

"Unpacking the Landscape of Digital Ecosystem Readiness: A Decade of Insights Through Bibliometric Analysis"

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Abstract

Recently, the urgency of preparing digital ecosystems for rapid change has attracted growing scholarly attention. This study explores how research on Digital Ecosystem Readiness (DER) has developed over the past five years, focusing not only on organizational preparedness but also on broader system-wide dynamics. While earlier studies mostly looked at small-scale details, this paper seeks to identify new trends, themes, and missing areas by reviewing 57 articles published between 2021 and 2025, taken from Scopus and Google Scholar. Using PRISMA guidelines to choose articles, the data were examined with VOSviewer, which created various visual tools like co-occurrence networks and maps showing how authors work together. Key findings show a shift from internal technological adoption toward topics like platform governance, AI integration, and policy-based digital sustainability. Despite growing interest, research on ecosystem-level readiness appears fragmented, with limited cross-national academic collaboration. The study suggests that current models could improve by using a broader approach that includes Technology–Organization–Environment theory, dynamic capability perspectives, and multi-stakeholder governance methods. This integrative view is essential for designing inclusive readiness strategies that reflect the realities of a fast-evolving digital world.

Keywords : Digital Ecosystem Readiness; Bibliometric Analysis; Technology–Organization–Environment; Platform Governance; and Knowledge Mapping



INTRODUCTION

Beginning Digital transformation has changed the way organizations, governments, and societies interact with each other in fundamental ways. This has made digital ecosystem readiness a key measure of how ready we are to deal with the many challenges that come with an increasingly digital world. The COVID-19 pandemic sped up this change by encouraging the use of digital platforms, improving infrastructure, and sparking strategic changes in many areas, including health, education, and micro, small, and medium-sized enterprises (MSMEs) (L. Chen et al., 2023); Rupeika-Apoga & Petrovska, 2022). Global assessments, such as the Digital Economy and Society Index (DESI) and the Global Connectivity Index (GCI), show that there are big differences in digital maturity and accessibility between countries and demographic groups. This shows that we need to understand and improve digital readiness at an ecosystem level (Sukmadiansyah et al., 2006); Bisultanova, 2023). Also, research shows that digital readiness is linked to both organizational performance and market competitiveness in the digital ecosystem, showing how it affects many different areas (Türkmen & Soyer, 2019).

There have been many studies on digital readiness from the points of view of technology, organizations, and people, but there have not been many systematic assessments that focus on digital ecosystem preparedness (Yang et al., 2024). Most of the time, existing studies look at digital readiness from the point of view of one business and use different analytical methodologies (Kumar et al., 2023). On the other hand, a full framework that brings together different aspects of readiness, such as governance, technological interoperability (like IoT), and the historical development of thematic trends, has not been studied enough, especially in light of today's global problems (Shkarupeta et al., 2020); Dixit et al., 2020). This divide shows how challenging it is to manage and work together on digital platforms to make a digital ecosystem that is open to everyone and strong.

To deal with these problems, this study asks a number of important research questions: What changes have happened in the last ten years that have affected the research landscape for digital ecosystem readiness? What are the most important research clusters? How do the connections between writers, institutions, journals, and nations show up? Also, what gaps are there that could lead to new ways for scholars to contribute? The study uses a multidimensional bibliometric methodology that includes citation analysis, keyword co-occurrence, author collaboration, and thematic content analysis of Scopus publications from 2013 to 2023. Its goal is to find out how digital



ecosystem readiness works in current and future contexts, such as the platform economy and sustainable digital transformation (Berampu & Sari, 2021); De Carolis et al., 2017).

This study has many goals: to create a knowledge map that shows thematic clusters and global collaboration networks, to find long-term trends in research, and to look into big gaps in different areas, like governance and sustainability, especially in developing regions (Novita Sari et al., 2023); Mızrak, 2023). The major goals of this study are to chart yearly trends in publications about digital ecosystem readiness, find important players in this field, show how themes have changed over time using advanced analytical methods, and outline patterns of academic collaboration. This study's goal is to fill in the gaps in our knowledge of ecosystem-level preparation. This will make it possible to create a long-term research agenda that includes technology, policy, and community involvement to achieve digital resilience.

This research follows the strict standards set by respected international journals by using the Scopus database for a thorough review, following established bibliometric protocols for clear methods, and providing a strategic framework for future research agendas (Rupeika-Apoga & Petrovska, 2022; Yang et al., 2024). This article not only describes the current state of digital ecosystem readiness in academia, but it also starts conversations that can lead to a fully functional ecosystem with strong technology, adaptable culture, positive policy-making, and strong infrastructure.

LITERATURE REVIEW

Sub 1: Concept and Evolution of Digital Ecosystem Readiness

Digital ecosystem readiness is based on basic ideas like technological readiness, organizational culture, and external environmental readiness. These ideas take into account the many different aspects of multi-actor digital ecosystems. Parasuraman's idea of technology readiness includes personal traits like being optimistic or uncomfortable with technology, which affect how ready a person or organization is to use new technologies (Parasuraman & Colby, 2014; A., 2000) Parasuraman, 2000). This theoretical paradigm requires a shift toward a systems-level view, since the complexity of digital ecosystems calls for a more comprehensive approach than just looking at how ready each business is for new technologies.

Tornatzky and Fleischer's Technology-Organization-Environment (TOE) framework is a key concept for figuring out how people adopt new technologies. It says that the interaction of technological, organizational, and environmental settings has a big effect on how quickly new technologies are adopted (Tsourela & Nerantzaki, 2020);

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Leochico et al., 2022). Recent research has also stressed that preparation must include digital platform interoperability, governance policies, and stakeholder participation (Zhou & Cen, 2024; (FARAGO et al., 2023). This change shows how limited prior studies were, since they frequently looked at technological and institutional theories separately and didn't include a wider view of ecosystem readiness that involves different players and digital infrastructures ((Annarelli et al., 2021).

Recent research on dynamic capacities also shows why businesses need to change how they use their resources as technology changes. Organizations can improve their ability to find and take advantage of market opportunities by becoming part of digital entrepreneurial ecosystems. This also makes their ecosystem as a whole more resilient (G. Chen et al., 2024); Dyduch et al., 2021). But there is still a gap between the micro-level readiness tests and the macro-level needs of big digital ecosystems. As a result, we need a more complete framework for Digital Ecosystem Readiness that looks at both how ready each entity is from a technology standpoint and how they depend on each other in a bigger technological ecosystem (Jagde et al., 2021).

In short, digital ecosystem readiness needs to be understood in the context of a framework that includes technology readiness, organizational dynamics, and environmental factors. Recognizing the complicated and interconnected nature of digital ecosystems is essential for encouraging the successful use of technology and collaborative innovation across many stakeholders. This method fills in the gaps between small-scale studies of readiness and larger studies of ecosystem needs, which is in line with what modern digital transitions require.

Sub 2: Determining Digital Ecosystem Readiness in Literature

Getting ready for a digital ecosystem is becoming a more prominent issue in modern literature as businesses struggle to deal with the problems that come with going digital. Soomro et al. (2020) looked at many different studies and found many models that show how businesses can get involved in digital activities (Nikou & Aavakare, 2021). These frameworks include digital culture, technology infrastructure, and digital skills. All of these elements are necessary to assist individuals in adopting digital technologies (K. M. et al., 2023); Sulistyowati et al., 2023).

Lee and Meng (2021) also argue that you need to know how to use digital tools well to improve operations and get ahead of the competition (K. M. et al., 2023). Research on Industry 4.0 utilizes the Technology-Organization-Environment (TOE) framework. It breaks down preparation into three main areas: the technology, the organization, and the

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environment. (Agostino & Costantini, 2022) strongly agree with this classification. They think that to be fully prepared for the digital age, you need a plan that encompasses all of these things (Ospanova et al., 2023).

Accessing technology is also difficult, which further complicates preparation for the digital age. The COVID-19 pandemic has made these disparities increasingly clearer. Because of this issue, there is now increased emphasis on the need for strong infrastructures and support systems to help all types of enterprises adopt digital technology (Dewa et al., 2024); Beaunoyer & Dup, 2020). (Buteau, 2021) says that when we construct a digital environment that helps people, we need to think about the big picture.

The larger picture encompasses not just technology but also the cultural and skill changes that need to take place for digital transformation to work. A business is ready for the digital world when it has the right mix of digital skills, infrastructure, and a culture that supports them. If businesses want to do well in a world that is growing increasingly digital, they need to learn more about these things and spend their money effectively.

In education, leadership, digital culture, and data-informed decision-making have become important parts of being ready for digital. Also, research shows that partnering capabilities and digital curation are very important for getting the digital ecosystem ready. A study by (Silva et al., 2023) shows that these elements are linked to the effectiveness of digital transformation in organizations. This shows how digital ecosystems are interconnected (Silva et al., 2023). The system shown here depends on basic things like technology and infrastructure, but it also stresses the need for an inventive culture, skilled people, and good governance structures. Digital preparedness may stay broken and unsustainable without these parts (Blayone et al., 2018). This is in line with the Resource-Based View (RBV), which says that companies should build up their skills to get an edge over their competitors in the digital world (Blayone et al., 2018).

Critics say that the main problem with the current models is that they rely too much on micro- and individual-based approaches that don't adequately reflect the complexity of readiness in ecosystems, especially when it comes to technology interoperability and cross-platform interaction. Future models need to look at readiness not just as a separate internal metric but also as a part of a global ecosystem that includes technology, people, organizations, regulatory frameworks, and digital culture.



Sub 3: Research on the digital ecosystem's readiness for connectivity and mapping needs

A bibliometric analysis by (Senyo et al., 2019) describes the digital ecosystem as a socio-technical environment where people, organizations, and digital technologies work together to create value on shared platforms (Review, n.d.). This conceptual basis indicates a significant gap in empirical research, as many studies focus solely on one aspect of an organization or platform and fail to consider the multi-actor perspectives and systemic interdependencies associated with digital changes.

Most of the complaints regarding the TOE framework and digital preparation models have to do with issues with technology and businesses. This limited focus often misses crucial things like governance, interacting with other organizations, and being ready for interoperability, especially when it comes to new technologies (Adhiatma et al., 2022). Adhiatma et al. (2022) say that these vital but often ignored parts should be added to models that show how digital ecosystems work. Making ordered maps to locate study clusters, moving subjects, and areas where there isn't enough real-world research is much more significant than the literature being so fragmented. Bibliometric tools like VOSviewer (Ahiase et al., 2024) help us see how the digital revolution is happening in a lot of different areas. The bibliometric evaluations that are already out there are helpful, but they don't give a full picture of how ready digital ecosystems are. There is a lot of information out there, but Kayser et al. (2019) argue that it is still a work in progress to put it all together into one framework (Adhiatma et al., 2022). Researchers need to work together to understand more about what digital ready looks like and how to get there. This picture should show how well the organization and the technology are ready, how well the digital platforms function together, and how well the governance works (Erku et al., 2023); Suparno & Kamuli, 2023). More and more, it's necessary for different kinds of technology to function together. This is vital for quickly providing services and sharing new ideas in digital ecosystems (Govender et al., 2025). As companies move toward a digital-first approach, it's crucial to include these diverse aspects in future models. This will make the digital world better prepared and last longer. In the digital age, more and more things are linked together.

There is an urgent need for bibliometric-based mapping that goes beyond just looking at publication trends and author networks. This mapping should look at intellectual structures, connections between different aspects of readiness, and how theories like TOE, Institutional Theory, and Quadruple Helix models can be combined (Silva et al., 2023). These kinds of methods should help reduce the current fragmentation and make

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it easier to create a model of preparation that includes everyone. They should also help expand the range of research into digital governance, inclusivity, and ecosystem preparedness that lasts ((Ghobakhloo & Iranmanesh, 2021).

RESEARCH METHOD

This study uses a bibliometric approach to look at how the scientific environment in the Digital Ecosystem Readiness (DER) field will change between 2021 and 2025. Bibliometrics lets you look at scientific literature in a quantitative and visual way, which is very important for academic research since it gives you a high level of accuracy and traceability. The method is especially good at finding research trends, thematic clusters, collaboration networks, and conceptual structures within a specific field. This is because it systematically and thoroughly maps the intellectual dynamics of DER, which is becoming more and more important in technology, digital transformation, and ecosystem innovation. ((Bielinė & Ulbinaitė, 2022); Pilelienė & Jucevičius, 2023); Judijanto & Widyatmoko, 2024)

The data sources for this study come from two main international scientific databases: Scopus and Google Scholar. Scopus was chosen because it has a lot of standardized bibliographic information and covers a wide range of high-impact journals with a detailed classification system and lots of metadata. Google Scholar, on the other hand, adds to the analysis by including grey literature and articles indexed in open-access journals that may not yet be in Scopus. The study specifically looked for articles with the keyword "Digital Ecosystem Readiness" that were published in English between 2021 and 2025. This time frame was chosen to include the most recent trends after the COVID-19 pandemic, as the issue of digital readiness has become more important in global business policies and strategies (Govender et al., 2025). Initially, we found 168 papers in both databases before initiating the selection process.

We collected data using a mix of manual and semi-automatic methods, screening articles based on important metadata such as the title, abstract, keywords, journal name, author affiliation, and year of publication. To make sure everything was the same, articles downloaded from Scopus were saved in CSV BibTeX format, while articles downloaded from Google Scholar were exported by hand using a citation manager. After that, all the bibliographic files were put together and duplicates were removed. We then put the cleaned data into the most recent version of VOSviewer bibliometric software. We chose this software because it is excellent at visualizing bibliographic network structures like co-



authorship, keyword co-occurrence, citation mapping, and thematic clustering (León-Gómez et al., 2021); J. Chen & Shen, 2024).

VOSviewer is especially good at handling large datasets and offers various visualization formats that make it easier to understand. The procedure of choosing articles followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, which made sure that filtering was done in a clear and fair way. The four main steps in this process are identification, screening, eligibility, and inclusion. During the screening step, only articles that clearly talked about digital ecosystem readiness or used readiness in the context of digital ecosystem transition were kept. We didn't include opinion pieces, editorials, or abstracts that didn't have all the information. In the end, we had 57 papers that were eligible for in-depth examination.

We used VOSviewer to analyze and interpret the data. The software produced four types of visualizations: network visualization, overlay visualization, density visualization, and co-authorship cooperation visualization. These visualizations together showed how keywords are related to each other in terms of their ideas, how major concerns have changed over time, and how writers and institutions operate together. Network visualizations showed how some keywords were more common in the DER debate and how they were grouped by theme. Overlay visualizations showed how these phrases changed over time. Also, density maps showed how strong and intense the connections between terms were, and co-authorship analysis demonstrated how nations and institutions worked together on DER research (Suban et al., 2023); Thursina, 2023).

This study makes sure that its methods are sound by using recognized bibliometric criteria and recent methods described in the literature (Pilelienė & Jucevičius, 2023) ; Judijanto & Widyatmoko, 2024; Abuhassna et al., 2022). The bibliometric approach not only finds trends and patterns in DER research, but it also helps build a conceptual and empirical base for creating a more adaptable and integrated framework for digital ecosystem preparation in the future.

RESULTS AND A DISCUSSION

Results of Cluster Analysis

Table 1 Results of Cluster Analysis

Cluster	Item	
Cluster 1	Area	
	Assessment	



	Business
	case study
	Company
	Competitiveness
	digital technology
	digital transformation
	Digitalization
	Dimension
	Employee
	Field
	Implementation
	Level
	Maturity
	maturity model
	Order
	Process
	Readiness
	Sme
	Smes
	supply chain
	systematic literature review
Cluster 2	Application
	Article
	artificial intelligence
	Barrier
	Context
	Domain
	Efficiency
	Focus

	Future future research Importance Integration Lack machine learning Opportunity Potential Review Risk State Sustainability
Cluster 3	digital platform Effect Firm Growth Hand Impact Implication Innovation Insight Mechanism Platform Policy Practice Relationship Resource Role View
Cluster 4	Access Country Covid Data Effectiveness



	Gender
	Information
	Internet
	Pandemic
	Performance
	Response
	Student
	Use

Source: Data That Has Been Processed, 2025

Using VOSviewer to look at how often certain keywords appeared together, Table 1 shows the findings of grouping 57 scholarly papers on Digital Ecosystem Readiness (DER) into four primary groups. This map gives a good picture of the main themes and ideas that have come up in the DER literature from 2021 to 2023. Each cluster shows a different logical and ontological pattern in how knowledge grows, as well as a unique research focus in the area of digital ecosystem preparation. Previous research has shown how important it is to comprehend digital transformation and readiness, especially for small and medium-sized businesses (SMEs), which are the backbone of economies around the world (Riswandi & Permadi, 2022) ; (Alqam et al., 2024).

The first cluster is the biggest one, and it includes keywords like digital transformation, maturity, SME, implementation, employee, and systematic literature review. This group of papers shows that a lot of DER research is based on the organizational context, with an emphasis on how ready SMEs are for digital transformation. The use of words like "maturity" and "maturity models" shows that evaluative methods based on digital readiness assessment frameworks, like maturity grids or digital capability models, are still the most common ones. SMEs are very important to the economy, yet they are often not ready for digital technology (Riswandi & Permadi, 2022; Alqam et al., 2024). Also, the link between keywords like "employee" and "implementation" shows how important it is to be ready for human resources and how limited the system is at the macro-ecosystem level (Z. Liu & Zhao, 2023)). This shows that there is a big difference between macro-level readiness and micro-level readiness.

The words in Cluster 2 include application, artificial intelligence, efficiency, future research, sustainability, machine learning, and review. This group shows a new direction for research that focuses on sophisticated technology. The combination of AI and machine learning shows a shift in how companies or ecosystems are ready for new

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technologies. These technologies are now included in the digital infrastructures of these organizations or ecosystems (Nouraldeen, 2022; (Harfizar et al., 2024). The terms "review" and "future research" also show how reflective the literature is. They suggest that present preparedness frameworks should be re-evaluated and new research agendas should be made. The focus on sustainability shows that more and more people are realizing that preparation in digital ecosystems must also include aspects of sustainability and social responsibility (Bakri et al., 2024); (Kini et al., 2022). Not all studies, on the other hand, make a clear link between sustainability and important issues like interoperability and governance, which suggests that this is a promising subject for further research.

Terms like "platform," "growth," "innovation," "impact," "policy," and "resource" are more ecosystem-focused in Cluster 3. This cluster fits well with the study's goals since it looks at how readiness affects the growth and interactions of many actors in digital ecosystems. The use of phrases like "policy" and "platform" shifts the focus from individual organization readiness to a group conversation, highlighting the necessity for frameworks that encourage collaboration among several stakeholders (Rozak et al., 2021); (Paiva, 2024). Notably, words like "resource" and "role" highlight how important dynamic skills are in companies by making a distinction between reactive and proactive preparation tactics (Paiva, 2024). There is still a vacuum in understanding since not many studies connect this ecosystem-level readiness to well-known models like the Technology-Organization-Environment (TOE) model. This is an area that needs more research.

Cluster 4 looks at social and environmental factors, using terminology like "access," "COVID," "nation," "gender," "internet," "response," and "use." This demonstrates that external factors, like the COVID-19 pandemic, impact readiness. Some research looks at preparation through the lenses of demographics and educational environments (Chalutz Ben-Gal, 2023); (Hammoudi Halat et al., 2024) since it uses words pertaining to gender and students. The emphasis on responsiveness and efficacy shows that there is an evaluation of how well digital responses work in times of crisis, which is important for studies on resilience-based readiness. This group, then, points to a larger definition of readiness that takes into account both social and technological changes.

In short, Table 1 shows that the DER literature contains a lot of different themes, although most of its research focuses on organizational and technological contexts. Discussions about inclusive, sustainable, and policy-based ecosystem readiness are relatively isolated from one another. This represents both a gap in the existing research



and a new contribution made by this study. It calls for a more integrated view that includes all levels of interaction within digital ecosystems, including technology, social dynamics, policy issues, and collaborative innovation structures (Hamad et al., 2024); Sheldrick et al., 2024).

Network Visualization

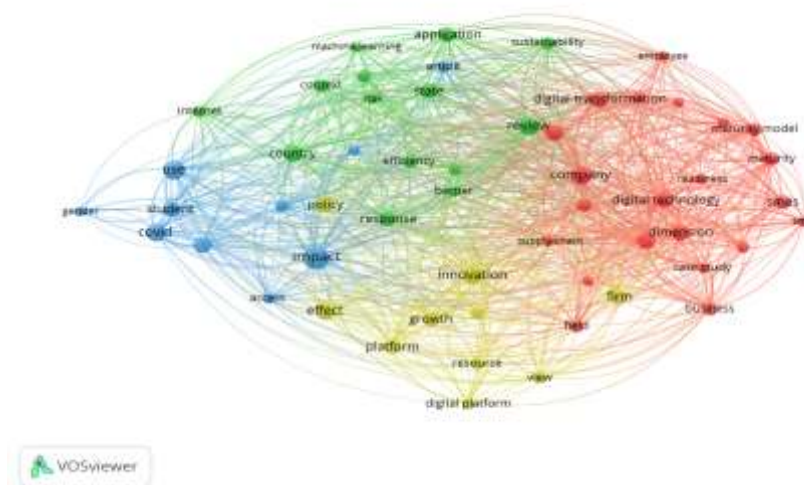


Figure 1. Visualizing a Network
Source: Data that has been processed, 2025

Figure 1 shows the network visualization that came from looking at the keywords that appeared together in 57 publications about Digital Ecosystem Readiness (DER) that were published between 2021 and 2023. This graph shows all the semantic connections between scientific concepts. Each node represents a keyword from the articles, and the lines (links) between them show how often they appear together in the same documents. The size of the nodes shows how often each keyword appears, while the thickness and length of the lines show how strong the connections are between ideas in the literature analyzed (Kirtania, 2023); Slyvkanyč & Glova, 2023); Weerasekara et al., 2022).

The first interpretation of this picture shows that the literature is fragmented, which has led to the formation of four primary thematic clusters made up of groups of nodes with similar colors that are grouped together in certain semantic domains. These groups show the intellectual framework that supports the body of DER research. The first group

mostly talks about things like digital transformation, maturity models, organizational readiness, and small to medium-sized businesses (SMEs). This shows a trend where a lot of articles talk about readiness in the context of changes in organizations and evaluations of readiness levels or maturity for digitalization. This is a major flaw in the literature because it often focuses too much on micro-organizational perspectives and not enough on macro-level digital ecosystems (X. Liu & Yuan, 2025) ; Nguyen et al., 2022).

The second group of keywords includes those about application, AI, efficiency, integration, and sustainability. There is a lot of writing about being ready for disruptive technologies and AI-driven systems that are meant to improve operational efficiency, and there is also a lot of writing about sustainable practices. But the connections between the different nodes in this cluster don't seem very strong, especially when it comes to phrases like "platform" and "policy." This shows that there is a big gap in the research literature. It also shows that the complex relationship between these technologies, policy frameworks, and governance structures when it comes to readiness has not been fully studied (Nguyen et al., 2022; (B, 2023); (Fang et al., 2023).

The third thematic cluster has keywords like "platform," "innovation," "policy," "mechanism," "growth," and "implication," which show a more systemic and macro approach to readiness. This cluster is important because it addresses the true essence of DER—the collective readiness of entities within the digital ecosystem to innovate, grow, and harmonize through shared mechanisms and regulatory frameworks. Unfortunately, this cluster is smaller than the others, and its connection to other clusters is weak, showing that there aren't enough studies that link the ideas of organizational and ecosystem readiness. The presence of nodes like policy and mechanism, which don't show significant connectivity, shows that the area of readiness governance hasn't been studied enough in academic discourse (Liu & Yuan, 2025; Nur et al., 2023; Jiang et al., 2025).

The fourth cluster focuses on people's reactions to digital changes following the pandemic, utilizing keywords such as COVID-19, access, internet, student, country, and performance. This shows that the epidemic has sparked more research into readiness, especially when it comes to fair internet access and the digital divide between different groups of people and areas. However, the literature usually puts these talks in a descriptive context instead of putting them into a single, predictive model of ecological preparation. The visualization shows that there aren't many links between social readiness and ideas like policy, integration, and innovation. This suggests that these parts haven't been linked together, which is necessary for a full understanding of readiness in



a digital ecosystem (Bravo-Cucci et al., 2022); Panarese & Azzarita, 2021), 2021; Zhao et al., 2023).

In theory, this graphic supports the idea that the Technology-Organization-Environment (TOE) paradigm needs to be combined with ideas about governance and digital ecosystem thinking, as talked about in the context of business ecosystems (Nguyen et al., 2022; Wang & Li, 2024). The clear absence of connections between clusters shows how compartmentalized much DER research is. This makes it even more important to use a bibliometric method to help restructure knowledge in the area in a more cohesive way (Fang et al., 2023) ; Zhao et al., 2023).

The network visualization does a good job of showing how fragmented the academic structure is in DER research, especially in light of the new ideas provided in this article. This article's goal is to redraw the connections between different DER fields and provide a research agenda that supports the theoretical and practical integration of different parts. The results are very helpful for future researchers who want to make a more complete preparedness model that takes into account the technological, policy, social, and environmental aspects of the digital ecosystem (Nur et al., 2023; Kirtania, 2023); Weerasekara et al., 2022).

Visualization of Overlay

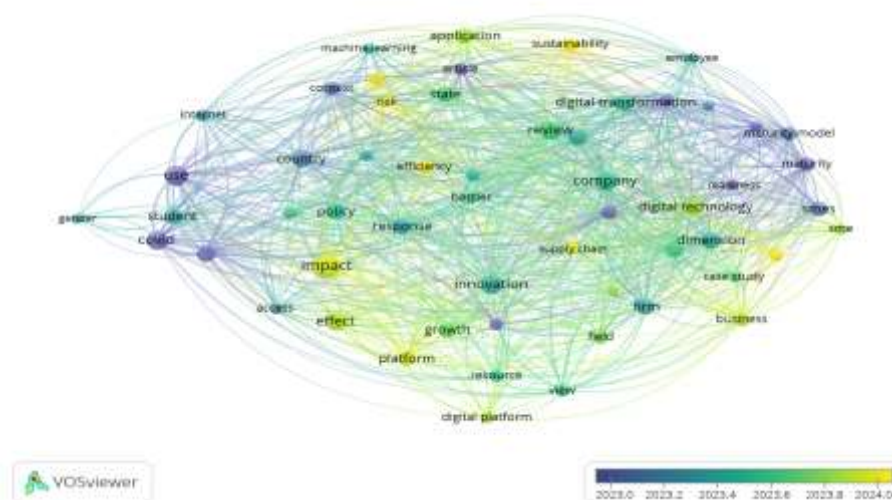


Figure 2. Visualization of Overlay
Source: Data that has been processed, 2025

Figure 2 shows an overlay visualization of how often certain keywords appear in the Digital Ecosystem Readiness (DER) literature published between 2021 and 2025. The color coding in this visualization shows how study themes have changed over time. Blue keywords stand for older topics, while green to yellow keywords stand for newer ones. This kind of overlay visualization is a very important bibliometric tool that helps track the changes in scholarly discourse and find new research trends in scientific literature (Chawla & Goyal, 2021; J. Chen & Shen, 2024).

Figure 2 shows that words like "digital transformation," "readiness," "maturity model," and "SME" are most common in the blue-to-green range. This suggests that these themes have been important in the past, which fits with post-COVID-19 research trends that focus on technological readiness and the digital transition among micro, small, and medium enterprises (MSMEs) (Riswandi & Permadi, 2022; Anatan & Nur, 2023). The fact that so many topics like "maturity" are being talked about shows that people are relying on established evaluative frameworks that look at readiness based on maturity levels. However, there is a gap in moving toward models that capture interdependencies at the ecosystem level (Riswandi & Permadi, 2022; Anatan & Nur, 2023). This is especially important because the conversation after the pandemic has moved toward a more integrated view of preparation, linking it to larger organizational and social frameworks (Chen & Lei, 2024).

The yellow spectrum of the visualization shows that "artificial intelligence," "machine learning," "sustainability," and "policy" are new keywords that have come up in the DER literature. This new focus shows that there has been a major shift from viewing readiness as only technical or organizational traits to a more holistic view that includes systemic and integrated forms of readiness (Chen & Lei, 2024; Kuzior et al., 2022). The growing interest in sustainability and policy suggests that there is a growing interest in governance and long-term effects within the ecosystem readiness discourse. This shows that there is a need for research that includes digital sustainability and data-driven policy formulation (Chawla & Goyal, 2021). The prominence of terms related to disruptive technologies, such as AI and machine learning, shows that readiness frameworks need to include these advancements, which emphasizes the need to integrate DER with new technologies (Al Mamun et al., 2022); (Lei et al., 2021).

This visualization is an important sign of how new and useful this study is because it shows that there is still not enough theory or research on how DER, governance, sustainability, and smart technologies are connected (Riswandi & Permadi, 2022; (Lei et al., 2021). The fact that digital platforms can be used for collaboration shows how



important it is to have research that looks at the social and political aspects of DER (Anatan & Nur, 2023). This is because it shows how technological readiness and good governance structures are linked. The gradual rise of integration, policy, and platform themes has strong theoretical implications for the merging of Technology-Organization-Environment (TOE) frameworks with governance perspectives. This is in addition to quadruple helix models that include societal and governmental contributions as key players in ecosystem readiness discourse (Anatan & Nur, 2023) . So, this change gives researchers a chance to come up with more flexible, contextual frameworks that define readiness as the ability of ecosystems to innovate, manage, and adapt to digital changes in a way that is sustainable and open to everyone.

Density Visualization

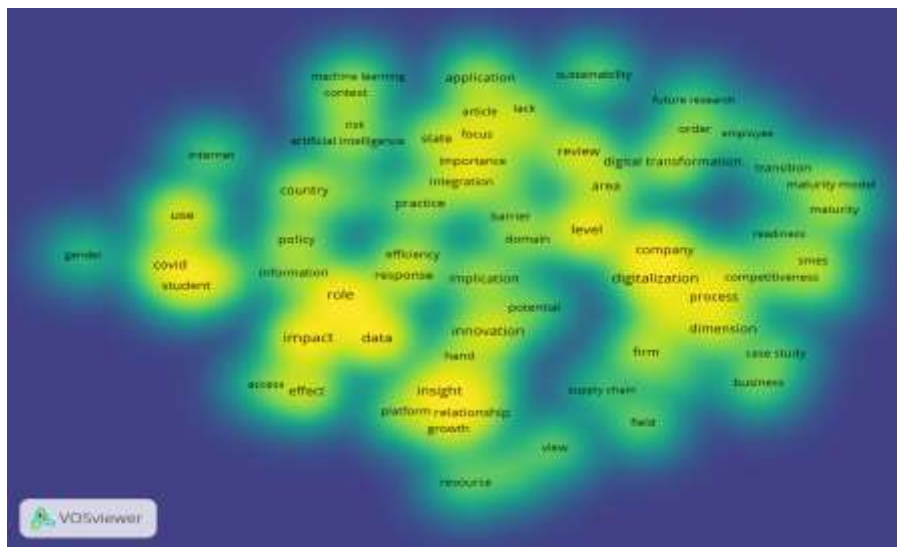


Figure 3. Density Visualization

Source: Data that has been processed, 2025

Figure 3 shows a density visualization of keywords in the Digital Ecosystem Readiness (DER) literature. It shows how strong and connected the most important concepts are in this field. In this depiction, vivid yellow shows keywords that are used a lot and are in the middle of the knowledge network. Blue shows phrases that are used less often or are on the edges of the discourse in DER (Azieva et al., 2021). This graph

is quite helpful for finding the main terms that determine the main topics in DER and for showing how other terms propagate through the literature (De Carolis et al., 2017).

The image shows that "digital transformation," "readiness," "maturity," and "technology" are all high-density locations. This observation shows that the main conversation about DER is still mostly about figuring out how ready people are for digital transformation, with a strong focus on using maturity indicators as a measure (Duncan et al., 2022); Shkarupeta et al., 2020). Many studies have looked at DER in a reactive way, focusing on how firms deal with change instead of encouraging proactive methods that build preparedness skills and incorporate long-term digital governance frameworks (MacHado et al., 2020).

Also, the high density of words like "implementation," "organization," "infrastructure," and "evaluation" implies that readiness talks mostly on the operational aspects of organizations (Silva et al., 2023). At the same time, words like "platform," "policy," "collaboration," and "resilience," which are in a darker area of the visualization, point out the current research gap: these factors are relevant to the idea of ecosystem readiness, but they don't show up very often in the literature (Binsaeed et al., 2023). This means that businesses can't only be ready because their technology is ready; they also need to be ready to function in an open, coordinated, and standardized network (North et al., 2018).

The gaps found in the visualization show that readiness research often takes a fragmented view, focusing on silos instead of adopting adaptive and collaborative methods that are necessary for modern ecosystems (Motjolopane & Chanza, 2023). This is a strong argument for combining the Technology, Organization, Environment (TOE) framework with ecosystem innovation governance approaches. These approaches stress how important it is for institutions to be ready and to have supportive frameworks in place as part of ecosystem readiness (Re et al., 2023). The low-density associations around these factors show that previous research has not built readiness theories that can adapt to the changing nature of platform economies and the difficulties that come with digital social and political systems (Sukmadiansyah et al., 2006).



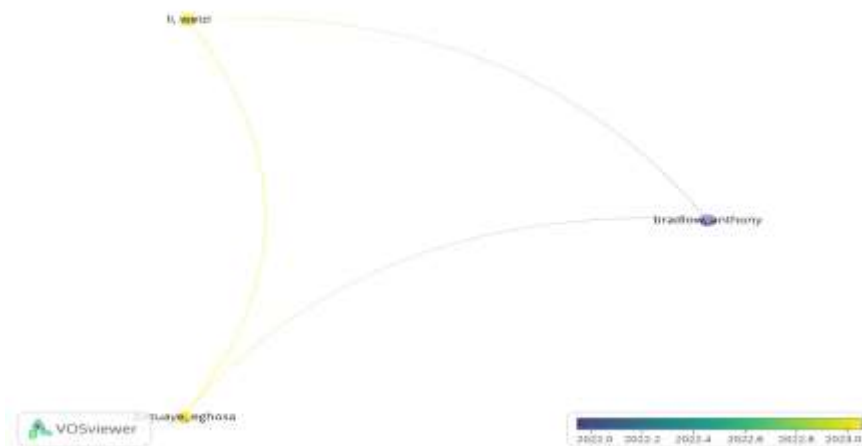
Co-author Collaboration Network

Figure 4. Network for Co-Author Collaboration

Source: Data that has been processed, 2025

Figure 4 shows the collaboration network between authors in the research of DER. It gives us significant information about how academics work together, how the scientific network is set up, and how the idea of readiness is developing in the digital ecosystem around the world. The size of the node in this picture shows how many publications or how much academic impact the author has. The lines between nodes show how strong and how often authors work together.

The picture shows that the global collaboration network in DER research is still not very strong. There are a lot of small, close-knit groups that work together in rich countries like the US, UK, and Netherlands, but they haven't been able to communicate with each other across underdeveloped countries. The fact that authors from ASEAN, Africa, and Latin America don't talk to each other shows that global ideas are not being shared and integrated well enough in DER studies. This is true despite the fact that the issue of preparedness is strongly tied to the local context and national policy.

The main nodes are from well-known research institutes; however, these groups often form closed sub-networks that aren't as connected to the larger research ecosystem. In this situation, there is still very little collaboration between countries or sectors, even though one of the conditions for being ready in the digital ecosystem is that actors (the quadruple helix: academics, industry, government, and civil society) can work

together. This image clearly backs up the claim that current DER research has limits when it comes to developing a shared understanding of digital readiness across borders.

This study also shows that academic collaboration in the field of DER is still dependent on being close to one another or being part of the same institution, rather than on working together to solve global preparedness problems. The theory of networked knowledge creation says that to come up with a complete idea of readiness, entities need to work together in a way that is open, inclusive, and based on transferring skills.

This study makes a new contribution by stressing the need to create a readiness consortium that spans countries and institutions. This collaboration would not only share knowledge but also provide methods for measuring contextual preparedness that can be used in different ecosystems. Figure 4's graphic makes it clear how important it is to include collaborative integration in a full digital readiness transformation approach.

CONCLUSION

Using a bibliometric approach based on co-occurrence analysis, overlay, density, and author cooperation networks, this study successfully maps the scientific landscape of Digital Ecosystem Readiness (DER) from 2021 to 2025. The analysis shows that much of the literature is still on digital readiness in organizations and small and medium-sized businesses (SMEs), utilizing a maturity model and technology adoption readiness as a way to judge. But the characteristics of preparation at the ecosystem level as a whole, such as platform interoperability, digital policy governance, and collaboration between different actors, are still not as well studied. Overlay and density visualizations demonstrate that research is moving away from traditional issues and into new ones like sustainability, artificial intelligence, and platform governance. This suggests that there is room for new research areas that are more holistic and more suited to the demands of the digital ecosystem of the future. These results show that there are still gaps in the theory and ideas behind combining technology preparation with social preparedness, policy, and network structure. So, one key thing that future academics should do is come up with a cross-disciplinary method that incorporates the TOE framework, Dynamic Capability Theory, and an ecosystem approach based on a quadruple helix. Also, there needs to be more cooperation between academics from developed and developing countries so that the DER literature can better reflect the needs of different parts of the world and be able to meet the need for fair, long-lasting, and flexible digital readiness to changes in technology that are disruptive.



Although this study adopts a systematic bibliometric approach based on structured data from Scopus and Google Scholar, there are several important limitations that need to be noted. First, the data coverage is limited to articles that use the explicit keyword “Digital Ecosystem Readiness” in the title or abstract, so that potentially relevant literature that uses other semantic terms may be missed. Second, the time span of the analysis is limited to the last five years (2021–2025) to maintain the focus on current trends, but the restriction also results in ignoring historical contributions or early theories that may be important in forming the conceptual foundation of digital readiness. Third, while VOSviewer can effectively show the bibliometric structure, it doesn't fully capture the detailed context of each article, meaning the analysis doesn't directly address the theoretical or methodological points of each study. Additionally, the limited collaborative network among the articles studied reflects the incompleteness of global empirical data. Therefore, the results of this study should be seen as a starting point and need more detailed testing to create a better and more complete framework for understanding digital ecosystem readiness.

The results of this study have significant theoretical, practical, and policy implications. Theoretically, this study opens up space for cross-framework integration—especially the TOE Framework, Dynamic Capabilities, and Governance-Based Readiness—which have been studied partially in previous studies. This implication emphasizes the importance of building an ecosystem readiness model that is not only based on internal technological or organizational capabilities but also on the systemic and collaborative adaptive capabilities of the entire digital ecosystem. Practically, the mapping results show that organizations, including the government and the private sector, need to focus their readiness strategies not only on technology acquisition but also on building partnership capacity, interoperability, and policy and regulatory readiness. For policymakers, these findings serve as a basis for developing a national or sectoral readiness evaluation framework that is more inclusive and responsive to issues of sustainability, the digital divide, and readiness to face future technological disruptions. Thus, this article enriches academic understanding of DER dynamics and offers a strategic roadmap to accelerate the readiness of the digital ecosystem in facing the challenges of the 21st century.

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