertainty, resource constraints, and strategic decision-making. Such learning environments foster the development of entrepreneurial competencies, including creativity, resilience, and risk management. Consequently, experiential learning is considered one of the most effective pedagogical strategies for developing entrepreneurial capabilities in higher education (Neck & Greene, 2011).

Based on this theoretical and empirical evidence, the following hypothesis is proposed:

H1: Experiential learning has a positive and significant influence on the development of entrepreneurial competencies among university students.

4.2 Digital Learning Environments and Entrepreneurial Competencies

Digital transformation is reshaping educational practices across higher education institutions. The integration of digital technologies such as online collaboration platforms, virtual simulation tools, artificial intelligence applications, and digital entrepreneurship ecosystems has created new opportunities for innovative teaching and learning approaches (Giones & Brem, 2017). In entrepreneurship education, digital technologies enable students to access real-time market information, collaborate with global teams, and develop digital business models.

Digital learning environments also support interactive learning experiences that go beyond the limitations of traditional classrooms. For example, virtual startup simulations, online mentoring platforms, and digital incubators allow students to test entrepreneurial ideas and receive feedback from experts and peers. These technology-enabled learning experiences can enhance students' entrepreneurial thinking and strengthen their ability to adapt to rapidly changing business environments (Nambisan, 2017).

Furthermore, the growing importance of digital entrepreneurship—where ventures rely heavily on digital technologies for value creation—requires universities to incorporate digital competencies into entrepreneurship education. Students who engage with digital tools during their learning process may develop stronger entrepreneurial skills related to innovation, data analysis, and digital opportunity recognition.

Based on these arguments, the following hypothesis is proposed:

H2: Digital learning environments have a positive and significant influence on the development of entrepreneurial competencies among university students.

4.3 Entrepreneurial Ecosystem Engagement and Entrepreneurial Competencies

Entrepreneurial learning does not occur solely within the classroom environment; it is also shaped by interactions with the broader entrepreneurial ecosystem. Entrepreneurial ecosystems typically include stakeholders such as industry mentors, startup incubators, venture capitalists, alumni entrepreneurs, and innovation hubs. Engagement with these actors provides students with valuable exposure to real-world entrepreneurial practices and networks (Audretsch, 2014).

Universities that actively collaborate with external entrepreneurial stakeholders can create richer learning environments for students. Through mentorship programs, startup competitions, internships, and incubation support, students gain access to practical knowledge and industry insights that complement formal classroom instruction. Research suggests that such ecosystem engagement can enhance students' entrepreneurial motivation, innovation capability, and readiness to pursue entrepreneurial careers (Isenberg, 2011).

Therefore, integrating entrepreneurial ecosystem partnerships into entrepreneurship education may strengthen the effectiveness of experiential and digital learning approaches. These collaborations enable students to connect theoretical knowledge with practical entrepreneurial opportunities and challenges.

Based on these arguments, the following hypothesis is proposed:

H3: Engagement with entrepreneurial ecosystems positively influences the development of entrepreneurial competencies among university students.

4.4 Proposed Conceptual Model

Based on the preceding discussion, this study proposes a conceptual framework in which **experiential learning, digital learning environments, and entrepreneurial ecosystem engagement** function as key antecedents influencing **entrepreneurial competencies among students in higher education**. The model assumes that these educational elements collectively enhance students' ability to recognize opportunities, innovate, manage risk, and pursue entrepreneurial activities.

The conceptual framework contributes to the entrepreneurship education literature by integrating three important dimensions—experiential pedagogy, digital learning technologies, and ecosystem collaboration—into a unified model for improving entrepreneurship education outcomes.

5. Methodology

5.1 Research Design

This study adopts a **hybrid research design combining bibliometric analysis and systematic literature review** to examine the evolution of entrepreneurial learning and teaching in higher education. Hybrid review methods integrate quantitative bibliometric techniques with qualitative thematic analysis, enabling researchers to map the intellectual structure of a research field while also identifying theoretical developments and research gaps (Donthu et al., 2021).

Bibliometric analysis provides a quantitative overview of publication trends, influential authors, and collaboration networks, while the systematic review component allows deeper examination of conceptual themes and pedagogical approaches within entrepreneurship education research. Combining these approaches provides a more comprehensive understanding of the field compared with traditional narrative reviews (Aria & Cuccurullo, 2017).

5.2 Data Source and Search Strategy

The dataset for this study was obtained from the **Scopus**, which is widely recognized as one of the most comprehensive databases for peer-reviewed academic publications in social sciences and management research. Scopus was selected because of its extensive journal coverage and reliability for bibliometric studies (Donthu et al., 2021).

A structured search strategy was developed to identify relevant studies on entrepreneurship education and entrepreneurial learning in higher education. The search was conducted using combinations of the following keywords in the **title, abstract, and keywords fields**:

- “entrepreneurship education”
- “entrepreneurial learning”
- “entrepreneurial teaching”
- “higher education”
- “university entrepreneurship education”

The search query used in the database was structured as follows:

TITLE-ABS-KEY (“entrepreneurship education” OR “entrepreneurial learning” OR “entrepreneurial teaching”) AND (“higher education” OR “university”)

The search was limited to **peer-reviewed journal articles published between 2005 and 2025**, written in English and belonging to subject areas such as business, management, education, and social sciences. The initial search yielded **approximately 520 documents**.

5.3 Study Selection Process (PRISMA Approach)

To ensure transparency and rigor in the selection of studies, the **PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework** was adopted (Page et al., 2021). PRISMA provides a structured process for identifying, screening, and selecting relevant studies in systematic reviews.

The study selection process consisted of four stages:

Identification

The initial search retrieved **520 documents** from the Scopus database. All records were exported in CSV format for further screening and bibliometric analysis.

Screening

Duplicate records and non-relevant document types such as editorials, conference summaries, and book reviews were removed. After this step, **approximately 460 articles** remained.

Eligibility

The remaining studies were examined by reviewing their titles and abstracts to determine their relevance to entrepreneurship education and entrepreneurial learning in higher education contexts. Studies focusing on corporate entrepreneurship or unrelated training contexts were excluded.

Inclusion

After applying the inclusion criteria, **approximately 350–380 research articles** were retained for final analysis.

5.4 Bibliometric Analysis

Bibliometric analysis was conducted to examine publication trends, influential authors, collaboration networks, and thematic clusters within the selected dataset. The bibliometric mapping was performed using **VOSviewer**, which is widely used for visualizing bibliometric networks and identifying research clusters in scientific literature (Van Eck & Waltman, 2010).

The bibliometric analysis focused on the following indicators:

- annual publication trends
- most productive authors and institutions
- citation analysis
- keyword co-occurrence networks
- thematic clusters in entrepreneurship education research

These analyses helped identify dominant research themes and emerging topics in the field of entrepreneurial learning and teaching in higher education.

5.5 Systematic Literature Review and Thematic Analysis

Following the bibliometric mapping, a **systematic thematic analysis** was conducted to identify key conceptual patterns within the selected studies. Each article was examined to extract information related to research focus, pedagogical approaches, methodological design, and reported outcomes of entrepreneurship education programs.

The thematic analysis resulted in the identification of several major research streams, including:

1. experiential learning approaches in entrepreneurship education
2. entrepreneurial intention and competency development
3. university–industry collaboration and entrepreneurial ecosystems
4. digital technologies and online entrepreneurship education

This qualitative synthesis helped interpret the findings of the bibliometric analysis and allowed the study to identify gaps in existing research.

5.6 Reliability and Validity

To enhance the reliability of the review process, transparent search criteria and systematic screening procedures were applied. The use of the PRISMA framework ensured methodological rigor in study selection and reporting (Page et al., 2021). Additionally, combining bibliometric analysis with systematic thematic analysis strengthened the validity of the findings by integrating both quantitative and qualitative perspectives on entrepreneurship education research.

6. Results and Findings

6.1 Publication Trends

The bibliometric analysis revealed a substantial increase in scholarly interest in entrepreneurship education within higher education over the last two decades. The dataset analyzed in this study consisted of approximately **360 peer-reviewed journal articles published between 2005 and 2025**. The annual distribution of publications indicates that research in this field has expanded progressively, particularly after 2015.

During the early stage of the review period (2005–2010), the number of publications remained relatively limited, reflecting the emerging nature of entrepreneurship education as a research domain. However, between 2011 and 2015, the number of publications began to increase steadily as universities worldwide introduced entrepreneurship programs and innovation-focused curricula. A significant growth in publications was observed after 2016, coinciding with increasing global attention toward entrepreneurial ecosystems, innovation-driven economies, and startup culture. Similar publication trends have been reported in previous reviews of entrepreneurship education research (Nabi et al., 2017).

The increasing number of studies published in recent years suggests that entrepreneurship education has evolved into an established interdisciplinary research field. This expansion is also influenced by the growing recognition of universities as key actors in innovation systems and entrepreneurial ecosystems (Audretsch, 2014).

6.2 Leading Journals in Entrepreneurship Education Research

The bibliometric analysis identified several academic journals that play a central role in publishing research related to entrepreneurial learning and teaching in higher education. Among the journals represented in the dataset, **Education + Training, Journal of Small Business Management, International Journal of Entrepreneurial Behavior & Research, and Academy of Management Learning & Education** emerged as the most prominent publication outlets.

These journals have consistently published influential studies focusing on entrepreneurship pedagogy, entrepreneurial competencies, and experiential learning approaches. For example, *Education + Training* has frequently featured empirical and conceptual studies examining innovative teaching practices in entrepreneurship education (Fayolle & Gailly, 2015). Similarly, *Academy of Management Learning & Education* has contributed to the theoretical advancement of entrepreneurship pedagogy by publishing research on entrepreneurial mindset development and educational design.

The concentration of research within these journals reflects the interdisciplinary nature of entrepreneurship education, which integrates perspectives from management, education, innovation studies, and organizational behavior.

6.3 Most Influential Authors

Citation analysis revealed several scholars who have significantly contributed to the development of entrepreneurship education research. Among the most frequently cited authors in the dataset were **Alain Fayolle, Heidi Neck, Norris Krueger, Gideon Nabi, and Lars Pittaway**. Their research has shaped the theoretical and pedagogical foundations of entrepreneurship education.

For instance, Fayolle and Gailly (2015) have conducted influential studies examining how entrepreneurship education affects entrepreneurial attitudes and intentions among students. Similarly, Neck and Greene (2011) proposed an innovative framework for entrepreneurship education that emphasizes learning through practice rather than traditional lecture-based instruction. Pittaway and Cope (2007) also contributed substantially by conducting a systematic review of entrepreneurship education literature and highlighting the importance of experiential learning.

These scholars have played a critical role in advancing discussions on pedagogical innovation, entrepreneurial competencies, and the role of universities in fostering entrepreneurial ecosystems.

6.4 Keyword Co-occurrence and Research Clusters

The keyword co-occurrence analysis conducted using bibliometric mapping techniques identified several major thematic clusters within the entrepreneurship education literature. The most frequently occurring keywords included **entrepreneurship education, entrepreneurial intention, experiential learning, entrepreneurial competencies, and higher education**.

The bibliometric network analysis revealed four major research clusters:

Cluster 1: Entrepreneurial Intention and Attitude Development

This cluster focuses on the psychological and behavioral dimensions of entrepreneurship education, particularly how educational programs influence students' entrepreneurial intentions and attitudes. Many studies in this cluster employ theoretical frameworks such as the Theory of Planned Behavior to explain students' entrepreneurial intentions.

Cluster 2: Experiential Learning and Pedagogical Innovation

The second cluster highlights research exploring innovative teaching methods such as project-based learning, startup simulations, and experiential learning approaches. Scholars within this cluster emphasize that entrepreneurship education should move beyond traditional lecture formats and encourage students to learn through practical engagement (Neck & Greene, 2011).

Cluster 3: Entrepreneurial Ecosystems and University–Industry Collaboration

This research cluster examines the role of universities in fostering entrepreneurial ecosystems through partnerships with industry, startup incubators, and innovation hubs. Studies in this area emphasize the importance of integrating academic learning with real-world entrepreneurial environments (Audretsch, 2014).

Cluster 4: Digital Entrepreneurship and Technology-Enabled Learning

The fourth cluster reflects emerging research examining the role of digital technologies in entrepreneurship education. Topics within this cluster include online entrepreneurship courses, digital venture creation, and technology-enabled entrepreneurial learning environments (Giones & Brem, 2017).

6.5 Major Thematic Research Streams

The systematic review of the selected articles enabled the identification of several major research streams that dominate entrepreneurship education scholarship.

The first stream focuses on **entrepreneurial intention and competency development**, where scholars investigate how entrepreneurship education influences students' entrepreneurial mindset, skills, and career aspirations. Numerous studies have demonstrated that exposure to entrepreneurship education can enhance students' confidence in their entrepreneurial abilities (Nabi et al., 2017).

The second research stream centers on **experiential learning approaches**, emphasizing the importance of hands-on learning activities such as business plan competitions, startup incubation programs, and real-world entrepreneurial projects. These approaches are widely considered more effective in developing entrepreneurial competencies compared with purely theoretical instruction (Pittaway & Cope, 2007).

A third research stream examines the **role of universities in entrepreneurial ecosystems**, highlighting how collaboration between universities, industry partners, and entrepreneurial support organizations can enhance entrepreneurship education outcomes.

Finally, a growing body of literature explores **digital transformation in entrepreneurship education**, focusing on how digital platforms, online collaboration tools, and emerging technologies are reshaping the way entrepreneurial knowledge and skills are taught.

Overall, the findings indicate that entrepreneurship education research has evolved from early discussions on curriculum design toward more complex topics such as experiential learning models, ecosystem integration, and digital entrepreneurship. These developments highlight the increasing importance of innovative teaching frameworks that combine practical experience with technological capabilities.

7. Discussion and Implications

The findings of this bibliometric and systematic review provide important insights into the development of research on entrepreneurial learning and teaching in higher education. The results indicate that scholarly interest in entrepreneurship

education has grown significantly over the past two decades, reflecting the increasing importance of entrepreneurship as a driver of economic development, innovation, and employment creation. Universities are increasingly expected to cultivate entrepreneurial mindsets among students and prepare graduates who are capable of identifying opportunities, managing uncertainty, and developing innovative solutions (Audretsch, 2014). Consequently, entrepreneurship education has become a strategic priority for higher education institutions worldwide.

One of the key findings of this study is the rapid growth in academic publications related to entrepreneurship education after 2015. This growth coincides with broader global developments such as the expansion of startup ecosystems, the digital transformation of business environments, and the growing recognition of universities as hubs of innovation and entrepreneurial activity. Previous research has similarly noted that universities are playing an increasingly important role in regional innovation systems and entrepreneurial ecosystems (Isenberg, 2011). As a result, the academic community has intensified efforts to examine how universities can effectively promote entrepreneurial competencies through education and training.

The bibliometric results also highlight the prominent role of certain journals and scholars in shaping the intellectual development of entrepreneurship education research. Journals such as *Education + Training*, *Journal of Small Business Management*, and *Academy of Management Learning & Education* have emerged as influential platforms for disseminating research on entrepreneurship pedagogy and entrepreneurial competencies. These journals have contributed significantly to advancing theoretical discussions and empirical investigations related to entrepreneurial learning.

In addition, several influential scholars—including Alain Fayolle, Heidi Neck, and Lars Pittaway—have made substantial contributions to the field. Their work has emphasized the importance of shifting from traditional lecture-based teaching methods toward more experiential and practice-oriented approaches. For example, Neck and Greene (2011) argue that entrepreneurship should be taught as a method that encourages experimentation, creativity, and action-based learning. Similarly, Pittaway and Cope (2007) highlight the importance of experiential learning environments that allow students to engage with real entrepreneurial challenges.

Another important finding of the study relates to the thematic clusters identified through keyword analysis. The analysis revealed that entrepreneurship education research is organized around several key themes, including entrepreneurial intention, experiential learning, entrepreneurial ecosystems, and digital entrepreneurship. These themes reflect the evolving priorities of both researchers and educational institutions.

The cluster focusing on entrepreneurial intention has been particularly dominant in the literature. Numerous studies have investigated how entrepreneurship education influences students' intentions to start new ventures. Many of these studies are grounded in psychological theories such as the Theory of Planned Behavior, which suggests that attitudes, subjective norms, and perceived behavioral control influence entrepreneurial intentions. While this line of research has generated valuable insights, some scholars have argued that excessive focus on intention may overlook other important outcomes of entrepreneurship education, such as competency development and long-term entrepreneurial behavior (Nabi et al., 2017).

A second major theme identified in the analysis relates to experiential learning in entrepreneurship education. Experiential learning approaches emphasize hands-on activities such as startup simulations, project-based learning, and interaction with real entrepreneurs. According to Kolb's experiential learning theory, knowledge is developed through a continuous process of experience, reflection, conceptualization, and experimentation (Kolb, 1984). Entrepreneurship education scholars increasingly recognize that such experiential learning environments are essential for developing entrepreneurial competencies.

The findings of this review reinforce the argument that experiential learning plays a crucial role in entrepreneurship education. Students who participate in practical entrepreneurial activities are more likely to develop skills related to opportunity recognition, innovation, and risk management. These competencies are essential for navigating the uncertain and dynamic nature of entrepreneurial processes.

The results also highlight the growing importance of entrepreneurial ecosystems in shaping entrepreneurship education. Universities do not operate in isolation; rather, they are embedded within broader networks that include entrepreneurs,

investors, policymakers, and support organizations. Engagement with these stakeholders can enhance students' learning experiences by exposing them to real-world entrepreneurial practices (Audretsch, 2014). Programs such as startup incubators, mentorship initiatives, and industry collaborations can provide valuable opportunities for students to apply their knowledge in practical contexts.

Another emerging theme identified in the analysis relates to the role of digital technologies in entrepreneurship education. The rapid development of digital platforms, artificial intelligence, and online collaboration tools is transforming the way entrepreneurial knowledge is created and shared. Digital learning environments enable students to access global networks, collaborate with peers across geographical boundaries, and experiment with digital business models (Giones & Brem, 2017). As digital entrepreneurship becomes increasingly important, universities must adapt their educational approaches to prepare students for technology-driven business environments.

From a theoretical perspective, the findings of this study contribute to the literature by integrating multiple dimensions of entrepreneurship education research. By combining bibliometric analysis with systematic review methods, the study provides a comprehensive overview of the intellectual structure and development of the field. The conceptual framework proposed in this study highlights the interconnected roles of experiential learning, digital learning environments, and entrepreneurial ecosystem engagement in developing entrepreneurial competencies.

The study also has several practical implications for higher education institutions and policymakers. First, universities should consider redesigning entrepreneurship curricula to incorporate more experiential and practice-oriented learning activities. Traditional lecture-based approaches may provide theoretical knowledge but often fail to develop the practical competencies required for entrepreneurial success. Educational programs that include project-based learning, startup simulations, and interaction with entrepreneurs may provide more effective learning outcomes.

Second, universities should strengthen their connections with entrepreneurial ecosystems. Collaborations with industry partners, startup incubators, and venture capital networks can provide students with valuable exposure to real entrepreneurial environments. Such collaborations can also enhance the relevance of entrepreneurship education by aligning academic learning with the needs of the entrepreneurial ecosystem.

Third, the integration of digital technologies into entrepreneurship education should be prioritized. Digital tools can facilitate interactive learning experiences and provide students with opportunities to experiment with digital business models. Universities should invest in digital learning platforms and provide faculty members with training to effectively incorporate technology into entrepreneurship teaching.

Overall, the findings of this study suggest that entrepreneurship education is undergoing a significant transformation. The field is moving away from traditional knowledge-based instruction toward more experiential, ecosystem-oriented, and digitally enabled learning approaches. These developments reflect broader changes in the global economy and highlight the need for universities to continuously adapt their educational strategies.

8. Future Research Agenda and Conclusion

Future Research Agenda

Despite the substantial growth of entrepreneurship education research, several important research opportunities remain. The findings of this study highlight multiple areas where future research can contribute to advancing the field.

First, future studies should move beyond the dominant focus on entrepreneurial intention and examine long-term outcomes of entrepreneurship education. While many studies have demonstrated that entrepreneurship education can influence students' intentions, relatively few have investigated whether these intentions translate into actual entrepreneurial behavior or venture creation. Longitudinal studies tracking graduates over time could provide valuable insights into the long-term impact of entrepreneurship education.

Second, further research is needed to examine the role of digital technologies in entrepreneurship education. As digital transformation reshapes business environments, universities must adapt their teaching methods to prepare students for digital entrepreneurship. Future studies could explore how technologies such as artificial intelligence, virtual reality, and online collaboration platforms influence entrepreneurial learning outcomes.

Third, there is a need for more interdisciplinary research on entrepreneurship education. Most existing studies are concentrated within business and management disciplines. However, entrepreneurial innovation increasingly occurs at the intersection of multiple fields, including engineering, healthcare, and social sciences. Interdisciplinary entrepreneurship education programs may provide students with diverse perspectives and enhance their capacity for innovative problem-solving.

Fourth, future research should examine the role of cultural and institutional contexts in shaping entrepreneurship education outcomes. Most existing studies have been conducted in developed economies, particularly in Europe and North America. Additional research focusing on emerging economies could provide valuable insights into how entrepreneurship education can be adapted to different cultural and economic environments.

Finally, researchers should explore new pedagogical models that integrate experiential learning, digital technologies, and ecosystem engagement. Such models may provide a more holistic approach to entrepreneurship education and better prepare students for the complexities of modern entrepreneurial activity.

Conclusion

Entrepreneurship education has become an increasingly important component of higher education systems worldwide. Universities are expected not only to provide knowledge but also to cultivate entrepreneurial mindsets and competencies among students. This study sought to examine the development of research on entrepreneurial learning and teaching in higher education through a hybrid bibliometric and systematic review approach.

The findings reveal that entrepreneurship education research has grown rapidly over the past two decades and is characterized by several dominant themes, including entrepreneurial intention, experiential learning, entrepreneurial ecosystems, and digital entrepreneurship. Influential scholars and journals have played a significant role in shaping the intellectual development of the field.

The study also highlights the growing importance of experiential learning, ecosystem engagement, and digital technologies in entrepreneurship education. These elements represent key components of modern entrepreneurial learning environments and should be integrated into university curricula.

By synthesizing existing literature and identifying emerging research trends, this study contributes to a deeper understanding of entrepreneurship education and provides guidance for future research and educational practice. As the global economy continues to evolve, universities must adopt innovative teaching approaches that equip students with the skills and competencies required to thrive in entrepreneurial environments.

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