

GLOBAL RESEARCH TRENDS IN ENTREPRENEURIAL EDUCATION: A BIBLIOMETRIC ANALYSIS OF POST-PANDEMIC SCHOLARLY EVOLUTION (2019–2024)

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Abstract

This study maps global research trends in entrepreneurial education from 2019 to 2024, analysing 1,212 SSCI-indexed journal articles from the Web of Science Core Collection through the lenses of human capital theory, planned behaviour theory, and entrepreneurial self-efficacy. Using the Bibliometrix package in R and VOSviewer, performance analysis and science mapping were applied to examine publication trends, citation impact, co-authorship networks, keyword co-occurrence, and thematic evolution. Results show sustained growth in scholarly output, led by the United States and European nations, while Malaysia and Singapore achieved exceptional citation impact. Strong transnational collaborations, particularly in Europe, underpin thematic priorities such as entrepreneurial learning, self-efficacy, innovation, and sustainability, with an emerging focus on gender, social entrepreneurship, and digital pedagogy. The findings offer actionable insights for educators, researchers, and policymakers, providing the most comprehensive recent bibliometric mapping of entrepreneurial education. This integration of quantitative evidence with theory informs post-pandemic research and pedagogical innovation.

Keywords: Entrepreneurial Education; Bibliometric Analysis; Research Collaboration Networks; Emerging Economies; Post-Pandemic Education; Innovation Pedagogy

INTRODUCTION

Entrepreneurship is widely acknowledged as a vital catalyst for economic prosperity, social stability, and sustainable development across both developed and developing economies (Boldureanu et al., 2020; Ratten & Jones, 2021). Within higher education institutions, entrepreneurship education plays a pivotal role in equipping learners with the knowledge, skills, and attitudes needed to identify and capitalise on opportunities. Such education fosters not only economic growth but also innovation, adaptability, and resilience in the face of societal and market challenges (Jiatong et al., 2021; Jena, 2020). Integrating successful entrepreneurial role models into curricula has been shown to positively influence students' entrepreneurial intentions, boost self-confidence, and encourage recognition of the broader social contributions of entrepreneurship—such as job creation—beyond purely financial returns (Boldureanu et al., 2020). From a theoretical standpoint, frameworks including human capital theory, entrepreneurial self-efficacy, self-determination theory, and the theory of planned behaviour strongly support the positive relationship between entrepreneurship education and entrepreneurial intentions (Fayolle et al., 2006; Chen et al., 1998; Wardana et al., 2020). Experiential learning, role models, and supportive environments strengthen perceived behavioural control and self-efficacy—key predictors of entrepreneurial intention (Vamvaka et al., 2020; Fayolle & Gailly, 2015). In the context of global challenges such as youth unemployment and post-pandemic recovery, entrepreneurial education is increasingly viewed as both an academic discipline and a strategic tool for socio-economic advancement (Ratten & Jones, 2021; Jena, 2020).

1.1 Rationale

Despite increasing recognition of entrepreneurship education as a means to enhance entrepreneurial competence and adaptability in the digital era, significant gaps remain in understanding the mechanisms by which it influences entrepreneurial outcomes. Self-directed learning (SDL) has been identified as a crucial competence for fostering adaptability and resilience in rapidly changing markets. Yet, empirical evidence linking SDL to entrepreneurship education outcomes is limited (Morris & König, 2021). Human capital theory has been widely applied to explain how knowledge, skills, and experience drive entrepreneurial success, but findings reveal complex, context-dependent relationships, underscoring the need for nuanced analyses across diverse settings (Assaker et al., 2020; Canavati et al., 2021). While systematic reviews address specific areas such as female entrepreneurship in sport (Costa

& Miragaia, 2022) and mindfulness in higher education entrepreneurship (Karali et al., 2023), they lack a comprehensive, recent mapping. Given digital transformation, globalisation, and post-COVID-19 disruptions, an updated bibliometric synthesis is essential to capture evolving trends, collaborations, and emerging themes.

1.2 Aim, Scope, and Contribution of the Study

This study conducts a comprehensive bibliometric analysis of global research trends in entrepreneurial education from 2019 to 2024, with emphasis on the post-COVID-19 era. Using 1,212 SSCI-indexed journal articles from the Web of Science Core Collection, it examines publication growth, geographic distribution, citation impact, collaboration networks, and the contributions of leading authors, institutions, and journals. The scope encompasses a range of contexts and themes, including academic entrepreneurship, entrepreneurial learning, student entrepreneurship, and entrepreneurial universities. Employing performance analysis and science mapping with the Bibliometrix package in R, the study provides a systematic and reproducible mapping of the field's intellectual landscape. The findings identify emerging research hotspots, reveal the global structure of scholarly collaboration, and spotlight influential contributors and outlets. These insights offer practical value for scholars, educators, and policymakers seeking to inform future research agendas, refine pedagogical approaches, and foster international cooperation in entrepreneurial education.

2.3 Theoretical Framework

This study grounds its bibliometric analysis in three complementary and well-established theoretical perspectives: Human Capital Theory, the Theory of Planned Behaviour, and Entrepreneurial Self-Efficacy Theory. These frameworks offer a comprehensive lens through which to interpret the observed patterns in entrepreneurial education research—including publication trends, thematic development, and collaborative networks—as well as to situate these trends within broader conceptual understandings of entrepreneurial behaviour and education outcomes.

2.3.1 Human Capital Theory

Human Capital Theory (HCT), pioneered by Theodore Shultz (1961) and further refined by Gary Becker (1964), conceptualises education, training, and skills development as productive investments that generate substantial returns at both individual and societal levels. Schultz's foundational work, *Investment in Human Capital*, emphasises that knowledge acquisition enhances economic capacity and can drive growth rates surpassing those attributable to traditional physical capital. Becker introduced further nuance by delineating between general and specific human capital: general education enhances productivity across various firms and sectors, while specific training primarily benefits the organisation providing it.

Within the context of entrepreneurship education, HCT provides critical insights into why targeted educational programs systematically improve entrepreneurial outcomes. Entrepreneurial education constitutes a form of specialised human capital investment that equips individuals with domain-relevant knowledge, analytical capabilities, skills in recognising opportunities, and competencies in venture management (Chell, 2007). This framework helps explain notable bibliometric trends: countries and institutions that make substantial investments in entrepreneurial human capital often demonstrate superior research outputs and innovation performance. For example, established economies like the United States, the United Kingdom, and Germany, with their robust investment in education and research infrastructures, lead in publication volumes. Meanwhile, emerging economies such as Malaysia and Singapore, despite producing fewer publications, achieve exceptionally high citation impact, suggesting that strategic, qualitative investments in entrepreneurship education can yield disproportionate scholarly influence through focused expertise and international collaboration.

Empirical studies substantiate the relevance of HCT to entrepreneurship education by demonstrating that educational interventions substantially enhance entrepreneurial competencies, self-efficacy, and new venture performance (Ahlers et al., 2015; Martin et al., 2013). Moreover, the theory's emphasis on cumulative skill accumulation aligns with observed longitudinal growth in bibliometric outputs, reflective of expanding institutional recognition of entrepreneurial human capital development as a key driver of economic and social progress.

2.3.2 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) provides a robust psychological framework to understand how entrepreneurship education influences entrepreneurial intentions and subsequent behaviours. TPB posits that behavioural intentions—essential immediate antecedents of actual behaviour—are shaped by three core constructs: attitudes toward the behaviour, subjective norms, and perceived behavioural control. In the educational context, attitude reflects students' positive or negative evaluations of entrepreneurship as a career option; subjective norms encompass perceived social pressures or support from significant others such as family, peers, or mentors; and perceived behavioural control corresponds to one's confidence in the ability to perform entrepreneurial activities effectively. Extensive empirical research has validated TPB's applicability within entrepreneurship education, with meta-analyses indicating that these constructs explain approximately 45-60% of variance in entrepreneurial intentions (Liñán et al., 2011). Education initiatives impact these components by increasing awareness of

entrepreneurship’s benefits (attitude), reinforcing supportive social environments and norms (subjective norms), and enhancing learners’ confidence via experiential learning, skill-building, and exposure to role models (perceived behavioural control) (Tsai et al., 2016).

From a bibliometric perspective, TPB helps interpret regional research productivity and citation impact as reflections of varying institutional environments that cultivate supportive norms and facilitate entrepreneurial learning. It also accounts for patterns of transnational collaboration, as TPB’s constructs resonate cross-culturally, fostering shared theoretical understanding while accommodating local contextual variations in entrepreneurial intentions and behaviours.

2.3.3 Entrepreneurial Self-Efficacy Theory

Entrepreneurial Self-Efficacy (ESE), conceptually rooted in Bandura’s broader social cognitive theory of self-efficacy (Bandura, 1977), captures explicitly individuals’ confidence in their ability to execute entrepreneurial tasks successfully. These tasks include opportunity identification, resource mobilisation, venture creation, and business management. Bandura identified four primary sources that contribute to the development of self-efficacy beliefs: mastery experiences (successful task performance), vicarious experiences (observing role models), verbal persuasion (encouragement and feedback), and physiological/emotional states (managing anxiety and fostering a positive mood). Entrepreneurship education strategically leverages these sources by providing hands-on learning that promotes mastery, presenting successful entrepreneurs as role models, offering mentorship and constructive support, and fostering a safe environment to build confidence (Wilson et al., 2007). Substantial research corroborates that ESE mediates the relationship between education and entrepreneurial outcomes, predicting opportunity recognition, persistence, and venture success. Furthermore, ESE theory explains variations in educational effectiveness across individual and cultural contexts: environments that systematically enhance the four sources of efficacy information produce superior behavioural and research results (Baum & Locke, 2004).

2.3.4 Integration and Application to Bibliometric Analysis

While bibliometric analysis traditionally maps the intellectual structure and evolution of research fields, anchoring such studies in established theoretical perspectives enriches interpretation and practical relevance. Human Capital Theory emphasises how knowledge, skills, and experiences acquired through entrepreneurship education enhance individuals’ capacities to identify and capitalise on opportunities effectively (Lepak & Snell, 1999; Lucas, 1988; Lusardi & Mitchell, 2014), thereby generating both individual advancement and broader socio-economic benefits. The Theory of Planned Behaviour highlights the psychological and social mechanisms—attitudes, norms, and perceived control—that entrepreneurship education modifies to foster entrepreneurial intentions (Ajzen, 1991; Armitage & Conner, 2001; Venkatesh et al., 2003). Complementing this, Entrepreneurial Self-Efficacy theory elucidates how belief in one’s entrepreneurial capabilities, strengthened via experiential learning and supportive ecosystems, translates educational exposure into actual entrepreneurial action (Armitage & Conner, 2001; Krueger et al., 2000; Venkatesh et al., 2003).

By embedding these theoretical lenses within the bibliometric framework, this study moves beyond purely descriptive accounts, contextualising publication volumes, thematic focuses, and collaboration trends as reflections of how education shapes entrepreneurial behaviour and outcomes globally. This theoretical grounding enhances the interpretive depth of the bibliometric findings. It offers actionable insights for educators, policymakers, and researchers aiming to design effective entrepreneurship education programs tailored to diverse contexts.

3. METHODOLOGY

3.1 Data Selection and Filtering Criteria

Data were drawn from the Web of Science Core Collection (Social Sciences Citation Index) for the period January 2019 to December 2024. A topic search (TS) was conducted using Boolean operators: “entrepreneurial education,” “entrepreneurship education,” “entrepreneurial learning,” “entrepreneurship learning,” “student entrepreneurship,” “entrepreneurial university,” “sustainable entrepreneurship,” “entrepreneurship as practice,” and “entrepreneurial ecosystem.” Only peer-reviewed research articles published in English and indexed in SSCI were included. Conference proceedings, book chapters, review articles, non-English publications, and duplicates were excluded. Following the initial retrieval of 1,567 records, titles, abstracts, and keywords were screened to remove 355 records that did not meet the inclusion criteria, resulting in a final dataset of 1,212 documents.

Table 1. Search Strategy and Keywords Used

Parameter	Details
Database	Web of Science Core Collection (SSCI)
Timeframe	2019–2024
Search Terms	- "Entrepreneurial Education" OR "Entrepreneurship Education"

Parameter	Details
	- "Entrepreneurial Learning" OR "Entrepreneurship Learning" - "Student Entrepreneurship" - "Entrepreneurial University" - [Complete List of Search Terms to Be Added]
Inclusion Criteria	- Peer-Reviewed Journal Articles; English Language; SSCI-Indexed; Original Research Articles
Exclusion Criteria	- Conference Proceedings; Book Chapters; Review Articles; Non-English Publications

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3.3 Bibliometric Analysis Techniques

Analysis combined performance analysis and science mapping, following established bibliometric frameworks.

3.3.1 Performance Analysis

- Annual publication counts and growth rates were calculated to assess research productivity over time.
- Geographic distribution and international collaboration patterns were analysed at the country level.
- Author productivity was measured through publication counts and h-index values.
- Total publications and citation impact assessed institutional contributions.
- Journal analysis employed Bradford’s Law to identify core publication outlets and impact factors.
- Citation analysis identified the most cited articles and overall citation patterns.

3.3.2 Science Mapping

- Co-authorship networks were constructed at the author, institution, and country levels to reveal collaboration structures.
- Keyword co-occurrence maps identified major research themes and their interrelationships.
- Citation and co-citation analyses traced intellectual linkages among key publications.
- Thematic evolution diagrams depicted shifts in research focus over the study period.
- Multiple correspondence analysis (MCA) was used to generate conceptual structure maps illustrating thematic clusters.

3.3.3 Software and Visualisation

All performance analyses were conducted using the *Bibliometrix* package in R (v4.3.0). Network visualisations and clustering were generated using VOSviewer (version 1.6.19; van Eck & Waltman, 2010) and Gephi (version 0.9.7). Microsoft Excel was employed for preliminary data management and descriptive statistics. Network normalisation used association strength, and co-occurrence counting employed a complete counting approach.

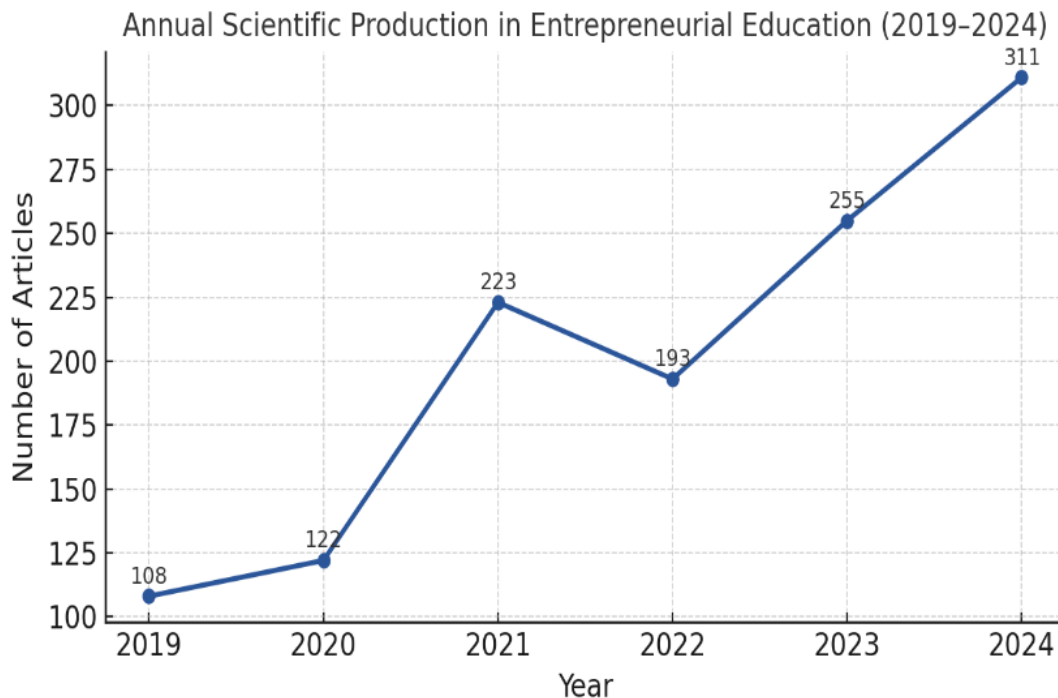
3.4 Reliability and Validity

To ensure robustness, inter-rater reliability checks were performed on a random sample of 10% of records during screening. Sensitivity analyses were conducted to test alternative search strategies and parameter settings. Methodological triangulation was used to compare key findings across R, VOSviewer, and Gephi outputs. Having established a rigorous dataset and analytical framework, we now present the bibliometric results.

4. RESULTS AND DISCUSSION

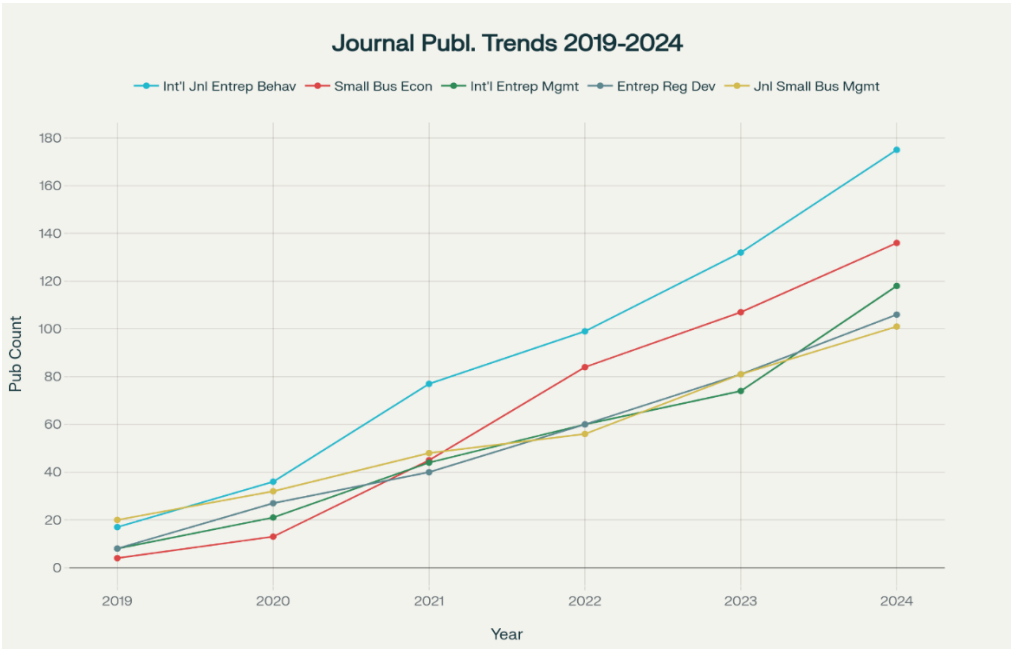
4.1 Publication Trends and Growth Patterns

The analysis of annual scientific production from 2019 to 2024 reveals a clear upward trajectory in research output on entrepreneurial education. In 2019, the field produced 108 publications, which increased steadily to 122 in 2020. A significant surge occurred in 2021, with 223 publications—almost doubling the output of 2019—likely reflecting an intensified scholarly interest in entrepreneurship in response to the post-pandemic economic recovery and shifting educational paradigms. Although there was a slight decline to 193 publications in 2022, the momentum resumed in 2023 with a peak of 255 articles, marking the highest annual output in the study period. Preliminary data for 2024 indicate continued vigorous research activity, suggesting sustained global interest. This growth pattern underscores the growing recognition of entrepreneurial education as a vital driver of innovation, resilience, and economic transformation, particularly in the context of post-COVID-19 challenges and opportunities.



4.2 Publication Trends of Top Journals

The publication output of leading journals specialising in entrepreneurial education research has shown a robust and consistent upward trajectory from 2019 to 2024. Notably, the *International Journal of Entrepreneurial Behaviour & Research* leads in volume, increasing from 17 articles in 2019 to 175 in 2024, reflecting sustained scholarly interest and growth in this domain. *Small Business Economics* and the *International Entrepreneurship and Management Journal* also demonstrate significant expansion, with respective outputs rising from 4 to 136 and 8 to 118 publications across the same period. Other key outlets, including *Entrepreneurship and Regional Development* and the *Journal of Small Business Management*, reflect this growth trend, marking the maturation and intensification of research activities in entrepreneurial education. This upward trend in publications highlights the increasing academic focus on entrepreneurship education, signalling a vibrant and evolving research field dedicated to understanding and fostering entrepreneurship learning, as well as its broader impacts within society.



4.3 Geographic Distribution of Research

The global landscape of entrepreneurial education research between 2019 and 2024 reveals significant geographic disparities in research output and impact. The United States dominates the field with 940 published articles, representing nearly 30% more output than the second-highest contributor, the United Kingdom, which produced 731 articles. This substantial gap underscores the prominent role of American institutions in advancing entrepreneurial education scholarship. China emerges as the third most productive nation with 406 articles, followed by a cluster of European countries, including Spain (258), Italy (234), Germany (232), and France (224). The strong representation of European nations in the top rankings reflects the region's growing emphasis on entrepreneurship as a driver of economic development and innovation. Sweden (178), Canada (144), and the Netherlands (129) complete the top ten, demonstrating the global reach of entrepreneurial education research across developed economies.

Table 2. Top Countries by Research Output

Country (Publications)			
USA (940)	Germany (232)	Australia (126)	Chile (71)
UK (731)	France (224)	Portugal (96)	Ireland (64)
China (406)	Sweden (178)	Norway (82)	India (57)
Spain (258)	Canada (144)	Denmark (78)	Switzerland (52)

4.4 Citation Impact and Research Quality

While research volume provides one measure of academic contribution, citation impact reveals a markedly different geographic pattern.

Table 3. Top 10 Countries by Citation Impact

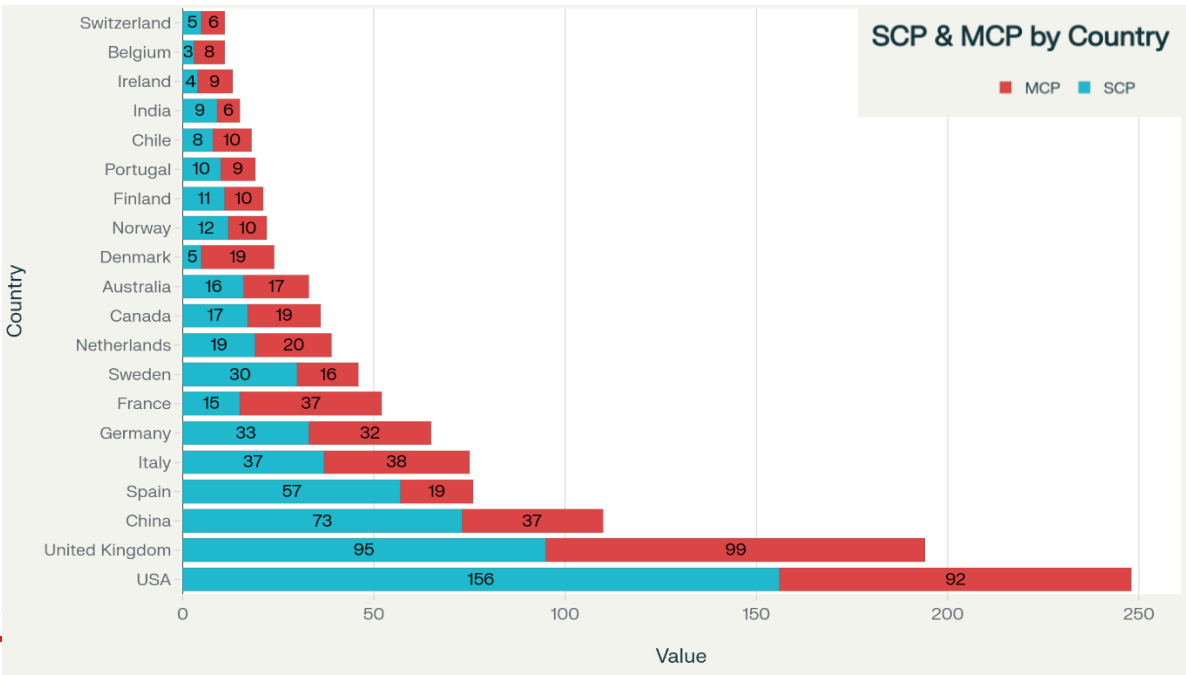
Rank	Country	Mean Citations	Rank	Country	Mean Citations
1	Malaysia	73.0	6	Iran	30.0

Rank	Country	Mean Citations	Rank	Country	Mean Citations
2	Liechtenstein	57.0	7	Saudi Arabia	29.3
3	Singapore	39.5	8	Australia	28.1
4	Germany	32.8	9	Malta	27.0
5	Netherlands	31.9	10	Finland	25.3

Malaysia leads all countries with an exceptional mean of 73.0 citations per article, indicating that, despite lower overall output, Malaysian research has a significant scholarly influence. This finding highlights the importance of research quality over quantity and suggests that emerging economies can produce highly impactful scholarship in entrepreneurial education. Liechtenstein follows with 57.0 citations per article; however, this figure should be interpreted cautiously, given the country's limited research output. Singapore's strong performance (39.5 citations per article) reflects its strategic investment in entrepreneurship education and innovation ecosystems. Notably, Germany and the Netherlands, which rank among the top producers by volume, also maintain high citation impact (32.8 and 31.9, respectively), demonstrating their ability to combine substantial output with influential research. The presence of Middle Eastern countries, such as Iran and Saudi Arabia, in the top citation rankings (30.0 and 29.3, respectively) indicates a growing regional expertise and international recognition of their contributions to entrepreneurial education research.

4.5 International Collaboration Networks

The analysis of multi-country collaboration patterns reveals varying approaches to international research partnerships. France leads in cross-national collaboration, with 71.2% of its entrepreneurial education papers involving authors from multiple countries. This high collaboration rate suggests that French researchers actively engage in international networks and benefit from diverse perspectives in their scholarship. The United Kingdom, Italy, and Germany each demonstrate balanced collaboration profiles, with approximately half of their research output involving international partnerships (51.0%, 50.7%, and 49.2% respectively). This pattern indicates mature research ecosystems that effectively combine domestic expertise with international collaboration to enhance research quality and global relevance. The high rates of international cooperation, particularly among European nations, reflect several key factors: the European Union's research funding mechanisms, which encourage cross-border partnerships; shared language advantages; and established academic exchange programs. These collaborative networks likely contribute to the high citation impact observed in several European countries, as international partnerships often lead to broader dissemination and increased scholarly attention.



The data on most-cited countries reveal that the USA leads both in total citations (5,330) and in influencing the field, averaging 21.5 citations per article, followed by the UK (3,724 citations; 19.2 per article). Germany (2,131; 32.8%) and the Netherlands (1,243; 31.9%) boast the highest average citation rates, underscoring the substantial impact of their research, despite having lower output than the USA or the UK. Italy (1,535; 20.5) and China (1,405; 12.8) occupy middle positions, while smaller European nations—Sweden, Australia, France, Denmark, Canada, Finland, and Norway—each contribute meaningfully, with averages ranging from about 14.6 to 28.1 citations per paper. At the lower end, emerging research hubs such as India (63 total citations; 4.2 per article) and Colombia (57; 19) still trail in both volume and impact, indicating that while Indian scholarship is growing, it lags significantly behind more established countries in both reach and citation influence.

Table 4. Top 30 Countries by Citations

USA (6330)	UK (3720)	Germany (2130)	Italy (1530)	China (1410)
Netherlands (1240)	Spain (1130)	Sweden (1038)	Australia (926)	France (820)
Denmark (675)	Canada (634)	Finland (532)	Norway (322)	Portugal (314)
Ireland (292)	Chile (279)	Malaysia (219)	Saudi Arabia (176)	Belgium (165)
Switzerland (148)	South Africa (92)	Iran (90)	Mexico (83)	New Zealand (83)

The geographic distribution of entrepreneurial education research highlights both opportunities and challenges. The research dominance of the United States and leading European nations reflects strong academic infrastructure. At the same time, the high citation impact of smaller countries like Malaysia and Singapore shows that excellence extends beyond traditional powerhouses. Robust international collaboration, especially within European networks, demonstrates how cross-border partnerships can enhance quality and global relevance. As the field evolves, these insights can guide strategies to build research capacity, promote diverse perspectives, and encourage global knowledge exchange—ensuring that entrepreneurial education reflects varied contexts and drives meaningful, internationally informed outcomes.

4.7 Leading Authors, Institutions, and Journals

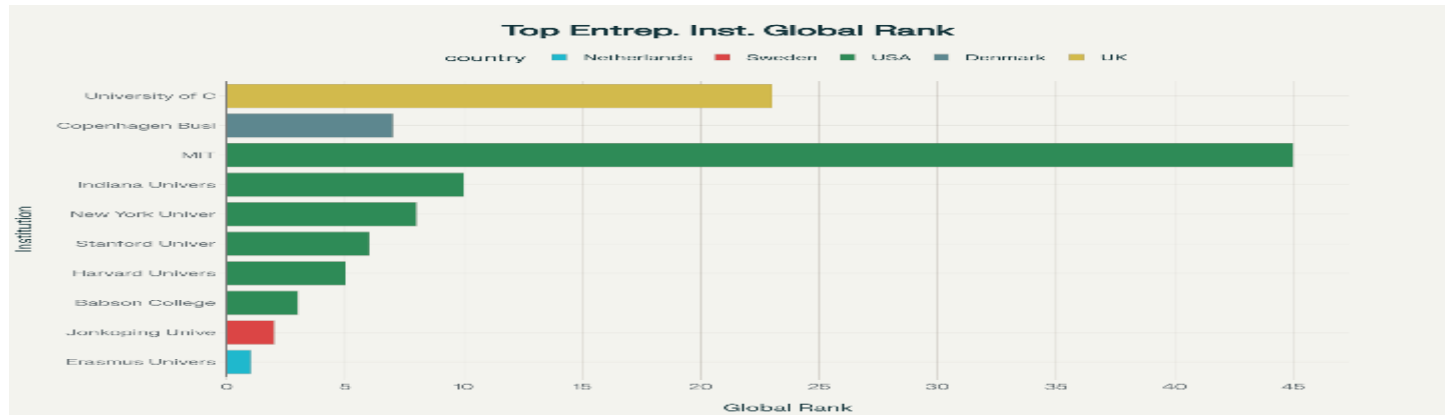
The entrepreneurial education research landscape is dominated by several highly influential scholars who have shaped the field through their extensive publications and citation impact. David B. Audretsch emerges as the most influential researcher with an exceptional h-index of 85 and over 200 publications, primarily affiliated with Indiana University's Kelley School of Business. His work focuses on entrepreneurship economics and the knowledge spillover theory of entrepreneurship, establishing him as a foundational figure in the field. Among the more specialised entrepreneurial education researchers, Robin Bell leads with an h-index of 22, contributing significantly to business planning education and problem-based learning approaches in entrepreneurship curricula.

Rank	Author	H-Index
1	Audretsch, David B.	85
2	Corbett, Andrew	28
3	Bell, Robin	22
4	Wibowo, A.	15
5	Huang-Saad, A.	14
6	Narmaditya, B. S.	12

Bell's research emphasises practical applications of entrepreneurship education methodologies and their effects on student entrepreneurial intentions. Andrew Corbett from Babson College represents another key contributor with an h-index of 28, focusing on corporate entrepreneurship, entrepreneurial learning, and cognition. His work bridges theoretical understanding with practical applications in entrepreneurship education. Wibowo A. has emerged as a highly productive researcher with 17 publications, specialising in entrepreneurial intention and self-efficacy studies. Meanwhile, Huang-Saad A. from the University of Michigan contributes necessary research in engineering entrepreneurship education.

4.8 Leading Global Institutions

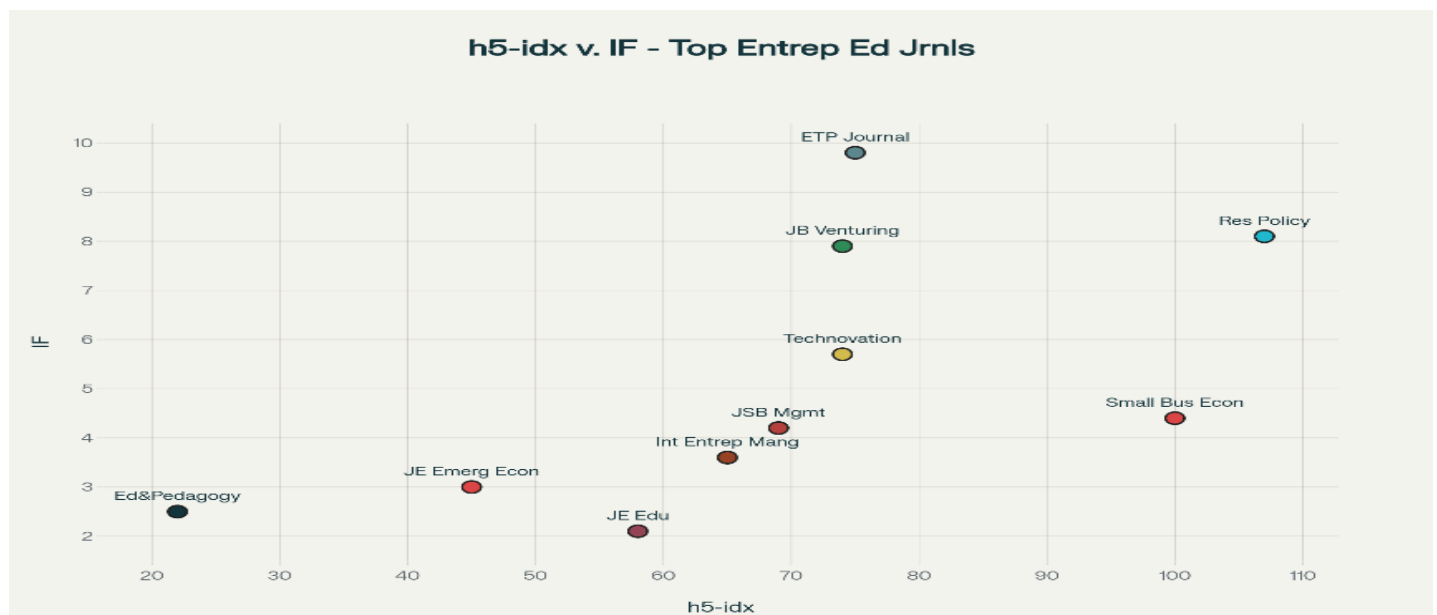
The institutional landscape reveals a strong international presence in entrepreneurial education research, with European institutions taking prominent positions.



Erasmus University Rotterdam in the Netherlands ranks as the top global institution for entrepreneurship research, followed closely by Jönköping University in Sweden. These rankings reflect the European emphasis on empirical research in entrepreneurship and innovation ecosystems. Babson College holds the third position globally, solidifying its reputation as a premier institution for entrepreneurship education. The college's specialised focus on entrepreneurship pedagogy and its development of innovative teaching methodologies has established it as a global leader in the field. Harvard University and Stanford University occupy the fifth and sixth positions, respectively, leveraging their research capabilities and extensive alum networks in the entrepreneurship ecosystem. The strong showing of American institutions continues with New York University (8th), Indiana University (10th), and MIT (45th), each contributing distinct expertise areas. Indiana University's strength lies in research on small business economics, while MIT excels in technology transfer and innovation studies. The presence of Copenhagen Business School (7th) and University of Cambridge (23rd) demonstrates the global nature of entrepreneurship research excellence.

4.9 Premier Academic Journals

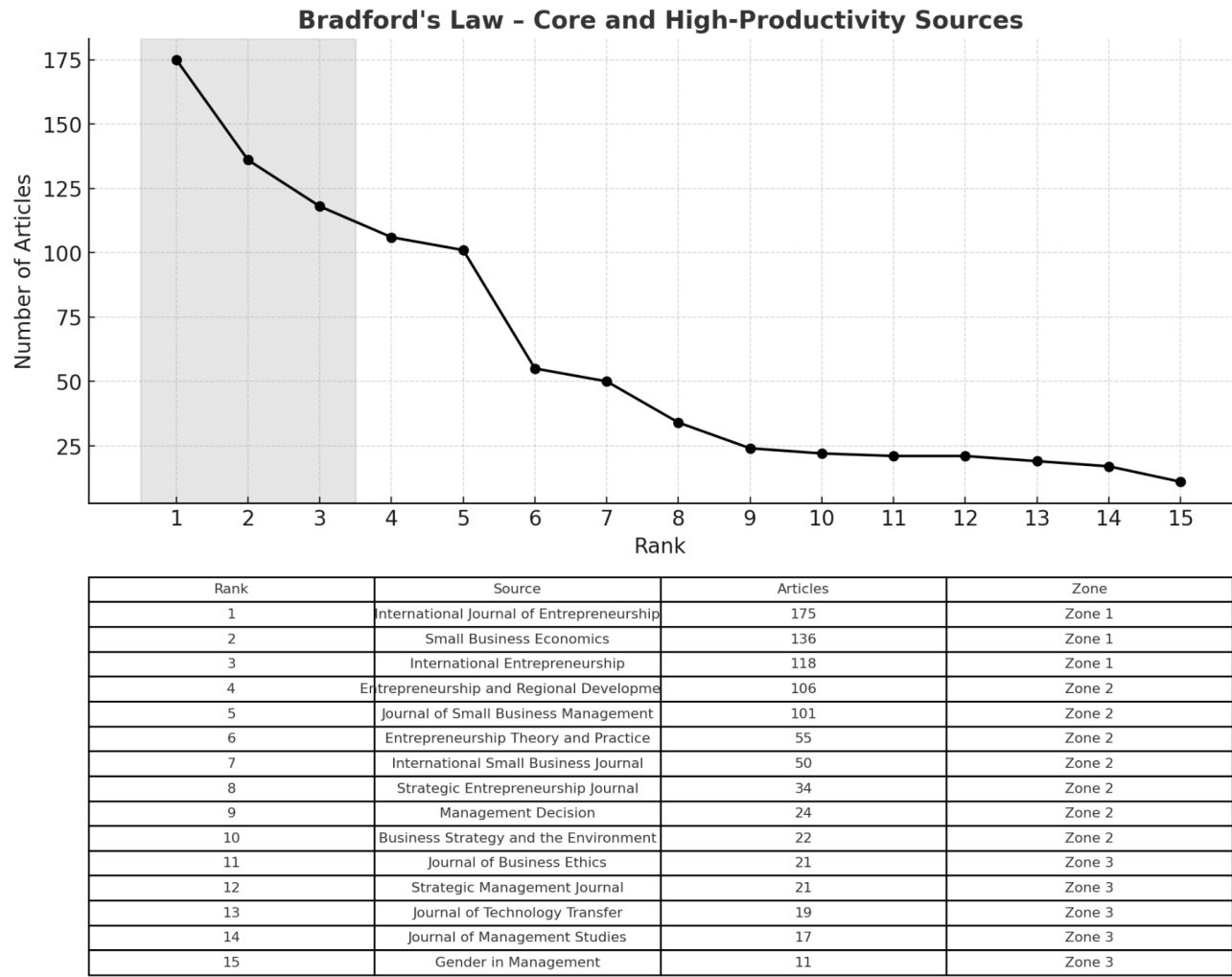
The publishing landscape for entrepreneurial education research is characterised by a diverse portfolio of high-impact journals spanning multiple disciplines. Research Policy leads with the highest h5-index of 107 and an impact factor of 8.1, serving as the premier venue for innovation and technology policy research that encompasses entrepreneurship education. Entrepreneurship Theory and Practice achieves the highest impact factor of 9.8, though with a lower h5-index of 75, indicating its role as a highly selective venue for theoretical contributions to the field.



Leading SSCI-Indexed Journals in Entrepreneurial Education Research

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July – December 2025

Zone 3 comprises a wide range of peripheral sources that publish fewer articles. This distribution confirms the typical Bradford pattern, where a small set of sources dominates scholarly output in a field.



4.13 Keyword Co-occurrence Network

The keyword co-occurrence network visualised in Figure illustrates the thematic structure of entrepreneurship research, generated through bibliometric mapping in VOSviewer. Larger nodes represent more frequently occurring keywords, with “entrepreneurship” and “entrepreneurship education” emerging as the dominant themes, indicating their central role in the field. The clustering of keywords into distinct, colour-coded groups reveals interconnected sub-themes, including entrepreneurial learning, higher education, human capital, entrepreneurial intentions, and social entrepreneurship. The connecting lines illustrate the strength of co-occurrence relationships, highlighting how core concepts are interlinked with related topics such as motivation, self-efficacy, leadership, and institutional theory. This mapping not only showcases the intellectual landscape of the domain but also points towards emerging areas and potential gaps for future research.



Capital Theory (HCT), Theory of Planned Behaviour (TPB), and Entrepreneurial Self-Efficacy (ESE).

5.1 Human Capital Development and Research Productivity

The dominance of the USA, UK, and Germany in publication volume reflects mature human capital ecosystems in which both policy and institutional investment have fostered sustained knowledge creation in entrepreneurial education. Aligning with HCT, these nations leverage substantial financial resources, specialised academic infrastructures, and established graduate programs to expand their research capacity. The case of Malaysia, which demonstrates the highest mean citations per article despite modest total output, underscores that targeted, quality-oriented investment in human capital—rather than sheer volume—can yield disproportionately high scholarly influence. This finding suggests that emerging economies can achieve global impact by strategically channeling resources into niche strength areas.

5.2 Socio-Cultural Shifts and Thematic Evolution

The Theory of Planned Behaviour offers explanatory power in understanding the thematic progression observed in our analysis. The increasing scholarly attention to sustainability, gender inclusivity, and social entrepreneurship mirrors evolving subjective norms that position entrepreneurship as a socially responsible and inclusive endeavour. Equally, the rise in research on digital pedagogy and hybrid learning reflects changes in perceived behavioural control, as technological tools enhance accessibility and diversify pathways to entrepreneurial skill acquisition. These thematic shifts indicate that educational and societal actors are increasingly framing entrepreneurship not merely as a wealth-generation mechanism but as a socially embedded means of addressing systemic challenges.

5.3 Psychological Enablers and the Enduring Role of Self-Efficacy

Entrepreneurial Self-Efficacy remains a central research theme throughout the study period, highlighting its enduring theoretical and practical importance. Consistent with ESE theory, educational interventions—particularly experiential and technology-enhanced learning methods—are designed to strengthen learners' confidence in their entrepreneurial competence. The proliferation of research into online experiential platforms and simulation-based learning post-2020 demonstrates a pedagogical adaptation to maintain and even enhance self-efficacy in disrupted learning environments. This aligns with evidence that high self-efficacy can enable entrepreneurial persistence in uncertain or resource-constrained contexts.

5.4 Integrated Implications for Global Scholarship

When considered together, these frameworks illuminate the interplay between structural capacity (HCT), socio-cultural context (TPB), and personal agency (ESE) in shaping entrepreneurial education research and practice. Countries with robust human capital infrastructure can lead in research volume, but impactful thought leadership can also emerge from strategically positioned smaller economies. Thematic diversification reflects broader societal shifts toward responsible and inclusive entrepreneurship, while the centrality of self-efficacy underscores the importance of individual psychological readiness as a universal success factor.

5.5 Contribution to the Literature

This study extends bibliometric scholarship by embedding trend analysis within a multi-theoretical explanation. Rather than treating publication and citation patterns as isolated metrics, our framework situates them in a broader interplay of educational investment, socio-cultural transformation, and personal cognitive empowerment. These findings not only map the intellectual landscape of entrepreneurial education but also offer actionable insights for policymakers, educators, and scholars seeking to align research and practice in ways that generate both academic and societal value.

6. CONCLUSION

This bibliometric review of 1,212 SSCI-indexed articles published between 2019 and 2024 confirms that entrepreneurial education has become a vibrant and rapidly expanding field of scholarly inquiry. Annual publication output more than doubled from 2019 to 2023, reflecting sustained global engagement and the strategic importance of entrepreneurship education in addressing socio-economic challenges. Consistent with Human Capital Theory, the dominance of the United States and leading European nations in publication volume reflects mature ecosystems with substantial institutional and policy investment. At the same time, the exceptionally high citation impact of smaller nations such as Malaysia and Singapore demonstrates that targeted, quality-driven research strategies can achieve disproportionate global influence.

Robust international collaboration—particularly across European and transatlantic networks—highlights the field's maturity and

its alignment with the collaborative knowledge-production models envisioned in Planned Behaviour Theory, where evolving societal norms increasingly favour shared learning and inclusive problem-solving. Influential scholars (e.g., David B. Audretsch, Robin Bell) and institutions (e.g., Erasmus University, Babson College) anchor intellectual development, while a diverse set of core journals provides avenues for both theory-driven and practice-oriented contributions.

The thematic trajectory of the literature—encompassing entrepreneurial learning, innovation, sustainability, gender, digital pedagogy, and social entrepreneurship—demonstrates the enduring importance of Entrepreneurial Self-Efficacy as a driver of pedagogical design and learner outcomes. These insights provide actionable implications for educators, policymakers, and researchers:

- For educators, integrating evidence-based pedagogies from high-impact studies can strengthen students' competencies and intention to act entrepreneurially.
- For policymakers, fostering targeted investment in research infrastructure and collaboration networks can elevate both the quantity and quality of scholarly output.
- For researchers, identifying underrepresented regions and emerging themes offers opportunities to expand the global and interdisciplinary relevance of the field.

Looking forward, advancing entrepreneurial education will require deeper engagement with sustainability, digital innovation, and equity; extending research into diverse socio-cultural contexts; and maintaining strong linkages between theory and practice. By embracing these priorities, the scholarly community can ensure that entrepreneurial learning remains relevant, inclusive, and adaptive to the evolving global landscape—enhancing its role as a catalyst for innovation, resilience, and sustainable economic development.

7. LIMITATIONS AND FUTURE RESEARCH

This study is limited by database coverage, potential bias in keyword selection, and threshold sensitivity in network construction. Future research could integrate multi-database searches, explore non-English literature, and test alternative bibliometric algorithms to triangulate findings.

DECLARATIONS

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Declaration of Conflicting Interests: The author(s) declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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