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Research Article

The Development of Digital Entrepreneurship in Academic Literature: Bibliometric Analysis in The Scopus Database

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Abstract: Digital entrepreneurship has become a transformative phenomenon in the modern economy, changing the way businesses are developed and run through digital technology. Although the literature on digital entrepreneurship is growing rapidly, comprehensive mapping of the evolution of knowledge and research patterns is still limited. This study analysis the development of digital entrepreneurship in academic literature through bibliometric analysis of the Scopus database to identify research trends, knowledge structures, and future directions. The analysis was conducted on 1,815 publications from 681 sources (1988-2025) written by 8,023 researchers, using R Studio (bibliometrix) and VOSviewer. The results show exponential growth with an annual growth rate of 17.22%, as well as five main theme clusters: digital business models, digital innovation, social entrepreneurship, e-commerce, and fintech. Thematic evolution shifted from traditional entrepreneurship (1988–2010) to digital transformation (2011-2018) to new technology integration (2019-2025). The level of international collaboration reached 26.39%, with the United States, China, and the United Kingdom as the main contributors. These findings provide a research roadmap for identifying research gaps, collaboration opportunities, and trending topics in digital entrepreneurship.

Keywords: Bibliometric; Digital Entrepreneurship; Fintech; Research Trends; Science Mapping

1. Introduction

Digital entrepreneurship is a new form of entrepreneurial activity that integrates digital technology into the process of value creation and business management. Digital transformation enables entrepreneurs to utilize online platforms, social media, data-based applications, and electronic payment systems to build and develop their businesses. The literature refers to digital entrepreneurship as a transformative phenomenon that changes market interaction patterns and value chains, making it important to understand as one of the main drivers of the modern economy (Nambisan, 2017)(Sussan & Acs, 2017)

Historical developments show that the term digital entrepreneurship has various derivatives, such as e-entrepreneurship, internet entrepreneurship, and technopreneurship. Although the terms are different, they essentially refer to the use of digital technology in entrepreneurial activities. Previous studies have grouped the evolution of this concept into three phases: the seed era (early emergence), the startup era (strengthening of the startup ecosystem), and the expansion era (technology integration and global expansion). This evolution confirms that digital entrepreneurship continues to adapt to social, economic, and technological contexts (Steininger, 2019).

On the other hand, digital entrepreneurship is also closely related to issues of financial inclusion, innovation, and sustainability. Data-based research in Chinese cities, for example, found that digital financial inclusion networks increase the intensity of innovation and entrepreneurship by accelerating industrial transformation (Li et al., 2023). In addition, social dimensions have also emerged, such as the role of women in digital entrepreneurship and its relationship with the digital literacy of the younger generation. These findings confirm that

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digital entrepreneurship is a multidimensional field that encompasses economic, social, and technological aspects.

Although the number of publications has increased rapidly, the digital entrepreneurship literature landscape remains fragmented by region, sector, or specific period. Previous reviews tend to be limited to specific themes or a small number of articles, so that a comprehensive thematic map across decades has not yet been drawn (Kraus et al., 2019). In fact, comprehensive mapping is needed to understand the direction of topic evolution, identify key actors in the global knowledge network, and highlight new research opportunities relevant to the dynamics of the digital economy.

For this reason, bibliometric analysis and science mapping were chosen as approaches capable of summarizing publication developments while mapping relationships between themes. Tools such as Bibliometrix in R and VOSviewer enable the visualization of keyword networks, co-citations, and collaborations between authors and countries (Aria & Cuccurullo, 2017). Thus, this study focuses on mapping the development of digital entrepreneurship based on Scopus data to examine publication trends, theme evolution, and global collaboration patterns that shape the knowledge ecosystem in this field.

2. Literature Review

Digital entrepreneurship is understood as the close relationship between digital technology and entrepreneurial processes that shape how opportunities are identified, validated, and scaled. The shift from "internet entrepreneurship" to a broader perspective on digital innovation is evident in a series of works that place digital artifacts, platforms, and ecosystems as the main drivers of value creation (Liu et al., 2025).

In line with this, the field has expanded from business models and innovation to issues such as platforms, digital marketing, sustainability, and SMEs. A comparison of WoS and Scopus reveals differences in emphasis: WoS often highlights "value creation," technology adoption, generativity, and ecosystems; Scopus more frequently features entrepreneurial ecosystems, digital platforms, digital marketing, sustainability, entrepreneurship education, and SMEs which explains the variation in focus across studies (Liu et al., 2025).

The ecosystem dimension is a crucial node because technology and collective intelligence transform the entrepreneurial process from upstream to downstream, including how actors interact on platforms and how governance is built to orchestrate value across networks. Recent studies even call for a more holistic approach when discussing "digital entrepreneurship platforms," so that the technological, market, and governance aspects are read as a whole (Liu et al., 2025).

The literature on digital finance reinforces this picture: networked digital financial inclusion has been shown to drive innovation and urban entrepreneurship. Findings based on 287 cities in China show that network centrality has a positive impact on innovation and entrepreneurship, with mechanisms through accelerated industrial structure transformation and stronger heterogeneity effects in developing cities (Li et al., 2022). The literature on women's entrepreneurship adds an important social layer. Bibliometric analysis confirms consistent growth in research and links it to the sustainability agenda, but also highlights structural barriers from access to capital, social norms, to market bias that affect women's entrepreneurial opportunities and performance, and opens up space for a new research agenda (Raman et al., 2022).

The theoretical framework in digital entrepreneurship studies can be traced from the perspective of innovation-driven entrepreneurship and dynamic capabilities. Rather than simply adopting information technology, digital entrepreneurship emphasizes the management of intangible assets such as data, algorithms, and platforms to respond to dynamic market changes. The resource-based view (RBV) places digital capabilities (e.g., analytical capabilities or digital system integration) as valuable and difficult to imitate strategic resources (Barney, 2015). Meanwhile, the dynamic capability framework explains how businesses can identify opportunities (sensing), capitalize on them (seizing), and adapt to change (transforming) on an ongoing basis (Carnahan et al., 2010). This concept reinforces the finding that generative digital artifacts facilitate continuous innovation (Nambisan, 2017).

From an institutional perspective, institutional theory helps explain how regulations, norms, and public policies shape the digital entrepreneurship ecosystem. Coercive pressure

in the form of data regulations, imitative pressure in platform-based business model standardization, and normative pressure through professional standards also determine the direction of development in this field (Dimaggio & Powell, 2021). Studies on the digital entrepreneurship ecosystem emphasize that interactions between the state, universities, corporations, and communities are key to accelerating digital transformation, particularly through policy support such as digital financial inclusion or fintech sandboxes (Sussan & Acs, 2017).

At the individual behavior level, technology adoption theory provides a framework for understanding how entrepreneurs and consumers accept digital innovations. Models such as the Technology Acceptance Model (TAM) and UTAUT emphasize the importance of performance expectations, ease of use, social norms, and supporting conditions in shaping intentions and actual use (Jakobsson, 1994). In the context of entrepreneurship, perceived benefits such as broader market reach or cost efficiency in customer acquisition significantly influence decisions to integrate digital technology into business processes.

The integration of these three theoretical lenses provides a strong conceptual basis for interpreting bibliometric results. RBV analysis and dynamic capabilities are relevant for understanding theme clusters around digital business models and platformization. The institutional perspective explains productivity variations across countries influenced by policy and infrastructure contexts. Meanwhile, technology adoption theory helps interpret keywords related to digital marketing, financial inclusion, and technological literacy. With this conceptual framework, bibliometric research not only describes publication trends but also maps the interactions between internal capabilities, institutional structures, and adoption behavior in shaping the digital entrepreneurship ecosystem.

3. Research Method

The research framework for this study was developed using a bibliometric approach to analyze the development of literature on Digital Entrepreneurship. The research process was carried out in three main phases that were interconnected, starting from determining the topic and keywords, collecting data from the Scopus database, to preparing the data for analysis using RStudio (Bibliometrix) and VOSviewer software. Next, the data was processed to produce bibliometric indicators and scientific network mapping that describe collaborations between authors, countries, and research themes. The results of the analysis were then interpreted to identify thematic trends, scientific contributions, and open research gaps. The final stage of this research framework emphasizes the implications, limitations, and future

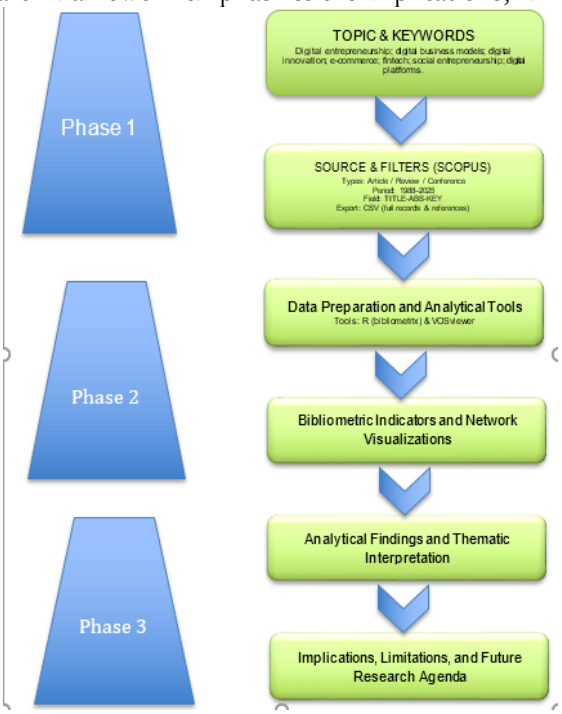

Figure 1. Research Methodology Framework Using Bibliometric Analysis with RStudio and VOSviewer

The figure above illustrates the bibliometric research method used to review literature related to Digital Entrepreneurship. This research was conducted through three main phases that were arranged systematically. The first phase included the identification of topics and the determination of relevant keywords, such as digital entrepreneurship, digital business models, digital innovation, e-commerce, fintech, social entrepreneurship, and digital platforms. The selection of these keywords was important to ensure comprehensive research coverage in line with the focus of the study. Next, data was collected from the Scopus database using specific filtering criteria, including publication type (articles, reviews, and conference proceedings), time period (1985–2025), and the use of a special search field (TITLE-ABS-KEY). The search results were then exported in CSV format, containing all records and references.

The second phase involves data preparation and the use of analytical tools. The extracted data is processed using RStudio (with the Bibliometrix package) to generate quantitative indicators related to publication trends, author productivity, leading journals, and publication distribution by country and institutional affiliation. In addition, the VOSviewer tool is used to map scientific collaboration networks, analyze the co-occurrence of keywords, and visualize citation networks. The combination of these two tools produces richer results: RStudio emphasizes descriptive statistics and trends, while VOSviewer provides a visual overview of the structure and relationships between elements in the literature.

The next stage is bibliometric analysis, which includes publication indicators and network visualization. At this stage, the analysis results are interpreted to highlight dominant research patterns, connections between countries, collaborations between authors, and new themes in the field of Digital Entrepreneurship. Network visualization helps identify thematic clusters and influential research centers, while indicator analysis provides insights into the dynamics and developments of this research field over a given period.

The third phase focuses on thematic discovery, interpretation of results, and research implications. The analysis results are not only presented descriptively, but also linked to the future research agenda and study limitations. These findings make an important contribution to mapping the direction of Digital Entrepreneurship research at the global level. In addition, this study also highlights potential research gaps that can be used as a basis for further research. Thus, RStudio and VOSviewer based bibliometric methods not only serve to summarize the literature but also provide a conceptual and strategic framework for future research development.

4. Results and Discussion

Bibliometric Profile of Digital Entrepreneurship Research

Figure 2 presents the main bibliometric profile of digital entrepreneurship research drawn from Scopus for 1988-2025. It gives a quick read on the size of the corpus, how fast it has grown, how collaborative the field is, and how recent and influential the publications are. Use it as a dashboard: the top row shows scope and growth, the middle row shows authorship patterns, and the bottom row summarizes vocabulary breadth and citation footprint.

Figure 2. Main Bibliometric Profile of Digital Entrepreneurship (Scopus, 1988-2025)

Based on the observation period of 1988–2025, 1,815 documents were obtained from 681 publication sources with an average annual growth rate of 17.22%. This figure shows that

research on Digital Entrepreneurship has experienced consistent growth and is gaining increasing attention from academics every year. Overall, there were 8,023 authors involved in these publications with a total of 5,941 author keywords and 13,323 references used.

In addition, the characteristics of scientific collaboration show that research on this topic tends to be collaborative, with an average of 8.69 authors per article and an international collaboration rate of 26.39%. No articles with a single author were found, indicating that Digital Entrepreneurship studies are generally conducted by teams across institutions and countries. The relatively young average age of the documents (2.94 years) and the fairly high citation rate (24.03 citations per document) confirm that this topic is a developing field of research with significant academic contributions to global literature.

Annual Scientific Output

Figure Annual Scientific Output in Digital Entrepreneurship (1988-2025) tracks the year by year volume of publications in the field. It offers a simple view of momentum: how long the topic stayed niche, when growth began to accelerate, and where the output currently stands.

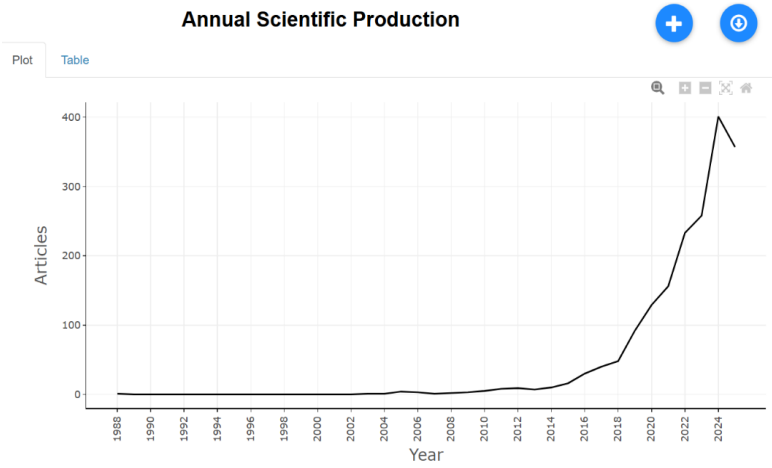

Figure 3. Annual Scientific Output in Digital Entrepreneurship (1988–2025)

The number of publications is relatively low with a stagnant trend, indicating that this topic has not yet become a major focus in global academic literature. However, since around 2016, there has been a consistent increase, followed by a sharp surge since 2020, peaking in 2024 with nearly 400 articles published. This significant growth is in line with the development of global digital transformation, the rapid growth of e-commerce, and the increasingly important role of platform-based innovation in the world economy.

Further analysis shows that the surge in publications after 2020 can be attributed to the context of the Covid-19 pandemic, where digitization and digital entrepreneurship became key solutions for maintaining business continuity. This situation has driven an increase in the number of studies on digital business models, technology adoption, and their impact on entrepreneurship. Additionally, the upward trend in publications reflects academics' attention to strategic issues such as digital inclusion, the role of fintech, and the social impact of technology-based entrepreneurial ecosystems.

Leading Sources of Publication

Figure 4 profiles the journals that publish the largest volume of digital entrepreneurship articles in the Scopus corpus. Ranking sources by number of documents offers a quick view of where the conversation is concentrated and which venues most frequently host work in this area.

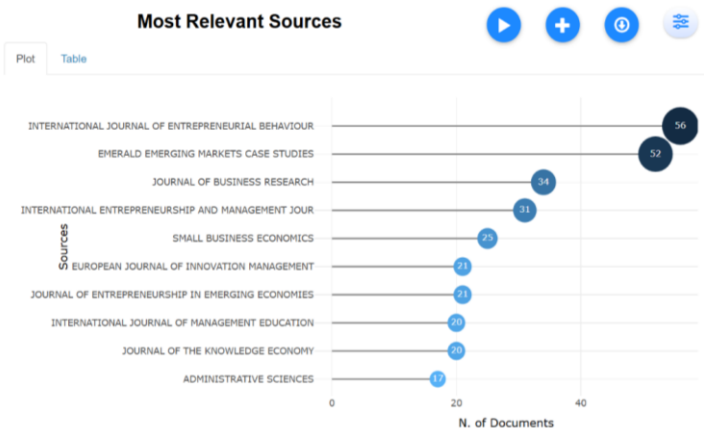

Figure 4. Top Publication Sources in Digital Entrepreneurship (by Number of Documents)

The image presents the results of an analysis of the most relevant sources in the field of Digital Entrepreneurship based on Scopus data processed using Biblioshiny for R. It can be seen that the International Journal of Entrepreneurial Behaviour & Research is the publication channel with the largest contribution, namely 56 documents, followed by Emerald Emerging Markets Case Studies with 52 documents. The next positions are occupied by the Journal of Business Research (34 documents) and the International Entrepreneurship and Management Journal (31 documents). This fact shows that Digital Entrepreneurship studies have a fairly established publication forum, especially in journals that focus on entrepreneurial behavior, emerging market studies, and international business and management research.

When critically reviewed, the dominance of these journals shows that research on Digital Entrepreneurship is not only within the scope of classical entrepreneurship, but is also increasingly discussed in the context of innovation, knowledge economy, and public policy studies. The existence of journals such as Small Business Economics (25 documents) and European Journal of Innovation Management (21 documents) shows that the discussion extends to microeconomics and innovation management, which are key aspects of the digital business ecosystem. On the other hand, relatively new journals or those with a specific focus, such as the Journal of Entrepreneurship in Emerging Economies and the International Journal of Management Education, play a role in raising the perspective of digital entrepreneurship from the point of view of developing countries and management education.

Geographical Distribution of Publications

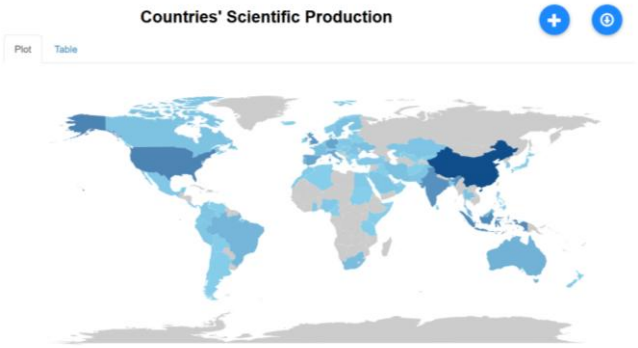

Figure 5. Distribution of Scientific Publications by Country

The image above shows a map of scientific publication distribution by country in the field of Digital Entrepreneurship, based on Scopus data processed using bibliometric methods in Biblioshiny for R. It is clear that research contributions are highly concentrated in several large countries, with China, the United States, and India occupying dominant positions, marked by darker blue colors. This dominance reflects the large research capacity in terms of funding, number of higher education institutions, and a rapidly growing digital entrepreneurship ecosystem in these countries. Meanwhile, Western European countries such as the United Kingdom, Germany, and the Netherlands also show significant contributions, albeit on a more moderate scale.

The fairly even distribution of publications across Asia, Europe, and parts of Latin America indicates that digital entrepreneurship has become a global research issue, not limited to developed countries alone. The presence of publications from developing countries such as Indonesia, Malaysia, and several African countries shows that the dynamics of digital entrepreneurship are also a concern in regions with growing levels of digitization. This phenomenon shows how digital entrepreneurship is seen as a strategic instrument to drive economic growth, strengthen financial inclusion, and facilitate business transformation at various levels.

This analysis also confirms differences in productivity levels between countries, which are generally influenced by the availability of research infrastructure, international collaboration networks, and national policy support for digital transformation. The high dominance of publications from China and the United States, for example, reflects not only academic capacity but also the size of the domestic digital market that drives applied research. Conversely, emerging developing countries on this publication map have the potential to become future sources of research on more contextual topics, such as the adaptation of digital business models in local markets or digital inclusion strategies in regions with limited infrastructure.

After assessing annual output, top sources, and country contributions through Bibliometrix, the analysis continued with VOSviewer mapping so that conceptual relationships between terms could be inspected at the network level. This mapping provides a visual representation of the density of relationships, cluster formation, and the position of central terms such as "digital entrepreneurship" in the keyword ecosystem, which together provide the basis for reading the thematic evolution in the next section.

Keyword Co-occurrence and Thematic Clusters

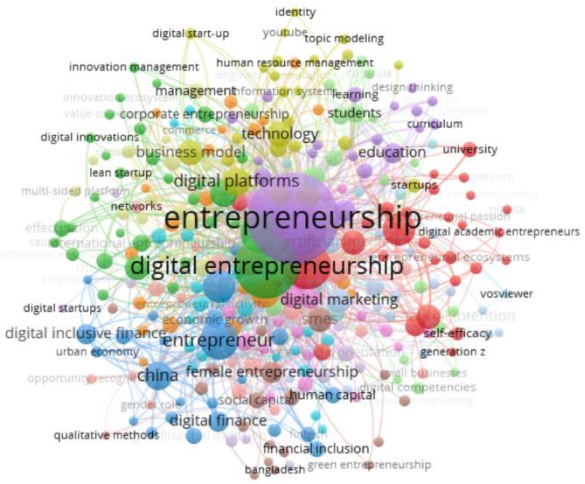

Figure 6. Network Map of Keywords Related to Digital Entrepreneurship

Figure 6 displays a co-occurrence network map of keywords related to digital entrepreneurship, mapped using VOSviewer. Each node represents a keyword, the size of the node indicates its frequency of occurrence, the thickness of the line reflects the strength of the relationship between keywords, and the color distinguishes thematic clusters. Overall, the map contains 306 items with 3,871 links and a total link strength of 6,125, providing an overview of the knowledge structure and thematic proximity within the corpus.

At the center of the network, "entrepreneurship" and "digital entrepreneurship" appear as the connectors between clusters. Surrounding them are several main topic groups: (i) platforms and business models (digital platforms, business model, startups); (ii) innovation and technology (digital innovation, technology, lean startup); (iii) marketing and market adoption (digital marketing, e-commerce); (iv) education and competencies (education, curriculum, human capital, students); and (v) finance and inclusion (digital finance, financial inclusion, digital inclusive finance, fintech), alongside social themes such as female entrepreneurship and social capital. The presence of geographical markers such as China indicates a strong regional contribution. The density of connections between clusters

confirms the cross-disciplinary nature of this field and reveals conceptual bridges, for example between platforms business models and digital finance or education themes.

International Collaboration Networks

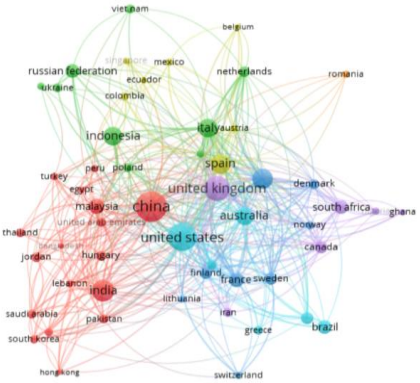

Figure 7. International Collaboration Networks

This visualization displays a map of international collaboration networks in the field of research. Each node represents the author's country of origin, with the size of the node indicating the number of documents or publication contributions, while the lines connecting the nodes illustrate the strength and frequency of international collaboration. Different colors indicate specific clusters that show closer or more intense relationships between countries within that group.

The visualization shows that large countries such as the United States, China, the United Kingdom, and India occupy central positions with larger node sizes, reflecting their dominance in publication contributions in the field of Digital Entrepreneurship. The dense connections and thick lines around these nodes indicate a high level of international collaboration, for example between the United States and the United Kingdom, Australia, and Western European countries. In addition, there are other collaborative groups involving Asian countries (such as China, India, Indonesia, Malaysia, and South Korea) that form their own clusters and demonstrate the contribution of the Asian region in promoting the development of literature in this field.

Overall, this network map illustrates that Digital Entrepreneurship research has a global character with major centers in developed countries, but at the same time shows significant participation from developing countries. This reflects the growing interest in digital entrepreneurship, which is not only an academic issue in the West, but also relevant in Asia, Latin America, and Africa. Such analysis can serve as a basis for identifying opportunities for further research collaboration and mapping global knowledge centers on the theme of Digital Entrepreneurship.

5. Conclusions

This study provides a comprehensive bibliometric mapping of the Digital Entrepreneurship literature based on 1,815 documents indexed in Scopus between 1988 and 2025, analyzed using RStudio (Bibliometrix) and VOSviewer. The results confirm rapid and consistent growth, with an annual rate of 17.22%, reflecting the increasing relevance of digital entrepreneurship as a global research agenda. Thematic clusters reveal the dominance of topics such as digital business models, innovation, e-commerce, fintech, and social entrepreneurship, while network analysis highlights the strong roles of China, the United States, and the United Kingdom in shaping the field.

Beyond descriptive insights, these findings have important implications for academics in identifying research gaps, practitioners in adopting digital strategies, and policymakers in designing supportive ecosystems. While this analysis is limited in its database coverage and methodological focus, future research could expand by integrating qualitative reviews and exploring new areas such as AI-based entrepreneurship and green digital business models.

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