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Global Trends in Digital Entrepreneurship Research Based on Bibliometric Analysis of the Scopus Database from 2013 to 2023

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ABSTRACT

The rapid advancement of digital technologies has significantly transformed entrepreneurial activities and business ecosystems worldwide. This study aims to analyze global research trends in digital entrepreneurship through a bibliometric approach using publications indexed in the Scopus database from 2013 to 2023. The study employs bibliometric analysis and network visualization using VOSviewer to examine publication patterns, collaboration networks among authors, institutions, and countries, as well as the thematic structure of the research field. The results show a significant growth in scholarly publications on digital entrepreneurship over the past decade, indicating increasing academic interest in the topic. The collaboration analysis reveals that several countries, particularly the United States, the United Kingdom, Germany, and the Russian Federation, play central roles in international research networks. In addition, the co-authorship and institutional networks highlight the presence of influential scholars and universities that actively contribute to the development of digital entrepreneurship studies. Keyword co-occurrence analysis identifies major research themes such as entrepreneurship, digital technologies, digital economy, business models, and digital innovation, while emerging topics such as sustainability, startups, and digitalization indicate evolving research directions. The findings demonstrate that digital entrepreneurship has developed into a dynamic and interdisciplinary research area that integrates perspectives from entrepreneurship, information systems, and innovation studies. This study provides a comprehensive mapping of the intellectual structure of digital entrepreneurship research and offers insights into future research opportunities in the evolving digital economy.

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1. INTRODUCTION

In recent years, the global economy has witnessed a transformational wave driven by digital technologies that reshape how individuals conceive, start, and scale entrepreneurial ventures. Digital entrepreneurship refers to the process of creating novel value propositions through the integration of digital technologies into entrepreneurial activities, emphasizing innovation, digital platforms, and the exploitation of emerging digital infrastructure [1]. Unlike traditional entrepreneurship, which often centers on physical products and localized markets, digital entrepreneurship transcends geographical boundaries and

leverages digital ecosystems to create scalable and dynamic business models [2]. This fundamental shift has catalyzed a proliferation of research in multiple disciplines, including information systems, management, innovation studies, and digital sociology, underscoring the complexity and interdisciplinary nature of the domain.

The surge in digital entrepreneurial activities is closely linked to rapid advancements in information and communication technologies (ICTs) such as cloud computing, big data analytics, artificial intelligence (AI), and blockchain. These technologies have not only lowered barriers to entry for aspiring entrepreneurs by providing accessible digital tools but also enabled more agile and lean business operations [3], [4]. For instance, digital platforms such as e-commerce marketplaces, social media networks, and mobile applications have become essential launchpads for digital ventures, enabling real-time customer engagement and global reach [4]. These technological enablers have prompted scholars to reconsider classical entrepreneurship theories and integrate them with digital transformation paradigms, leading to a new subdomain—digital entrepreneurship research.

Academia's growing interest in digital entrepreneurship is mirrored by an increased volume of scholarly publications over the past decade. Bibliometric studies suggest that research outputs in digital entrepreneurship have grown exponentially, illustrating both the maturation of the field and its relevance to contemporary economic and technological environments [5]. Researchers have explored various thematic clusters, including digital business models, entrepreneurial ecosystems in digital contexts, digital innovation processes, and the socio-economic impacts of digital ventures [5]. This extensive body of work has contributed valuable insights but has also produced a fragmented landscape of research foci, methodologies, and theoretical frameworks.

Despite the robustness of digital entrepreneurship research, there remains considerable variation in how scholars conceptualize key constructs such as digital business models, digital innovation, and entrepreneurial agency in digital contexts. Some researchers emphasize technological affordances and platform economics, while others foreground institutional and socio-cultural influences on digital entrepreneurial behavior [6]. Furthermore, the rapid evolution of digital technologies creates a moving target for academic inquiry, making it challenging to delineate stable research streams or predict sustained trends. Such conceptual diversity underscores the need for systematic analysis techniques that can identify and visualize the intellectual structure and growth patterns of the field over time.

Bibliometric analysis offers a powerful methodological lens to address these challenges by quantitatively examining scientific publications and their citation networks, co-authorship patterns, thematic co-occurrences, and knowledge diffusion pathways [7]. By employing metrics such as publication counts, citation analysis, keyword co-occurrence, and co-citation networks, bibliometric studies can reveal how research themes evolve, how scholars and institutions interconnect, and which areas are emerging or declining. Applied to digital entrepreneurship research, bibliometric analysis provides not only a macro-level view of global scholarly trends but also critical insights into the intellectual foundations and future directions of the field.

Although digital entrepreneurship research has grown rapidly, there is currently no comprehensive bibliometric synthesis that maps global research trends over a sustained period using a standardized and scalable dataset such as Scopus. While individual studies have examined specific subthemes or regional contexts, the absence of a longitudinal, global bibliometric overview limits scholarly understanding of thematic trajectories, influential authors, collaboration patterns, and research frontiers in digital entrepreneurship between 2013 and 2023. As a result, academics and practitioners alike lack a consolidated benchmark to assess the maturity of the field, identify emerging knowledge gaps, and guide strategic research

agendas for future inquiry. This study aims to conduct a comprehensive bibliometric analysis of digital entrepreneurship research indexed in the Scopus database from 2013 to 2023 to identify global trends, thematic developments, influential contributors, and collaborative networks.

2. METHOD

This study employed a quantitative bibliometric research design to systematically examine global trends in digital entrepreneurship research. Bibliometric analysis was selected because it enables the objective evaluation of scientific output, citation structures, and intellectual development patterns within a specific research domain [7]. The approach combines descriptive performance analysis and science mapping techniques to provide both productivity-based indicators (e.g., publication counts, citation metrics, prolific authors, institutions, and countries) and relational insights (e.g., co-authorship, co-citation, and keyword co-occurrence networks). Through this dual analytical framework, the study captures both the structural and dynamic evolution of digital entrepreneurship scholarship over time.

The data for this study were retrieved from the Scopus database, chosen due to its extensive coverage of peer-reviewed journals, conference proceedings, and interdisciplinary publications across business, management, information systems, and social sciences. The search strategy was developed using relevant keywords such as "digital entrepreneurship," "digital entrepreneur," "digital startup," and related variants, applied to titles, abstracts, and keywords. The publication period was limited to 2013–2023 to reflect a decade marked by rapid digital transformation and platform-based innovation. Only English-language documents categorized as articles, reviews, and conference papers were included to ensure academic rigor and comparability. The initial dataset was refined through a screening process to remove duplicates, unrelated records, and incomplete metadata, resulting in a final corpus suitable for bibliometric examination. Data analysis was conducted using VOSviewer. Science mapping techniques were applied to visualize co-authorship networks, keyword co-occurrence clusters, and co-citation relationships among authors and sources. Network visualization and clustering algorithms were used to identify thematic groupings and emerging research fronts.

3. RESULTS AND DISCUSSION

Co-Authorship Analysis

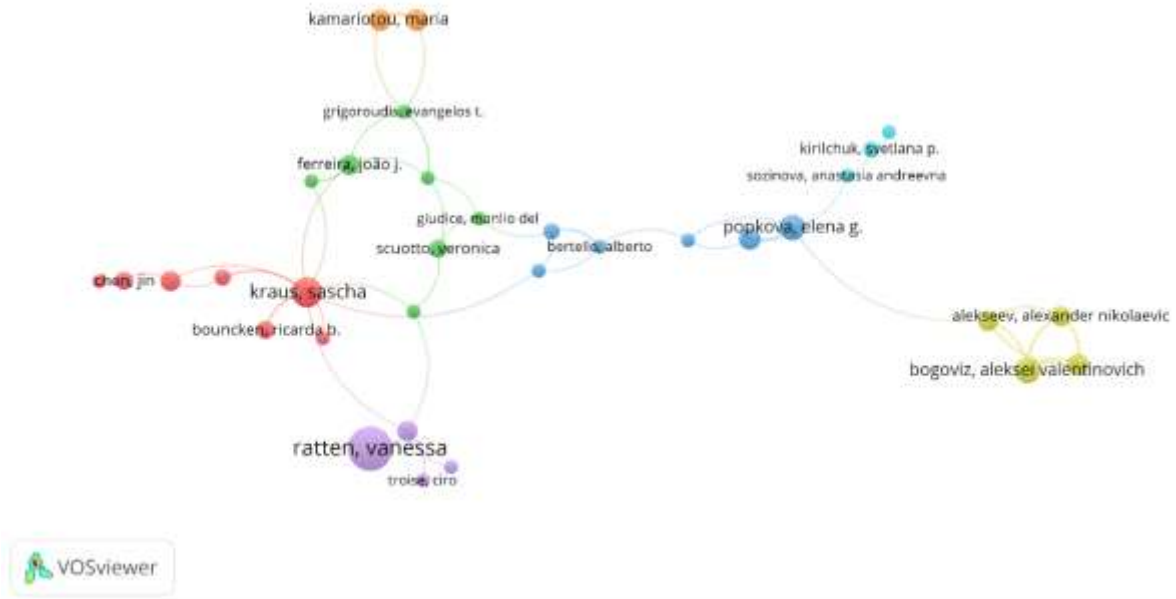

Figure 1. Author Visualization
Source: Data Analysis

Figure 1 illustrates the collaborative relationships among key researchers in the field of digital entrepreneurship research. The map reveals several distinct collaboration clusters, each represented by different colors, indicating groups of authors who frequently publish together. One prominent cluster centers around Sascha Kraus, who appears as a major hub connecting multiple researchers such as Ricarda Bouncken and Jin Chen, suggesting a strong collaborative influence in the literature. Another significant cluster includes Elena G. Popkova, who is linked with scholars such as Alberto Bertello and other researchers from Eastern European academic networks, indicating regional collaboration patterns in digital entrepreneurship studies. Additional clusters involve authors such as Vanessa Ratten, who collaborates with Ciro Troise and other scholars focusing on entrepreneurial ecosystems and digital innovation topics. The visualization also shows bridging connections among clusters through authors like Manlio Del Giudice and Veronica Scuotto, who act as intermediaries linking different research groups.

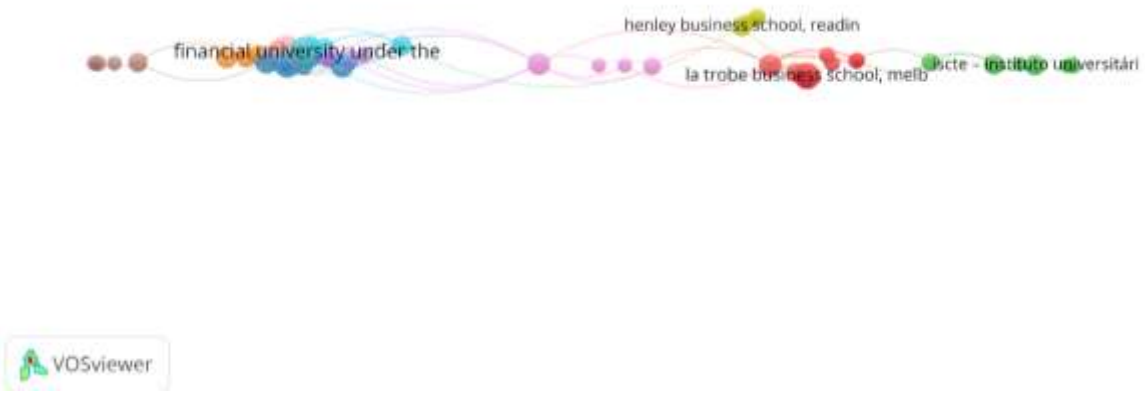

Figure 2. Institution Visualization
Source: Data Analysis

Figure 2 illustrates the relationships among universities and research institutions contributing to the field of digital entrepreneurship. The visualization indicates that several institutions serve as central nodes within the research network, suggesting active collaboration and higher publication influence. Financial University under the Government of the Russian Federation appears as one of the most prominent institutions, acting as a central hub connected with multiple institutions, which indicates its significant contribution and collaborative engagement in digital entrepreneurship research. Other notable institutions include La Trobe Business School (Melbourne) and Henley Business School (University of Reading), which also demonstrate collaborative links with other universities, reflecting the participation of institutions from different geographical regions in advancing this research area. Additionally, SCTE – Istituto Universitário is connected within another cluster, highlighting contributions from European research institutions.

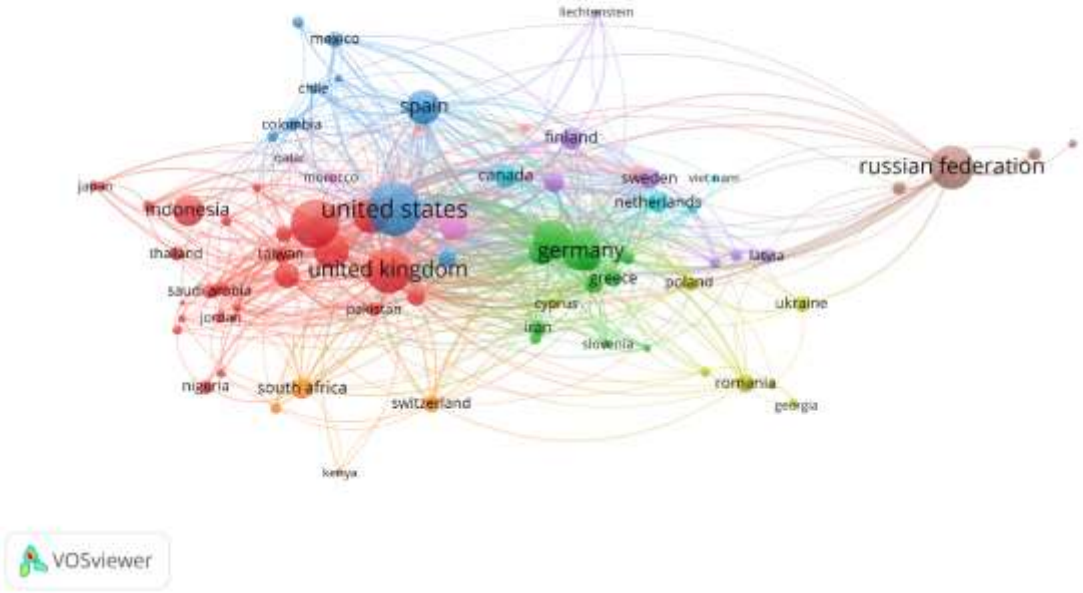

Figure 3. Country Visualization
Source: Data Analysis

Figure 3 illustrates the global research collaboration patterns in digital entrepreneurship studies. The map shows that the United States, the United Kingdom, Germany, and the Russian Federation appear as major hubs within the international collaboration network, indicated by their larger node sizes and numerous connections with other countries. The United States occupies a particularly central position, collaborating extensively with countries across Europe, Asia, and other regions, highlighting its dominant role in the development of digital entrepreneurship research. Similarly, the United Kingdom forms strong collaborative ties with various countries including Indonesia, Saudi Arabia, and Pakistan, reflecting active academic cooperation across different regions. In Europe, Germany, Finland, the Netherlands, and Sweden form another important cluster, demonstrating strong intra-European research collaboration. Meanwhile, the Russian Federation also stands out as a significant contributor with multiple connections to European and Asian countries. The visualization further reveals the participation of emerging research contributors such as Indonesia, South Africa, and several Asian countries, indicating that digital entrepreneurship research is increasingly becoming a globally collaborative field involving scholars from diverse geographical regions.

Citation Analysis

Table 1. Top Cited Literature

Citations	Authors and Year	Title
2,141	[8]	The real-time city? Big data and smart urbanism
2,076	[9]	Digital Entrepreneurship: Toward a Digital Technology Perspective of Entrepreneurship
1,952	[10]	The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes
1,202	[11]	Algorithmic labor and information asymmetries: A case study of Uber's drivers
1,132	[12]	Digital transformation by SME entrepreneurs: A capability perspective
879	[13]	China's manufacturing locus in 2025: With a comparison of "Made-in-China 2025" and "Industry 4.0"

816	[14]	Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process
772	[15]	Digital transformation: A review, synthesis and opportunities for future research
704	[16]	The digital entrepreneurial ecosystem
699	[17]	How entrepreneurial SMEs compete through digital platforms: The roles of digital platform capability, network capability and ambidexterity

Source: Scopus

Keyword Co-Occurrence Analysis

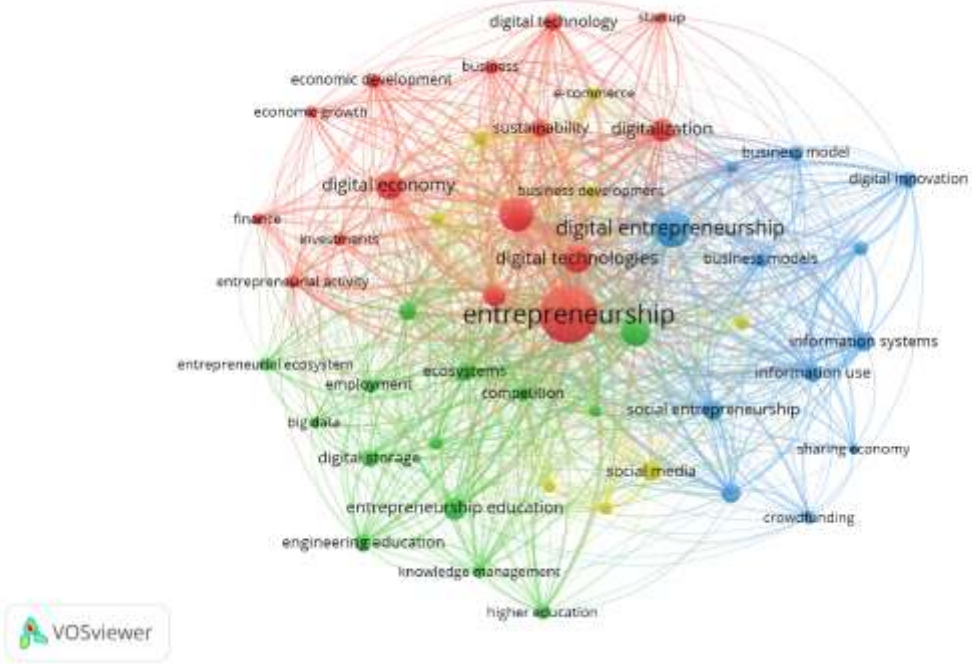

Figure 4. Network Visualization
Source: Data Analysis

Figure 4 illustrates the conceptual structure of research on digital entrepreneurship. The map highlights several interconnected research themes represented by clusters of keywords that frequently appear together in the literature. The keyword "entrepreneurship" appears as the most prominent node at the center of the network, indicating that it serves as the primary conceptual foundation of the field. Closely connected keywords such as digital entrepreneurship, digital technologies, digital economy, and digitalization suggest that the integration of digital technologies into entrepreneurial activities has become a major focus of contemporary research. The red cluster represents research themes associated with the digital economy and technological transformation of entrepreneurship. Keywords such as digital technology, e-commerce, startup, economic growth, and economic development indicate that many studies examine how digital technologies enable new entrepreneurial opportunities and contribute to economic development. This cluster emphasizes the role of technological innovation and digital platforms in transforming traditional business activities and facilitating the emergence of digital startups and new business ventures.

The blue cluster highlights themes related to digital business models and information systems. Keywords such as business model, digital innovation, information systems, sharing economy, and crowdfunding indicate that researchers increasingly focus on how digital technologies reshape organizational structures and value creation processes. The presence of these terms suggests that scholars are particularly interested in understanding how digital platforms, information technologies, and

innovative financing mechanisms influence entrepreneurial strategies and business model innovation. Another important cluster, shown in green, focuses on entrepreneurial ecosystems and knowledge development. Keywords such as entrepreneurial ecosystem, knowledge management, entrepreneurship education, higher education, and big data reflect research that explores how educational institutions, innovation ecosystems, and knowledge networks support the development of digital entrepreneurship. This cluster indicates that the development of entrepreneurial capabilities and knowledge-sharing mechanisms is considered an important factor in fostering successful digital ventures.

The network also reveals emerging interdisciplinary connections between digital entrepreneurship and broader socio-economic themes. Keywords such as social entrepreneurship, social media, sustainability, and competition suggest that digital entrepreneurship research increasingly intersects with discussions on social innovation and sustainable development. The dense interconnections among keywords demonstrate that digital entrepreneurship is a multidisciplinary research area that integrates insights from entrepreneurship, information systems, innovation studies, and economic development, highlighting the evolving complexity of the field.

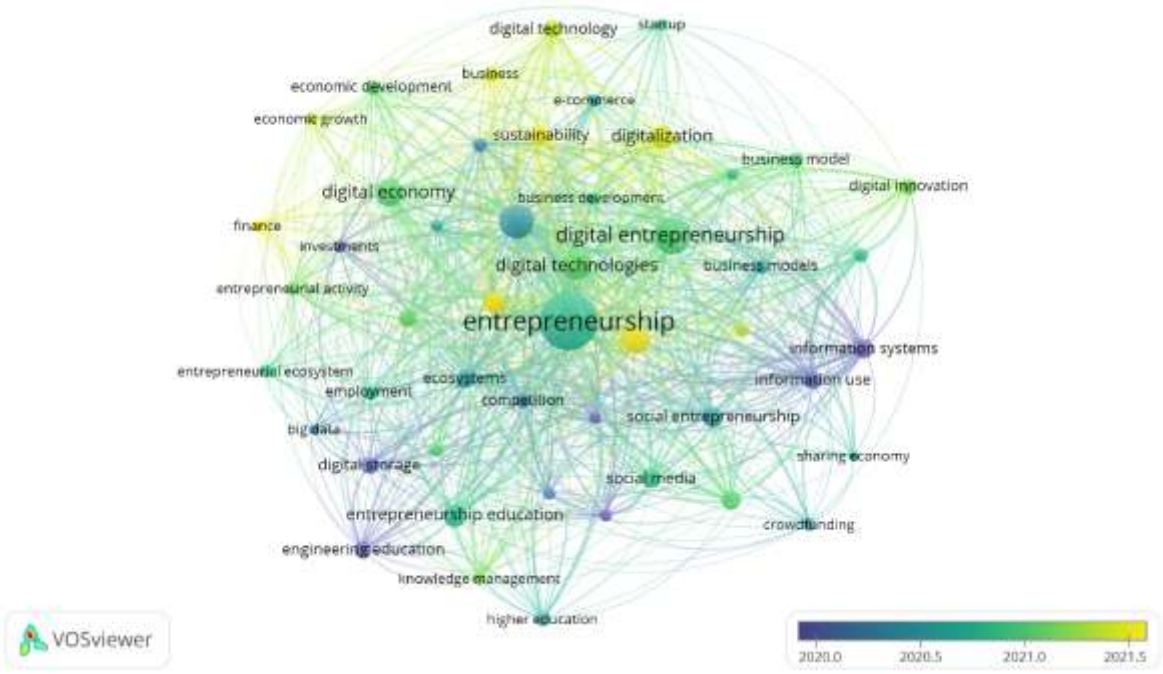

Figure 5. Overlay Visualization
Source: Data Analysis

Figure 5 illustrates the temporal evolution of research themes in digital entrepreneurship. In this map, the color gradient represents the average publication year of keywords, where darker blue colors indicate earlier research topics and yellow colors represent more recent developments. The keyword "entrepreneurship" remains the central concept connecting various research themes, demonstrating that digital entrepreneurship studies continue to be rooted in traditional entrepreneurship theory while integrating new technological perspectives. Keywords such as information systems, engineering education, and knowledge management appear in darker tones, indicating that these topics were among the earlier research focuses in the development of digital entrepreneurship literature.

As the field evolved, research began to emphasize the integration of digital technologies into entrepreneurial activities. Keywords such as digital entrepreneurship,

digital technologies, business model, digital innovation, and digital economy appear in green tones, suggesting that these topics became prominent during the middle phase of research development. This indicates that scholars increasingly focused on how digital transformation influences business creation, innovation processes, and value creation mechanisms within entrepreneurial ecosystems. The emergence of these themes reflects the growing importance of digital platforms, technological infrastructures, and innovation networks in shaping modern entrepreneurial practices.

More recent research trends are highlighted by yellow-colored keywords such as digitalization, startup, digital technology, sustainability, and economic growth. These emerging topics suggest that current studies are increasingly exploring the broader economic and societal impacts of digital entrepreneurship, including sustainable development, technological diffusion, and digital-driven economic transformation. The visualization indicates that digital entrepreneurship research is progressively shifting toward examining how digital technologies contribute to sustainable innovation, startup ecosystems, and inclusive economic development, reflecting the expanding interdisciplinary nature of the field.

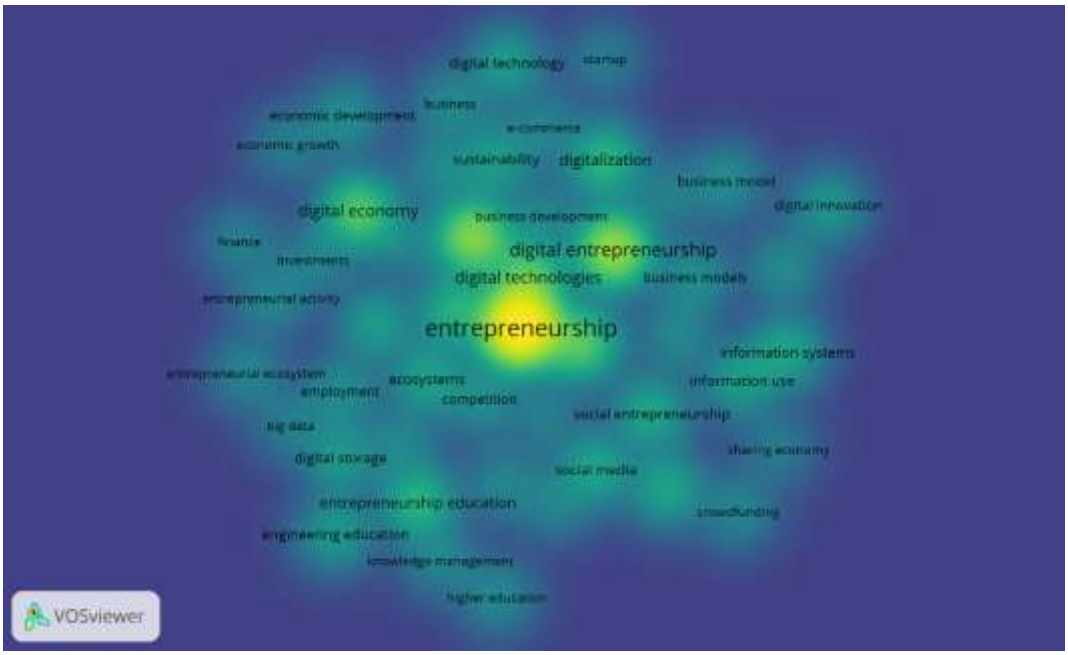

Figure 6. Density Visualization
Source: Data Analysis

Figure 6 illustrates the intensity and concentration of research topics within the field of digital entrepreneurship. In this map, areas with brighter yellow colors represent keywords that appear more frequently and are strongly interconnected within the literature, while darker areas indicate topics that receive comparatively less attention. The keyword "entrepreneurship" appears as the most prominent and densest area at the center of the map, indicating that it remains the core concept in this research domain. Closely surrounding it are related keywords such as digital entrepreneurship, digital technologies, and digital economy, which suggests that the integration of digital technologies into entrepreneurial activities has become a dominant focus in the academic discussion. Beyond the central theme, the map also reveals several supporting research areas that contribute to the broader digital entrepreneurship discourse. Keywords such as digitalization, business models, information systems, social media, and crowdfunding appear in moderately dense areas, indicating their significant but slightly

less dominant presence in the literature. Additionally, topics related to entrepreneurship education, knowledge management, big data, and entrepreneurial ecosystems are visible in lower-density regions, suggesting emerging or specialized research interests within the field.

Discussion

The findings of this bibliometric analysis provide a comprehensive overview of the development and intellectual structure of digital entrepreneurship research between 2013 and 2023. The analysis indicates a substantial increase in scholarly interest in this field over the past decade, reflecting the growing importance of digital technologies in transforming entrepreneurial activities and business ecosystems. The increasing volume of publications suggests that digital entrepreneurship has emerged as a significant interdisciplinary research domain that integrates perspectives from entrepreneurship, information systems, innovation management, and digital economy studies. This growth is closely associated with the rapid expansion of digital platforms, e-commerce ecosystems, and technological innovation, which have created new opportunities for entrepreneurial activities worldwide.

The co-authorship analysis reveals that digital entrepreneurship research is supported by several collaborative research networks led by influential scholars. Authors such as Sascha Kraus, Vanessa Ratten, and Elena G. Popkova appear as important contributors within the global academic community. These scholars serve as central nodes connecting different research groups, indicating the presence of knowledge exchange and collaborative relationships across institutions and countries. The presence of multiple clusters also suggests that research on digital entrepreneurship is conducted within several specialized research communities that focus on different aspects of the field, such as innovation ecosystems, digital business models, and entrepreneurial strategy. This collaborative structure reflects the interdisciplinary nature of digital entrepreneurship research.

Institutional collaboration analysis further demonstrates that several universities play an important role in shaping the research landscape. Institutions such as the Financial University under the Government of the Russian Federation, La Trobe Business School, and Henley Business School appear as key contributors to the development of digital entrepreneurship scholarship. The presence of these institutions within the collaboration network indicates that research in this field is supported by academic institutions that emphasize innovation, business transformation, and digital economy studies. These institutional collaborations also highlight the importance of international partnerships in advancing knowledge production and expanding research capacity within the field of digital entrepreneurship.

The country collaboration network shows that research on digital entrepreneurship is characterized by strong global participation. The United States, the United Kingdom, Germany, and the Russian Federation emerge as major hubs within the international collaboration network. These countries demonstrate extensive research activity and maintain strong collaborative links with scholars from other regions. The dominance of these countries reflects their advanced digital infrastructure, strong research institutions, and active innovation ecosystems. At the same time, the presence of countries such as Indonesia, South Africa, and several Asian and Middle Eastern nations suggests that interest in digital entrepreneurship research is expanding beyond traditional research centers, indicating a growing global diffusion of digital entrepreneurial practices.

The keyword co-occurrence analysis reveals the thematic structure of digital entrepreneurship research. The results indicate that the field is strongly centered around the concept of entrepreneurship, which remains the foundational theoretical framework for understanding entrepreneurial activities in digital contexts. Closely related themes include digital technologies, digital

economy, digitalization, and digital innovation, highlighting the central role of technological development in shaping entrepreneurial processes. These themes demonstrate that digital entrepreneurship research focuses heavily on understanding how emerging technologies influence opportunity recognition, business model innovation, and value creation.

Another important research cluster identified in the analysis relates to digital business models and information systems. Keywords such as business model, information systems, sharing economy, and crowdfunding reflect the increasing attention given to how digital platforms transform traditional business structures. These themes suggest that researchers are particularly interested in examining how entrepreneurs utilize digital infrastructures to create scalable and innovative business models. The rise of platform-based entrepreneurship, digital marketplaces, and technology-driven financing mechanisms has significantly expanded the scope of entrepreneurship research in recent years.

The analysis also highlights the importance of entrepreneurial ecosystems and knowledge development in supporting digital entrepreneurship. Keywords related to entrepreneurship education, knowledge management, big data, and higher education indicate that the development of digital entrepreneurial capabilities requires supportive institutional and educational environments. Universities, innovation hubs, and digital training programs play a crucial role in preparing entrepreneurs to navigate rapidly evolving technological landscapes. This finding emphasizes that digital entrepreneurship is not solely driven by technological innovation but also depends on the availability of knowledge resources and supportive ecosystems. The overlay visualization further reveals the evolution of research themes over time. Earlier studies focused primarily on information systems, knowledge management, and technology adoption in entrepreneurial contexts. Over time, research shifted toward examining digital entrepreneurship, digital innovation, and business model transformation. More recent research trends emphasize topics such as digitalization, startups, sustainability, and economic growth. This progression indicates that digital entrepreneurship research is increasingly addressing broader societal and economic implications, including sustainable development and digital-driven economic transformation. The density visualization confirms that entrepreneurship and digital entrepreneurship represent the most intensively studied topics in the literature. However, the map also highlights emerging areas such as social entrepreneurship, social media, digital ecosystems, and crowdfunding. These emerging themes suggest that future research may increasingly explore the intersection between digital technologies and social innovation, particularly in addressing global challenges such as sustainability, economic inequality, and inclusive economic development.

4. CONCLUSION

This study provides a comprehensive overview of global research trends in digital entrepreneurship based on a bibliometric analysis of publications indexed in the Scopus database from 2013 to 2023. The findings indicate that digital entrepreneurship has emerged as a rapidly growing and multidisciplinary research field, reflecting the increasing role of digital technologies in shaping modern entrepreneurial activities and economic development. The analysis reveals that several countries, particularly the United States, the United Kingdom, Germany, and the Russian Federation, play dominant roles in advancing research and fostering international collaboration. Furthermore, the co-authorship and institutional networks highlight the importance of collaborative research communities and academic institutions in driving knowledge production within this field. The keyword analysis shows that the literature is strongly centered on themes such as entrepreneurship, digital technologies, digital economy, and digital innovation, while emerging topics including sustainability, startups, and digitalization indicate evolving research directions.

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