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Digital innovation and entrepreneurship: a review of challenges in competitive markets

Christoph Kreiterling[1*]

*Correspondence: christophkreiterling@gmail.com

[1] BaFin, Federal German Financial Supervisory Authority, Bonn, Germany

Abstract

This article presents a narrative review of seven selected studies investigating the impact of digital innovation on entrepreneurship and its outcomes within diverse sociopolitical contexts. Results show that improved innovation output scores and the ability to absorb innovative models are associated with higher GDP growth rates. Technological changes account for 35–40% of the dynamics, while regional factors account for 40%. Internet usage has led to decreased operational costs, increased sales, and better customer interaction for 88% of companies, enabling 83% to expand their markets and 78% to engage more effectively with suppliers. Digitalization fosters entrepreneurship expansion into new markets, creating a positive feedback loop between the two variables. Additionally, the study found that government roles have a more significant influence on entrepreneurship sustainability compared to electronic readiness. Digital technologies have been shown to enhance firm productivity, particularly in manufacturing and intensive industries.

Keywords: Digital innovation, Entrepreneurship, Digitalization, Regulation, Innovation

Introduction

Digital innovation has become a driving force behind entrepreneurial success in today's competitive markets. The immense advantages of digital technology adoption have been demonstrated across businesses of varying sizes and industries, with significant implications for economic growth and societal transformation. However, the path to embracing digital innovation is not without its obstacles. This paper aims to examine the unique challenges entrepreneurs face in leveraging digital innovation and proposes areas for further exploration. To establish a common understanding, I define innovation as any activity that adds value to a business or service. Digital innovation, specifically, refers to advancements in technology or the internet, such as cloud-based services (e.g., Uber, Amazon, Skype), customer feedback platforms, and more (Demirkan et al., 2016). Entrepreneurship encompasses efforts to enhance organizational efficiency and counteract entropy (Leibenstein, 1979).

Digital innovation has been shown to significantly boost GDP growth, enhance business performance, and increase competitiveness. For instance, a study by Oxford Economics and Accenture PLC projected that digitalization would augment the average

GDP growth rate by 32% for the top ten global economic powers by 2020 (Macchi et al., 2015). Digital innovation's transformative nature influences economies at large (Teece, 1986) and provides entrepreneurs with valuable consumer data via social media (Scuotto et al. 2017), facilitating adaptability to evolving markets (Bouwman et al., 2018) and improving online visibility. Despite the proven benefits of digital innovation, discussions regarding the inherent challenges for entrepreneurs have been scarce. This review aims to bridge this gap by exploring the intersection of digital innovation and entrepreneurship, shedding light on the emerging obstacles for entrepreneurs. By reviewing relevant literature, I analyze the challenges and outcomes of digital business innovation across various industries and national contexts, offering an extensive analysis of seven empirical research papers. My findings indicate that entrepreneurs encounter challenges across sectors and political environments, warranting further research to validate the extent of these implications.

Methods

Literature selection

The article aims to produce a literature review of relevant studies in the field of digital innovation and entrepreneurship. To achieve this goal, I conducted a comprehensive and systematic search of the literature to identify key research contributions. My search strategy was designed to maximize the chances of identifying all relevant studies, while minimizing the chances of excluding important research. Below, I outline the main components of my search strategy, including the databases used, the search terms and filters applied, and the inclusion and exclusion criteria applied during the screening process.

Database selection: I primarily utilized Scinapse, a powerful academic search engine, to compile potential studies for my review. Scinapse provides access to a vast database of scholarly publications and is specifically designed for researchers to identify relevant research quickly and efficiently.

Search terms and filters: I set the topic filtering function of the search engine to "entrepreneurship" to focus my search on studies related to digital innovation and entrepreneurship. To further refine my search, I included publications in English for the period of 2010 to 2022, as this represents a phase of unprecedented growth in business digitalization and digital transformation. I used the following search terms: (business OR entrepreneurship) AND (digital innovation) OR digitalization AND (significance OR importance OR efficacy).

Manual search: In addition to my database search, I performed a manual search by screening the reference lists of identified papers to detect any additional relevant studies that may have been missed by my initial search.

Inclusion and exclusion criteria: I applied specific criteria to select the most relevant studies for my review. I excluded grey literature, short communications, letters to editors, reports with no primary data, conference abstracts, dissertations, and secondary research (narrative and systematic reviews) from the literature review. I did not consider authors' affiliations, nationalities, and professional background for either inclusion or exclusion of articles.

As a result of my search strategy, I identified 34 relevant papers for review. After further screening the bibliography and applying my inclusion and exclusion criteria, I

identified 18 records eligible for full-text screening. Out of these, I ultimately selected seven papers for inclusion in my review (see Fig. 1). Table 1 provides an overview of these selected studies, including the author and year of publication, country or region of the research, field of study, relevant digital technology, study objectives, and study outcomes.

Figure 1 shows a flowchart of the included papers indicating how I carried out the search through the stages of identification, screening, and eligibility. I originally identified 34 papers through Scinapse database searches and two additional through a manual search. This was narrowed down to 16 after the screening processes and then finally down to seven after excluding irrelevant papers.

Findings

Brief summary of selected studies

KPMG conducted a 2019 global industry survey which identified Information Communication Technology (ICT), digital networks, Internet-based cloud computing services, social networks, e-mails, Enterprise Resource Planning (ERP), and office software as among the so-called "top technologies" that drive long-term business values. This paper will only discuss those technologies relevant to the reviewed studies; other "top technologies" may require a more in-depth understanding than the scope of this paper allows.

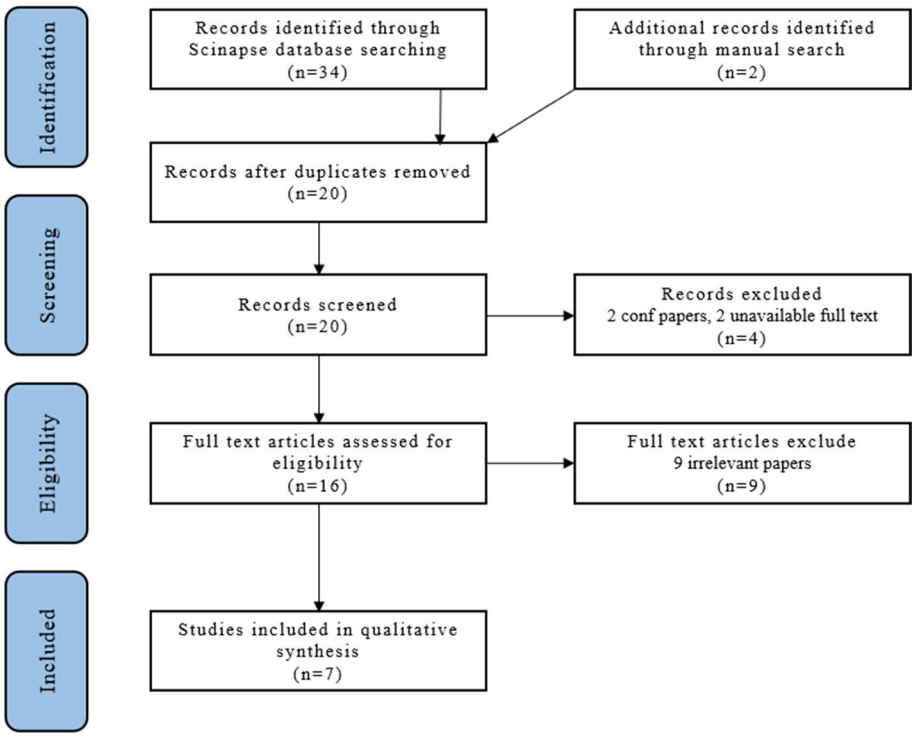

Fig. 1 Flowchart of the included papers indicating how the search was carried out through the stages of identification, screening, and eligibility. 34 papers were originally identified through Scinapse database searches, and 2 additional through a manual search; this was narrowed down to 16 after the screening processes, and then finally down to seven after excluded irrelevant papers

Table 1 Summary of design, scope, and results of the selected studies

Author, year	Country/region	Field	Technology	Objective/s	Results
Abu-Rumman et al., (2021)	Jordan	Entrepreneurial orientation	Entrepreneurial networks	Evaluate the impact of entrepreneurial orientation (EO) in Jordanian SMEs and to empirically examine the relationship between entrepreneurial orientation (EO) and its dimensions	Jordanian SMEs should prioritize the entrepreneurial orientation aspects explored in this study in order to strengthen their entrepreneurial culture and innovative performance
Cunningham et al. (2015)	East Africa: Nairobi (Kenya), Dar es Salaam (Tanzania) and Kampala (Uganda)	Innovation Ecosystem	ICT (Information Communication Technology)	1. To assess whether ICT-based entrepreneurship has a role in sustaining socioeconomic growth in Nairobi, Dar es Salaam and Kampala. 2. To detect the capacity of the three economic regions to absorb innovation	The three economies revealed an improving innovation output score according to GII 2014, and a better capacity of absorbing innovation models. The result was a better economy and higher growth in GDP as opposed to 2013
Calvino and Criscuolo (2019)	France	Economy and business	Digitalization through ICT	To analyze the impact of digitalization/ digital transformation on business dynamics (job entry and reallocation rates) in 15 countries	35–40% of the dynamics is due to technological changes, whereas 40% is region-specific. That is the reason for the significant difference among countries
Suominen (2017)	Latin America and the Caribbean (LAC)	Marketing and Business	Internet and digital networks	To evaluate the significance of the internet in businesses led by LAC	Internet boosted business advances, it decreased operational costs and increased average sales. Internet and digital networks enabled 88% of companies to better interact with customers. It also enabled 83% of companies to expand their markets. Finally, it boosted invading new markets and interacting with suppliers in 78% of companies

Table 1 (continued)

Author, year	Country/region	Field	Technology	Objective/s	Results
Galindo-Martín et al., (2019)	29 European countries	Marketing and Economics	Cloud computing services, social networks, E-mails, Office software	To assess the influence of digital dividends on entrepreneurship	Digitalization facilitates the invasion of entrepreneurship to new markets and the expansion of current markets. Positive feedback exists between the two variables. When dividends (driven by digitalization) increase, they urge more competitiveness and reflect positively on the performance and sustainability of entrepreneurship. That promotes more digitalization
Yaghoubi (2012)	Iran	Agriculture	Internet and ICT	To study the drivers of digital innovation in business	Governmental rules (cognitive role, supporting role, and policy-making role) had more influence on entrepreneurship sustainability compared to electronic readiness (ICT applications and infrastructure)
Gal et al., (2019)	20 OECD countries (Turkey plus 19 countries from the European Union)	Industry and Manufacture	Internet, simple and complex cloud computing, front and back-office apps, and ERP (Enterprise Resource Planning)	To evaluate how digital technologies impact industrial productivity	Digital technologies boost productivity of firms, especially in manufacturing and intensive industries

Abu-Rumman et al.'s study (2021) aimed to explore the mediating role of dynamic capabilities developed by entrepreneurial networks and orientation in SME performance. Data were collected from 100 Jordan-based SMEs using an electronic questionnaire and analyzed using structural equation modeling. Results showed that entrepreneurial orientation had a significant positive impact on SME performance, while entrepreneurial networking had an insignificant impact. Dynamic capabilities played a significant mediating role in both relationships. The study recommends SMEs to develop strong networks and strategic alliances for a competitive advantage and encourages future research to explore the same framework with additional variables.

Calvino and Criscuolo (2019) investigated the effect of digital technologies on business dynamics—specifically job entry and reallocation rates—in a policy paper for the Organization for Economic Cooperation and Development (OECD). The authors discussed the drivers and levers of job entry according to the OECD and concluded that digitalization and government policy have a significant relationship. They found that digitalization accounted for 35–40% of business innovation, while in-between country variation accounted for about 40%. This reflects the significant impact that national regulations and policies have on a state's overall economic growth, including the success of entrepreneurship and digital innovation. Regulations and policies that support entrepreneurs accordingly increase their chances of success. Yaghoubi et al. (2012) conducted the second study in this review, which further highlights the immense importance of successful implementation of digital innovations. They found that information technology influences all organizational and social activities levels and can even change the nature of trends and businesses.

Galindo-Martín et al. (2019) analyzed 29 European countries to determine the impacts of digital innovation on societies as a whole. They confirmed that the relationship between value creation, digital transformations, digital dividends, and entrepreneurship is significant. Their analysis of these 29 countries shows that entrepreneurial activity effectively ensures growth in a society's economy, which generally increases an average resident's standard of living. Higher entrepreneurial stimulus and resulting new opportunities, as well as greater competition generated in various associated markets, lead to further new innovations and corresponding digital transformations.

Cunningham et al. (2015) discuss a specific business model of innovation in the African economic regions of Nairobi, Kenya; Dar es Salaam, Tanzania; and Kampala, Uganda. The model integrates the private sector, public sector, science parks, National Research and Education Networks (NREN), innovation funding, skills and training, research and education, and local communities. These three economic regions showed high development rates and absorption capacity of the innovation model. The 2014 Global Innovation Index (GII) framework rankings identified digital innovation as a key element in advanced economies. Entrepreneurial adoption of advances in digital technologies is vital to the growth and survival of businesses around the world. The GII rankings reflect an advanced economy.

Suominen (2017) found that digital technologies empower Latin American companies of all sizes to cut costs, improve customer service, and create new products and

services. Digitalization has created new prospects for Latin American economies to become more productive while expanding opportunities for entrepreneurship and driving equitable economic growth.

Gal et al. (2019) found that the adoption of digital technologies in an industry correlates with productivity gains at the firm level. Their study integrated transnational company-level productivity statistics and industry-level data on digital technology adoption, where routine-intensive businesses are particularly affected. Their findings revealed that digital technology innovation may have contributed to the widening disparity in company productivity performance. Thus, efforts to encourage digital adoption should go hand in hand with establishing the conditions for lagging firms to catch up, most notably through improving access to skill training and development programs.

Discussion

This review sheds light on the significant influence of digital technologies and digitalization on business growth and longevity. It also provides a comprehensive overview of the most common challenges faced by both new and established businesses in the digital era. Digitalization has proven to be a powerful driver for GDP growth. By leveraging digital technologies, businesses can streamline their operations, resulting in cost savings and enhanced productivity. This allows for increased profit margins and the ability to scale quickly. Furthermore, digitalization has been shown to have a positive effect on average purchases, effectively doubling them in many cases. This can be attributed to several factors, such as the ease of access and convenience provided by digital channels, which have contributed to increased purchase intention among consumers. In addition to driving up purchase intentions, digital technologies have also been instrumental in improving customer satisfaction. By providing more personalized and seamless customer experiences, businesses can effectively meet and even exceed customer expectations. This leads to higher levels of satisfaction, which in turn can result in stronger customer loyalty, increased word-of-mouth referrals, and ultimately, sustained business growth. However, the rapid pace of digital innovation has also introduced new barriers and challenges for entrepreneurs. These challenges are discussed in the context of seven aforementioned studies, which highlight the difficulties businesses may face when embracing digital technologies. By understanding and addressing these challenges, businesses can harness the full potential of digital technologies and digitalization to drive growth, increase purchase intention, and improve customer satisfaction in the long run. These identified challenges are:

Overcoming regulatory barriers

Calvino and Criscuolo (2019) and Cunningham et al. (2015) have highlighted that regulatory barriers can pose significant challenges to entrepreneurship. These barriers can take many forms, including a lack of funding resources, high innovation costs, and regulations that can hinder the application of new technologies in entrepreneurial endeavors across developing, emerging, and developed nations, as well as across different industries. The 2016 World Economic Forum report suggested that regulatory barriers on state and local levels can form market entrance barriers or increase the time to market for the development of new products and services. However, it is important to

note that regulatory barriers are not always negative. They can also serve as a means of protecting consumers from harmful products or services. In addition, regulatory barriers can help ensure that businesses operate in an ethical and sustainable manner. Therefore, it is important to strike a balance between protecting consumers and promoting entrepreneurship.

Securing funding

The issue of securing funding for innovation is a critical challenge that entrepreneurs face in addition to regulatory barriers. While Cunningham et al.'s (2015) study found that African economic regions that perform 10% or higher in GDP were marked as innovation learners, the reality is that securing funding resources continues to be a primary challenge for these regions. This highlights the limitations of GDP as a measure of economic growth and innovation. Moreover, the cost of implementing new technologies can be extremely high, which can be a major barrier for small businesses and entrepreneurs who lack the necessary resources. This can lead to devastating consequences for those who fall behind on the latest digital innovations. Gal et al.'s (2019) study further supports the challenges of securing funding for innovation. The study revealed that companies seek to be the first to adopt technologies, which leads to a rapid pace of progress with the aim of achieving target incomes and preserving competitiveness. However, this can also contribute to the high costs of implementing new technologies in an ever-modernizing digital age. While some may argue that the rapid pace of technological advancement is necessary for economic growth and competitiveness, it also creates a significant barrier for entrepreneurs who cannot keep pace with the latest innovations. In addition to the financial burden, it is important to note that access to funding is not distributed equally. Marginalized communities and entrepreneurs, particularly women and people of color, often face additional barriers to accessing funding for their innovative projects. This perpetuates existing social and economic inequalities, which undermines the potential benefits of innovation for broader society. In conclusion, the issue of securing funding for innovation is a critical challenge that requires attention and action. While GDP growth and competitiveness are important, they should not come at the cost of perpetuating inequality and hindering innovation among marginalized communities. Policymakers, investors, and business leaders need to work together to create a more equitable and supportive environment for innovative projects, particularly those led by marginalized communities. This will require a systemic approach that addresses the root causes of financial barriers to innovation, including unequal distribution of funding and resources.

Outdated or obscure technologies

Rapid digital innovation can have a negative impact on certain technologies, and this is a crucial point to consider. While digitization has undoubtedly emerged as a vital driver of entrepreneurship and innovation, it has also led to the emergence of obscure technologies that serve only a niche market or have been overshadowed by newer alternatives. It is worth noting that not all entrepreneurs can keep up with the rapid pace of digital innovation or may lack interest in working with obscure technology. Therefore, those who decide to engage with such technologies may face significant challenges and

risks, including wasting time and resources building their business on an obsolete or irrelevant platform. While the review recommends that entrepreneurs identify future opportunities by exploring the context of entrepreneurship and digital innovation, operationalizing digital technologies as moderators or mediators, or modeling the specificities of the role of digital technologies as independent or dependent variables, these recommendations fall short of addressing the issue at hand. They don't provide specific solutions to the challenges that entrepreneurs may face when dealing with outdated or obscure technologies. Entrepreneurs need to recognize that there is a real cost to adopting obscure technologies that may have limited applications or lack support. The review could have delved deeper into this issue and offered more practical recommendations on how to mitigate the risks associated with these technologies. For instance, entrepreneurs should conduct thorough research and analysis before investing in a particular technology to determine its long-term potential and viability in the market. Furthermore, the review could have examined the broader implications of the digital divide that exists among entrepreneurs. It is well documented that access to digital resources is unevenly distributed, with some entrepreneurs having more access than others. As a result, entrepreneurs with limited access may be at a disadvantage when it comes to adopting new technologies. Finally, the review highlights the importance of extending an understanding of obscure technologies to a wider community of experts through target group-oriented communication methods. While this recommendation is a step in the right direction, it does not address the larger issue of how to bridge the digital divide and ensure that all entrepreneurs have equal access to the resources and knowledge they need to succeed in the digital age.

Sociopolitical considerations

Digital innovation and entrepreneurship's effect on employment is a multifaceted issue that cannot be ignored. Cunningham et al. (2015) assert that digital innovation and entrepreneurship will have a considerable impact on employment, but it is crucial to examine the wider sociopolitical implications of this trend. Businesses should be conscious of the societal value multiplier of their digital endeavors, which encompasses both the socioeconomic influence of their digital initiatives and their social responsibility function (Calvino & Criscuolo, 2019). Furthermore, governance styles and cultural norms can substantially affect how entrepreneurs engage with digital innovations. Considering Abu-Rumman et al.'s (2021) research on the role of dynamic capabilities developed by entrepreneurial networks and orientation in SME performance, it is important to integrate these findings into the broader conversation. Their study revealed that entrepreneurial orientation positively affected SME performance, while entrepreneurial networking had an insignificant impact. Dynamic capabilities played a significant mediating role in both relationships. This implies that government regulations and policies should support the development of strong networks and strategic alliances for competitive advantages among SMEs. Evidence suggests that the benefits of digital innovation to entrepreneurship can be observed in various regions, including OECD countries, 29 European countries, some parts of Latin America, and at least three economic regions in Africa (Calvino & Criscuolo, 2019; Cunningham et al., 2015; Galindo-Martín et al., 2019; Suominen, 2017). Nevertheless, the role of government regulations and policies

in shaping the outcomes of digital innovation cannot be understated. In many cases, such regulations and policies can result in significant variations in business performance and longevity (Cunningham et al., 2015), posing a substantial concern for entrepreneurs and their market entry. To address this challenge, policymakers and regulators need to comprehend how industry-led digital initiatives can help meet specific policy objectives and targets. They can utilize policy tools to incentivize industries to invest in digital initiatives that yield larger societal benefits (Galindo-Martín et al., 2019). Through such collaboration, they can tackle major obstacles faced by entrepreneurs. It is crucial to acknowledge that not all digital initiatives are equal. The consequences of digital innovation on employment and society can be both advantageous and detrimental, depending on factors like the type of digital innovation, the affected industries, and existing regulations and policies. Policymakers and regulators must carefully assess the potential social and economic impacts of digital innovation and collaborate with businesses to ensure that the advantages are broadly distributed. Moreover, potential inequalities arising from uneven distribution of digital innovation must be considered, and measures should be taken to ensure that the benefits are widely shared and that vulnerable groups are not left behind. In conclusion, while digital innovation and entrepreneurship can provide significant benefits to employment and society, the broader sociopolitical implications must be taken into account. Policymakers and regulators should work with businesses to guarantee that digital initiatives positively impact society on a larger scale, and that the benefits are more evenly distributed. By doing so, they can address a major challenge faced by entrepreneurs and foster a more equitable and prosperous future for all.

Conclusions

The analysis of seven peer-reviewed publications on digital innovation and the challenges entrepreneurs face in a fast-growing digital world offers valuable insights on the relationship between digital innovation and entrepreneurship. These studies span regions around the world and various study fields, which highlights the universal significance of this relationship. Although the small sample size of this narrative study restricts the scope of conclusions drawn, it nonetheless provides a foundation for future research that examines how these trends are replicated in other studies and explores the challenges outlined in this paper in more depth.

In particular, examining the impact of the "top technologies" identified by KPMG (2019) will help paint a more comprehensive picture of how digital innovation is transforming businesses and societies worldwide. These technologies include the Internet of Things, Robotic Process Automation, Artificial Intelligence and Machine Learning, Blockchain Technology, Augmented Reality, Virtual Reality, Networking, Biotech, and On-Demand Marketplace Platforms. Understanding the implications of these technologies is essential to maximizing the benefits of digital innovation.

The findings of the reviewed studies highlight the pivotal role digital innovation plays in fostering business growth, increasing returns on investment, and promoting societal transformation. This is evidenced by Calvino and Criscuolo (2019), who found that digitalization accounts for 35–40% of business innovation and that national regulations and policies significantly impact entrepreneurship and digital innovation. Similarly,

Galindo-Martín et al. (2019) confirmed the positive relationship between value creation, digital transformations, digital dividends, and entrepreneurship.

However, as noted by Gal et al. (2019), the adoption of digital technologies can lead to widening disparities in company productivity performance, emphasizing the need for efforts that ensure lagging firms can catch up. This can be achieved through improved access to skill training and development programs. Furthermore, overcoming the challenges of digital innovation requires collaboration between entrepreneurs, governments, and institutions. Developing facilitatory forums to maximize the benefits of digital innovation can pave the way for overcoming these challenges.

In summary, understanding the interplay between digital innovation and entrepreneurship is crucial for business growth and societal transformation. The findings from these seven publications provide valuable insights into this relationship and highlight the need for future research that further explores these trends and challenges. By examining the impact of "top technologies" and fostering collaboration between entrepreneurs, governments, and institutions, businesses and societies can harness the power of digital innovation to drive economic growth and improve the standard of living for all.

Limitations of the study

While the insights derived from the seven peer-reviewed publications provide valuable information on the relationship between digital innovation and entrepreneurship, this study is not without its limitations. In this chapter, I discuss the key limitations that should be considered when interpreting the findings and conclusions of the study.

Small sample size: The narrative study is based on a small sample size of seven publications, which may not provide a comprehensive representation of the current state of research on the interplay between digital innovation and entrepreneurship. This limitation restricts the generalizability of the findings and highlights the need for further research with larger samples and diverse sources of information.

Geographical and industry-specific focus: The publications reviewed in this study focus on specific industries and regions, which limits the ability to draw universal conclusions about the relationship between digital innovation and entrepreneurship. Future research should aim to include a wider range of industries and geographic locations to provide a more comprehensive understanding of the topic.

Limited scope of digital technologies: The study primarily discusses the technologies identified as relevant to the reviewed publications. However, KPMG (2019) identified several other "top technologies" that may be crucial for understanding the full impact of digital innovation on entrepreneurship. This limitation emphasizes the need for future research that investigates the broader range of digital technologies and their effects on business growth and societal transformation.

Cross-sectional analysis: The study presents a snapshot of the relationship between digital innovation and entrepreneurship based on the findings from the selected publications. However, this cross-sectional approach may not fully capture the dynamic nature of the relationship and the factors that influence it over time. Longitudinal studies that track the changes in digital innovation and entrepreneurship over an extended period would provide a more in-depth understanding of the interplay between these two factors.

Heterogeneity in methodologies: The reviewed publications employed different methodologies and approaches in their respective investigations, making it challenging to synthesize the findings into a cohesive conclusion. A more systematic approach to reviewing and synthesizing the literature on digital innovation and entrepreneurship would help provide a clearer understanding of the relationship between these factors.

In conclusion, the limitations of this study should be carefully considered when interpreting its findings and conclusions. Despite these limitations, the study offers valuable insights into the relationship between digital innovation and entrepreneurship and provides a foundation for future research to build upon. By addressing these limitations and expanding the scope of inquiry, researchers can better understand the interplay between digital innovation and entrepreneurship, which is essential for driving business growth and societal transformation.

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The sole author had the idea for the article, performed the literature search, performed data analysis, and drafted the article.

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Availability of data and materials
All data collected for this study were collected from academic databases, as outlined in the Methods section of the text. The materials used were compiled through searches of public studies. No further data sharing is applicable to this article.

Declarations

Competing interests
The author has no relevant financial or non-financial interests to disclose, and no affiliations with any entity that has interests in the subject matter or materials discussed in this manuscript. The author is unaware of any organization that may gain or lose financially through the dissemination of this research.

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