

The Role of Digital Platforms in Developing Entrepreneurship: A Bibliometric Analysis

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ABSTRACT

The rapid advancement of digital technology has significantly transformed the entrepreneurial landscape, offering unprecedented opportunities and posing new challenges. This study employs a bibliometric analysis to explore the role of digital platforms in developing entrepreneurship. The analysis identifies key thematic clusters such as entrepreneurial ecosystems, digital marketing, and social entrepreneurship, highlighting their interconnectedness and impact on entrepreneurial activities. Recent research trends emphasize the implications of the Covid-19 pandemic and the potential of emerging technologies like the metaverse. Identified research opportunities in less explored areas, such as digital artifacts, digital skills, and e-commerce, suggest directions for future investigation. Additionally, the author collaboration network reveals strong intra-group collaborations with scope for increased interdisciplinary research. This comprehensive overview provides valuable insights into the current state and future potential of digital entrepreneurship, guiding scholars and practitioners in navigating this dynamic field.

Keywords: Digital Platforms, Entrepreneurship, Bibliometric Analysis, Entrepreneurial Ecosystems, VOSviewer

1. INTRODUCTION

The rapid advancement of digital technology has reshaped numerous aspects of life, including how entrepreneurship is fostered and conducted [1]. Digital platforms, characterized by their ability to connect, enable, and empower various stakeholders through virtual networks, have become instrumental in this transformation [2]. These platforms provide entrepreneurs with unprecedented access to resources, markets, and networking opportunities that were previously difficult or impossible to leverage [3]. Notably, digital platforms such as social media, e-commerce sites, and online learning modules have democratized the entrepreneurial landscape, allowing even individuals with limited capital to enter competitive markets [4], [5].

The significance of digital platforms in entrepreneurship extends beyond mere market access [2]. They serve as a crucial conduit for knowledge exchange and innovation, facilitating the rapid spread of both tacit and explicit knowledge [6]. This capability not only accelerates the pace of innovation but also enhances the learning curves of new entrepreneurs [7]. Furthermore, digital platforms are playing a pivotal role in reducing geographical and socio-economic barriers, offering a more inclusive environment for entrepreneurial ventures, particularly in underserved and developing regions [4], [8].

Despite the evident advantages, the integration of digital platforms in entrepreneurship also presents challenges. Issues such as digital privacy, data security, and unequal access to technology pose significant barriers to the effective utilization of these platforms [1]. Moreover, the

overwhelming volume of information available can paradoxically lead to decision paralysis or the spread of misinformation. Therefore, understanding the balance of these benefits and challenges is crucial for stakeholders aiming to foster a supportive entrepreneurial ecosystem [9].

Academic interest in this domain has surged, as evidenced by the increasing number of studies focusing on digital platforms and entrepreneurship [10]. However, there remains a disjointed understanding of how these platforms have systematically influenced entrepreneurial activities globally [11]. A bibliometric analysis of existing literature can map the research landscape, identifying prevailing trends, gaps, and the evolution of themes over time. Such an analysis is instrumental in synthesizing broad data sets to provide clarity and direction for future research endeavors [4].

Despite the extensive body of research, there is a notable lack of comprehensive analysis that integrates diverse studies into a coherent understanding of how digital platforms influence entrepreneurship. Many studies focus on specific aspects of digital platforms or cover limited geographical areas. This fragmentation makes it difficult for policymakers, educators, and entrepreneurs themselves to grasp the full spectrum of impacts. The challenge lies in synthesizing existing research to highlight critical insights and overlooked areas, thereby providing a structured foundation on which future studies and policies can be built.

The primary objective of this research is to conduct a bibliometric analysis to systematically review and synthesize existing literature on the role of digital platforms in developing entrepreneurship. This study aims to identify key trends, thematic evolutions, and research gaps within the field. By mapping the intellectual structure and trajectory of this research area, the study will provide valuable insights into the dynamics of digital platforms and their implications for entrepreneurial practice and theory. This comprehensive overview will not only aid in understanding the current landscape but also in shaping the direction of future investigations and interventions in digital entrepreneurship.

2. LITERATURE REVIEW

2.1 *Digital Platforms and Entrepreneurial Ecosystems*

Digital platforms have emerged as dynamic ecosystems that foster entrepreneurial activities by providing critical resources and connections necessary for startup growth and innovation. [12] define digital platforms as "digitally mediated technologies that facilitate the interaction between two or more distinct but interdependent sets of users who interact through the platform." This interaction often leads to the creation of value and exchange, which are foundational to entrepreneurial ventures. Studies have highlighted the role of platforms like LinkedIn, Kickstarter, and Alibaba in providing access to capital, markets, and expertise, significantly lowering the barriers to entry for startups [13].

The research by [14] extends this by examining how digital platforms enable the rapid scaling of new ventures through network effects, where the value of the service increases as more participants join the network. This scalability is crucial in the rapid growth observed in startups such as Uber and Airbnb. These companies leverage digital platforms not just for customer engagement but also to disrupt existing market structures and dynamics.

2.2 *Challenges and Limitations of Digital Platforms in Entrepreneurship*

While digital platforms facilitate numerous opportunities for entrepreneurs, they also present distinct challenges. A significant issue highlighted in the literature is the digital divide, which refers to the gap between demographics and regions that have access to modern information and communications technology, and those that do not [15]. This divide can limit the opportunities for digital entrepreneurship, particularly in less developed regions. Additionally, concerns about data privacy and security have been a growing area of concern, as startups often rely heavily on data analytics for business decisions and customer engagement [16].

Moreover, [17] discuss the dependency on platform providers, which can lead to vulnerabilities if the platforms change their policies or business models. This dependency is exacerbated by the monopolistic tendencies of some large platform providers, which can stifle innovation and control market dynamics in ways that may not always benefit smaller entrepreneurial firms.

2.3 *The Role of Digital Platforms in Innovation and Knowledge Exchange*

Digital platforms significantly contribute to innovation and knowledge dissemination within entrepreneurial networks. [18] argues that platforms act as both a repository and a conduit for tacit and explicit knowledge, facilitating rapid innovation cycles and iterative learning processes. This is particularly evident in technology sectors, where platforms like GitHub and Stack Overflow provide both budding and established tech entrepreneurs with access to cutting-edge knowledge and collaboration opportunities.

Mentioning the role of digital platforms in education and training, platforms such as Coursera and Udacity offer resources that entrepreneurs can use to gain new skills and refine existing ones, crucial for maintaining competitive advantage in rapidly evolving markets [19]. This educational aspect also extends to peer learning through forums and community groups, further enhancing the knowledge exchange facilitated by digital platforms.

3. METHODS

This research employs a bibliometric analysis to explore the expansive body of literature concerning the role of digital platforms in entrepreneurship development. The study's primary data sources include well-established academic database like Google Scholar. The search criteria are designed to capture a broad range of publications using keywords like "digital platforms," "entrepreneurship," and "startup ecosystems," combined with advanced search operators to refine the results to relevant studies published between 2003 and 2024. Upon gathering an initial list of publications, the data is processed using. This tool facilitates the examination of data through techniques such as citation analysis, co-citation analysis, and keyword co-occurrence analysis. This approach allows for the identification of the most influential studies, authors, and journals in the field, as well as the detection of emerging trends and thematic clusters within the research community.

4. RESULTS AND DISCUSSION

4.1 Research Data Matriks

Table 1. Research Data Metrics

Publication years	: 2003-2024
Citation years	: 21 (2003-2024)
Paper	: 980
Citations	: 64299
Cites/year	: 3061.86
Cites/paper	: 65.61
Cites/author	: 30534.05
Papers/author	: 455.90
Author/paper	: 2.73
h-index	: 114
g-index	: 234
hI,norm	: 75
hI,annual	: 3.57
hA-index	: 62
Papers with ACC	: 1,2,5,10,20:894,784,554,377,220

Source: Publish or Perish Output, 2024

The table presents an extensive set of metrics derived from a bibliometric analysis of research publications on digital platforms and entrepreneurship from 2003 to 2024. Over this 21-year period, a total of 980 papers have been published, accumulating 64,299 citations. This indicates a strong academic interest and relevance in the topic, with an average of 3,061.86 citations per year. Each paper, on average, receives 65.61 citations, reflecting the high impact and visibility of research in this domain. The citation metrics also reveal that each author in this field has, on average, accumulated 30,534.05 citations, with each author contributing to approximately 455.90 papers, demonstrating significant scholarly engagement and collaboration.

Additionally, the author-to-paper ratio is 2.73, suggesting that most papers are collaborative works involving multiple researchers. The h-index of 114 signifies that 114 papers have received at least 114 citations, indicating a substantial influence of this research on the academic community. The g-index of 234 further highlights the depth of highly cited articles, and the hI,norm index of 75 points to the normalized productivity and impact of the researchers. The hI,annual of 3.57 shows a consistent annual impact, and the hA-index of 62 highlights the quality of highly cited articles. Notably, papers with high adjusted citation counts (ACC) show substantial individual contributions, with the top papers receiving 894, 784, 554, 377, and 220 citations, respectively, underscoring the presence of seminal works that drive the research agenda in this field.

4.2 Network Visualization

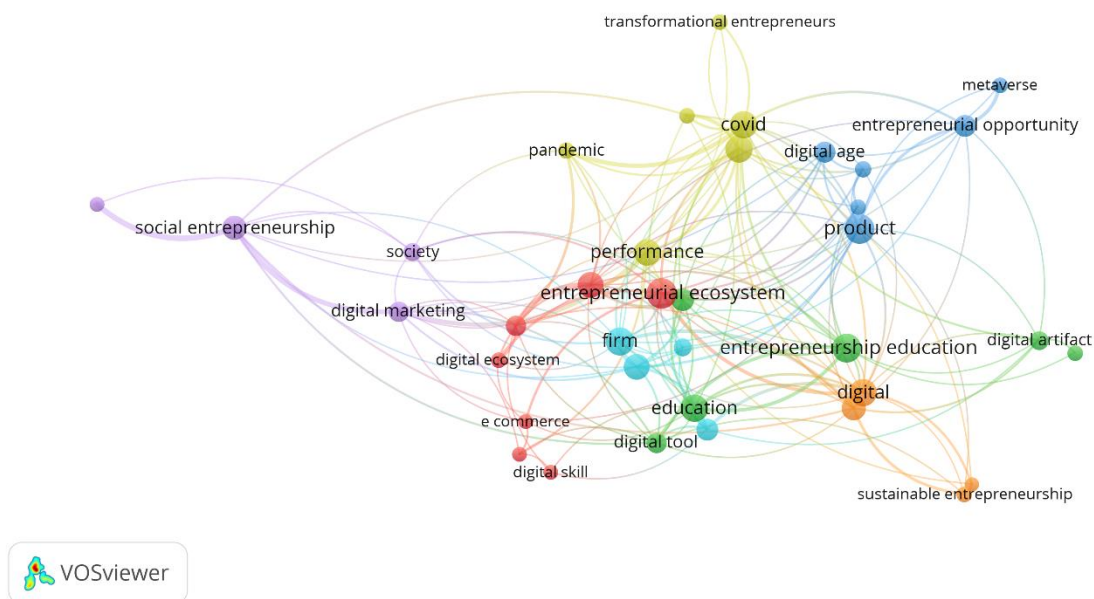


Figure 1. Network Visualization

Source: Data Analysis Result, 2024

The first VOSviewer network visualization depicts the co-occurrence of keywords in the research literature on digital platforms and entrepreneurship. The figure is color-coded to represent different thematic clusters, each signifying a particular area of focus within the broader research landscape. These clusters are interconnected, indicating the interdisciplinary nature of the research and how various themes overlap and influence one another. Below is an in-depth interpretation of the figure, focusing on the major thematic clusters identified.

1. Entrepreneurial Ecosystems and Performance (Red-Light Blue Cluster)

The red cluster is centrally located and prominently features keywords such as "entrepreneurial ecosystem," "performance," "firm," and "digital ecosystem." This cluster highlights research that explores the structure and dynamics of entrepreneurial ecosystems and their impact on firm performance. It indicates a significant body of work focused on how digital platforms integrate into entrepreneurial ecosystems, influencing the growth and success of firms. The presence of "digital ecosystem" underscores the role of digital infrastructure and interconnected networks in fostering entrepreneurial activities. Studies in this cluster likely examine the components of successful entrepreneurial ecosystems, including access to resources, networking opportunities, and the role of digital tools in enhancing firm performance.

2. Digital Marketing and Social Entrepreneurship (Purple Cluster)

The purple cluster includes keywords such as "digital marketing," "social entrepreneurship," and "society." This cluster suggests a focus on the intersection of digital marketing strategies and their application in social entrepreneurship. Research in this area explores how digital platforms are leveraged to promote social entrepreneurship initiatives and the societal impact of these ventures. It indicates an interest in understanding how digital marketing can be utilized to raise awareness, engage communities, and drive social change. The inclusion of "society" points to

studies that examine the broader societal implications of digital marketing within the context of social entrepreneurship.

3. Entrepreneurship Education and Digital Tools (Green-Orange Cluster)

The green cluster comprises keywords such as "entrepreneurship education," "education," "digital tool," "digital skill," and "sustainable entrepreneurship." This cluster highlights the importance of educational initiatives and digital tools in fostering entrepreneurial skills and sustainable entrepreneurship. It suggests a significant research focus on how digital platforms are used in educational settings to enhance entrepreneurial learning and skill development. The emphasis on "sustainable entrepreneurship" indicates a growing interest in integrating sustainability principles into entrepreneurship education, preparing future entrepreneurs to address environmental and social challenges. Research in this cluster likely explores the effectiveness of digital tools in enhancing entrepreneurial education and promoting sustainable business practices.

4. Digital Age and Entrepreneurial Opportunity (Blue Cluster)

The blue cluster includes keywords such as "digital age," "entrepreneurial opportunity," "product," and "digital artifact." This cluster focuses on the opportunities that arise in the digital age for entrepreneurs. It explores how digital platforms create new avenues for product innovation and the development of digital artifacts. Research in this area examines the nature of entrepreneurial opportunities in the digital economy and how entrepreneurs can leverage digital technologies to create and capture value. The presence of "digital artifact" suggests studies that investigate the creation and impact of digital products and services in the entrepreneurial landscape.

5. Covid-19 and Transformation (Yellow Cluster)

The yellow cluster features keywords such as "covid," "pandemic," "transformational entrepreneurs," and "digital age." This cluster highlights the impact of the Covid-19 pandemic on entrepreneurship and the role of digital platforms in enabling transformational entrepreneurship during the crisis. Research in this cluster examines how the pandemic has accelerated digital transformation and the emergence of new entrepreneurial opportunities. The term "transformational entrepreneurs" indicates a focus on individuals who leverage digital platforms to drive significant changes in their industries or communities during the pandemic. Studies in this area likely explore the challenges and opportunities faced by entrepreneurs in adapting to the new normal brought about by Covid-19.

The interconnectedness of the clusters suggests a high degree of interdisciplinary research. For instance, the connection between the "entrepreneurial ecosystem" and "digital marketing" indicates studies that explore how marketing strategies are integrated within entrepreneurial ecosystems. Similarly, the link between "entrepreneurship education" and "sustainable entrepreneurship" reflects research that combines educational initiatives with sustainability goals. The overlapping nature of these clusters highlights the multifaceted impact of digital platforms on entrepreneurship. It shows that research in this field does not occur in isolation but rather intersects across various domains, such as marketing, education, societal impact, and technological transformation. This interconnectedness is crucial for understanding the comprehensive role of digital platforms in fostering entrepreneurship.

4.3 Overlay Visualization

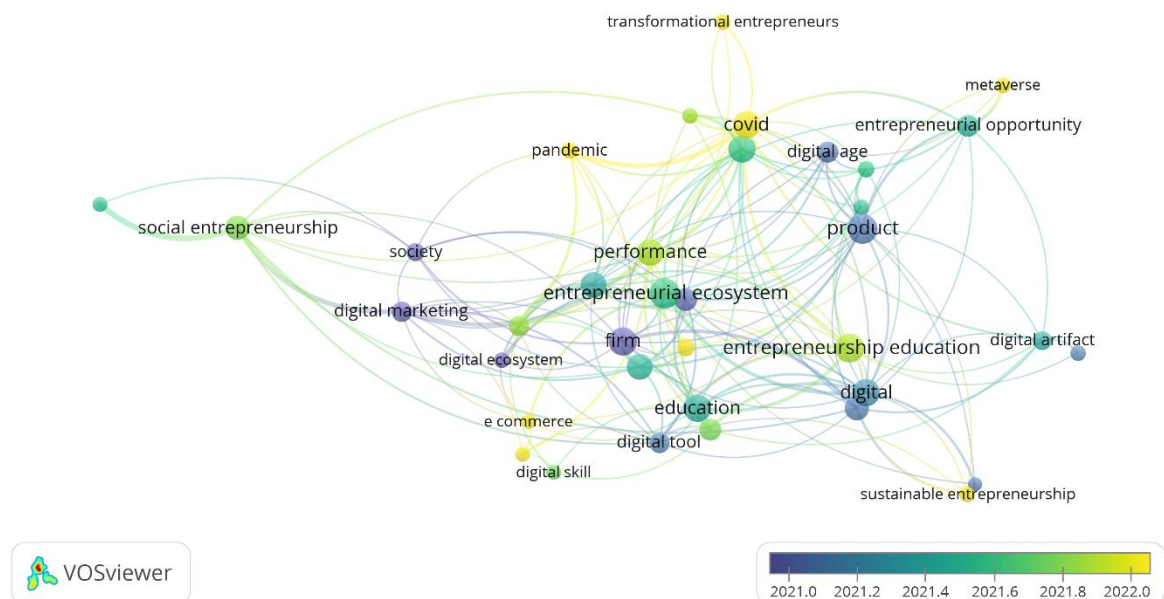


Figure 2. Overlay Visualization

Source: Data Analysis Result, 2024

The VOSviewer network visualization illustrates the co-occurrence of keywords in the research literature on digital platforms and entrepreneurship over time, with a color gradient representing the average publication year from 2021 to 2022. This visualization helps identify how research interests have evolved and where recent attention has been focused.

In the central area of the network, keywords such as "entrepreneurial ecosystem," "performance," "firm," and "digital ecosystem" are prominent and are marked in green, indicating their relevance throughout the period and stabilizing interest over time. These themes form the core of the research landscape and have been consistently important in understanding the broader dynamics of digital platforms and entrepreneurship. Research on entrepreneurial ecosystems, in particular, explores how digital platforms contribute to creating supportive environments for startups, including access to resources, mentorship, and networking opportunities. The sustained interest in these areas highlights their foundational role in the field.

The yellow-colored keywords such as "covid," "pandemic," "transformational entrepreneurs," and "metaverse" indicate more recent research trends, especially around the year 2022. The Covid-19 pandemic has significantly influenced recent studies, focusing on how digital platforms have enabled entrepreneurial resilience and innovation during the crisis. Researchers have examined the acceleration of digital transformation driven by the pandemic and how entrepreneurs have adapted to new realities, leveraging digital tools to maintain business continuity and explore new opportunities. The emergence of the "metaverse" as a keyword suggests a growing interest in how virtual and augmented reality technologies can create new entrepreneurial opportunities. This nascent area of research explores the potential of immersive digital environments for business innovation, customer engagement, and new forms of commerce.

Keywords such as "digital age," "entrepreneurial opportunity," "product," and "digital artifact" are shown in blue and light green, representing themes that have been established but continue to evolve with new insights and developments. The focus on the "digital age" and "entrepreneurial opportunity" reflects ongoing interest in how digital technologies create new

market opportunities and transform traditional business models. The study of "products" and "digital artifacts" encompasses research on the development, distribution, and impact of digital goods and services, which remain critical to understanding the digital economy's dynamics.

The pandemic has acted as a catalyst for research into digital transformation, resilience, and new entrepreneurial opportunities, marked by the prominence of keywords such as "covid," "pandemic," and "transformational entrepreneurs" in yellow. This shift indicates a recent and significant interest in how entrepreneurs navigate and leverage digital platforms during global crises. The interest in emerging technologies such as the "metaverse" points to a forward-looking trend where researchers are beginning to explore the implications of advanced digital environments for entrepreneurship. This trend suggests that the next frontier of digital entrepreneurship may heavily involve immersive technologies and virtual marketplaces.

4.4 Citation Analysis

Table 2. The Most Impactful Literatures

Citations	Authors and year	Title
4635	[20]	Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms
2614	[21]	Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship
2183	[22]	The rise of the platform economy
1901	[23]	The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes
1748	[24]	Entrepreneurship and small business
1403	[12]	Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems
1344	[25]	Digital transformation by SME entrepreneurs: A capability perspective
1135	[26]	The lineages of the entrepreneurial ecosystem approach
1016	[27]	The digital entrepreneurial ecosystem
918	[28]	Digital entrepreneurship: A research agenda on new business models for the twenty-first century

Source: *Publish or Perish Output*, 2024

The table lists the most impactful literature in the field of digital platforms and entrepreneurship, highlighting the top-cited works that have significantly influenced academic discourse. The seminal work by Sambamurthy, Bharadwaj, and Grover (2003), titled "Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms," leads the list with an impressive 4,635 citations. This paper is foundational in understanding how information technology can enhance organizational agility, a critical factor in contemporary business environments driven by rapid technological changes. Its high citation count underscores its pivotal role in shaping subsequent research on digital transformation and agility in firms.

Following this, Nambisan's (2017) influential paper, "Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship," has garnered 2,614 citations. This work is crucial for its comprehensive exploration of how digital technologies redefine entrepreneurial activities and ecosystems. Nambisan's contribution provides a framework for understanding the interplay between digital technologies and entrepreneurial processes, which has been widely adopted and cited in further research exploring digital entrepreneurship from various angles.

Other notable contributions include Kenney and Zysman's (2016) "The rise of the platform economy," which has received 2,183 citations. This paper delves into the transformative impact of

platform-based business models on the global economy, emphasizing the shift from traditional to platform-centric market structures. Similarly, the collaborative work by Nambisan, Wright, and Feldman (2019) on "The digital transformation of innovation and entrepreneurship" (1,901 citations) addresses the broader challenges and progress within the digital transformation landscape. Additionally, Burns' (2022) "Entrepreneurship and small business" with 1,748 citations, reflects its importance in understanding the evolving dynamics of small businesses in the digital era. The recurring citations of Nambisan in multiple influential papers highlight his significant contributions to the field.

4.5 Author Visualization

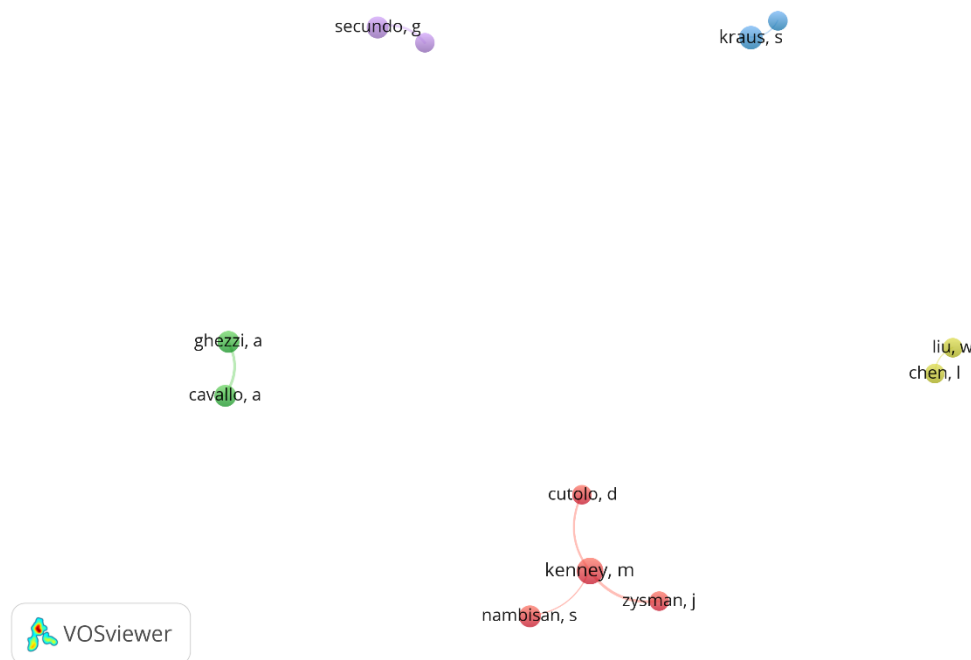


Figure 3. Author Visualization

Source: Data Analysis Result, 2024

The VOSviewer visualization illustrates the author collaboration network in the field of digital platforms and entrepreneurship. The nodes represent individual authors, and the links between them indicate co-authorship of research papers. The color of each cluster denotes distinct research groups or collaborations. The visualization reveals several prominent clusters, each comprising authors who frequently collaborate with each other.

The red cluster, located centrally, includes key authors such as Cutolo, Kenney, Nambisan, and Zysman. This cluster indicates a robust collaborative relationship, likely focused on foundational and high-impact research within the field. The interconnectedness of these authors suggests a tightly knit research community that has contributed significantly to the understanding of digital platforms and their role in entrepreneurship.

In contrast, the other clusters, such as the purple cluster with Secundo, the green cluster with Ghezzi and Cavallo, and the blue cluster with Kraus, show smaller, more specialized research groups. These clusters represent distinct subfields or specific topics within the broader domain. For instance, Ghezzi and Cavallo's close connection suggests focused collaboration, possibly on a niche aspect of digital entrepreneurship. The distribution and relatively sparse connections between clusters imply that while there is collaboration within certain groups, there is less inter-group

collaboration, highlighting the potential for future cross-collaborative opportunities to bridge these subfields and enhance the interdisciplinary nature of research in this domain.

4.6 Density Visualization

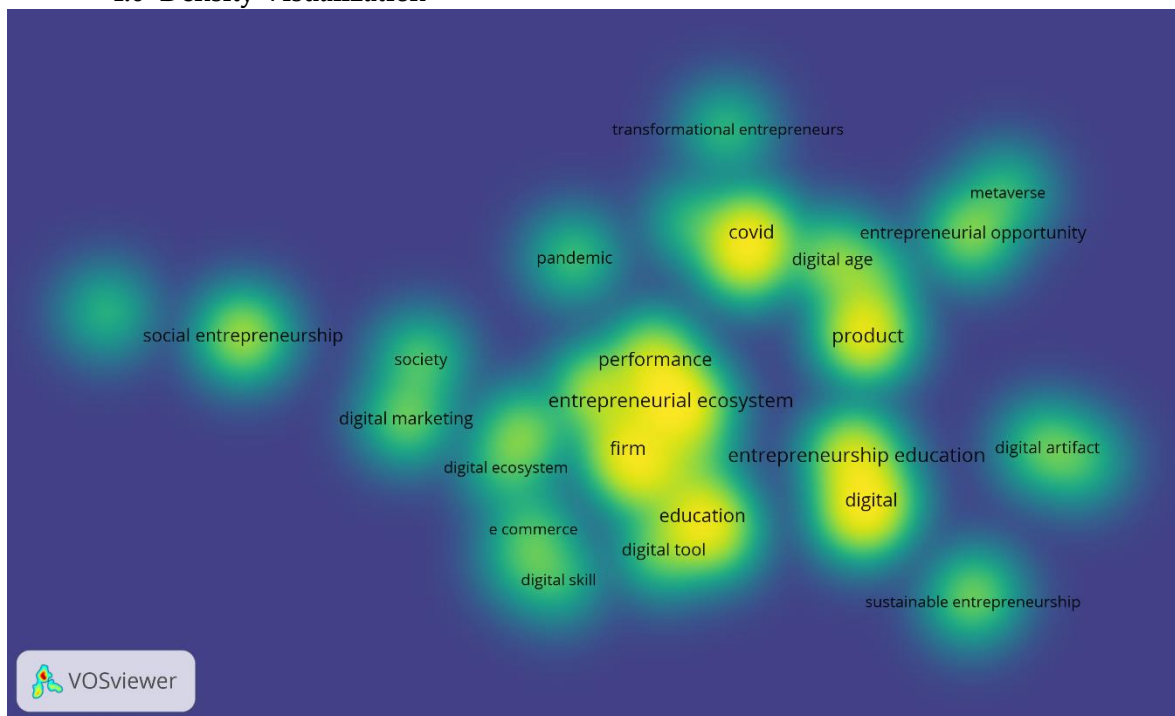


Figure 4. Density Visualization

Source: Data Analysis Result, 2024

The VOSviewer heatmap visualization highlights areas of research intensity and potential gaps within the field of digital platforms and entrepreneurship. The brightness of each area correlates with the frequency and prominence of research topics, with less bright areas indicating opportunities for further exploration and study. Notably, the areas labeled "digital artifact," "metaverse," "digital skill," "e-commerce," and "pandemic" appear less bright, suggesting they are under-explored relative to other themes.

The less bright area surrounding "digital artifact" and "metaverse" signifies an emerging research frontier with significant potential. Digital artifacts encompass the digital products and services created by entrepreneurs, while the metaverse represents a nascent digital environment combining virtual and augmented realities. The intersection of these themes could provide fertile ground for investigating how digital artifacts are developed, marketed, and utilized within the metaverse, especially considering the rapid advancements in VR/AR technologies. Researchers could explore the implications of these technologies for entrepreneurship, such as new business models, consumer behavior in virtual spaces, and the economic impact of virtual goods.

Similarly, the areas around "digital skill," "e-commerce," and "pandemic" highlight critical opportunities to address gaps in understanding how digital skills are developed and utilized in entrepreneurial contexts, particularly in response to global disruptions like the Covid-19 pandemic. Investigating the role of digital skills in enhancing e-commerce capabilities and resilience during crises can provide valuable insights for policymakers and educators aiming to prepare entrepreneurs for future challenges. Additionally, research could focus on the long-term effects of the pandemic on digital entrepreneurship, identifying strategies that helped businesses survive and thrive, which can inform best practices and support mechanisms for future crises. By delving into these less bright

areas, scholars can contribute to a more comprehensive understanding of the evolving digital entrepreneurial landscape.

CONCLUSION

The analysis of the thematic clusterization, research trends, research opportunities, and author collaboration in the field of digital platforms and entrepreneurship provides a comprehensive understanding of the current research landscape and highlights future directions. The thematic clusterization reveals interconnected domains such as entrepreneurial ecosystems, digital marketing, and social entrepreneurship, underscoring the multifaceted impact of digital platforms on entrepreneurial activities. Research trends identified through the temporal evolution of keywords indicate a growing focus on the implications of the Covid-19 pandemic, technological innovations like the metaverse, and sustained interest in foundational themes like entrepreneurial performance and education. Less bright areas in the heatmap visualization, including digital artifacts, metaverse, digital skills, e-commerce, and pandemic-related studies, present significant research opportunities to address gaps and expand the field's knowledge base. Lastly, the author collaboration network showcases strong intra-group collaborations with potential for increased interdisciplinary research, particularly between well-established researchers and emerging scholars. By synthesizing these insights, we gain a holistic view of the field's current state and future potential, paving the way for impactful and innovative research in digital entrepreneurship.

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