JOURNAL OF GOVERNANCE AND DEVELOPMENT
https://e-journal.uum.edu.my/index.php/jgd

How to cite this article:
Huda, M. N., Nurmandi, A., & Saefudin. (2025). A bibliometric analysis of research on digital maturity: Research streams, influential works and future research paths. *Journal of Governance and Development, 21*(1), 40-53. https://doi.org/10.32890/jgd2025.21.1.3

A BIBLIOMETRIC ANALYSIS OF RESEARCH ON DIGITAL MATURITY: RESEARCH STREAMS, INFLUENTIAL WORKS AND FUTURE RESEARCH PATHS

[1*]Muh Nurul Huda, [2]Achmad Nurmandi & [3]Saefudin
[1]Doctoral Program of Government Affairs and Administration,
Jusuf Kalla School of Government,
Universitas Muhammadiyah Yogyakarta, Indonesia
[2,3]Bachelor Program of Digital Business,
Universitas Muhammadiyah Karanganyar, Indonesia

[1]Corresponding author: muhammad.nurul.psc22@mail.umy.ac.id

Received: 4/1/2025 Revised: 11/1/2025 Accepted: 22/1/2025 Published: 31/1/2025

ABSTRACT

This research aims to analyze bibliometrics regarding digital maturity. Digital maturity is the level of an organization's ability to utilize digital technology effectively to achieve its strategic goals. The method used in this research is qualitative research with a literature study approach. The data found was obtained and analyzed in as many as 579 documents. This research also uses VOSviewer to map and analyze data. The results of the analysis show that global trends show a significant increase in the number of publications from 2014 to 2023, reflecting increasing interest and focus in digital maturity research. China is the country that contributes the most research publications. Meanwhile, 2023 will be the highest publication year. Peng, G. is the most prolific author with 4 documents. Research trends show increasing focus throughout the decade. The increasing emphasis on digital maturity reflects a paradigm shift in understanding and dealing with the challenges and opportunities faced by society in this digital era.

Keywords: Digital maturity, model maturity, digital technology.

INTRODUCTION

The digital era has presented new challenges and opportunities for organizations. Organizations that want to survive and thrive in this era need to increase their digital maturity. Rapid changes in competition, demand, technology and regulations make it more critical than ever for organizations to respond and adapt to their environment (Teichert, 2019). Technological developments and digitalization have become essential elements of modern life. As a consequence, the transformation led by these developments has seen tremendous changes in organizations (Aslanova & Kulichkina, 2020). Organizations that want to remain relevant and competitive in this era need to have a high level of digital maturity (Haryanti et al., 2023). The role of attitudes and organizational culture is very influential in shaping attitudes towards technology by supporting an atmosphere of innovation and enthusiasm for continuing to develop knowledge (Cristobal-Fransi et al., 2023). Connection and collaboration through digital platforms are also an essential factor in digital maturity, indicating the ability to connect with resources and other colleagues efficiently in a digital context (Alimam et al., 2023).

The growth of advances in modern science and technology is characterized by a significant impact on various sectors of life, including education, business and government (Gashkova & Morozova, 2023). This phenomenon is known as the digital revolution, which involves fundamental changes in obtaining, storing and sharing information (Kahmann et al., 2023). This is the impact of the digitalization process in the business world, and the transformation is comparable to that which emerged in the first Industrial Revolution (Astuti et al., 2021). Digitalization cannot be avoided due to the rapid development of technology. Today, every individual, business world, and government have become part of the new digital era (Eremina et al., 2019). The digitalization process has accelerated the development of all industries by making them connected, fast and controlled while providing easy access to the necessary data and information (Tutak & Brodny, 2022).

This study identifies several topics considered to have been promoted to see how digital maturity is; however, the study's results have not been able to answer the concept of digital maturity firmly. Therefore, this study initiates a systematic review to analyze digital maturity from several recent studies. This study is based on the knowledge gap about digital maturity that is external and not specific to issues such as government, governance, and e-government. Digital maturity refers to an entity having the capability and readiness to utilize digital technology effectively (Park et al., 2023). The importance of the concept of digital maturity lies in the ability of an entity, such as an individual, organization, or society, to effectively integrate and utilize digital technologies (Da Col et al., 2023). Aspects of digital maturity include digital literacy and technology skills (Cha et al., 2023). Assessment of understanding and practical ability to use information critically in digital environments (Tönnißen et al., 2023), as an integral part of technological infrastructure, it involves aspects of accessibility to hardware, software and internet connectivity (de Castro et al., 2023). Skills in innovation and the adoption of new technology are also crucial elements (Trask & Linderoth, 2023). Along with the ability to integrate technology into business processes and daily activities (Lamptey et al., 2023). In addition, a deep understanding of digital maturity is critical to responding to change and maximizing the potential digital technology offers.

An organization's digital maturity is how it has integrated and implemented digital technologies into its operations, strategies, and overall business models. Beyond mere technology adoption, it encompasses the evolution of organizational culture, leadership, processes, and personnel to utilize digital tools effectively. Comprehension and assessment of digital maturity are becoming increasingly important as businesses are under increasing pressure to adjust to technological advancements such as cloud

computing, big data, and artificial intelligence (Bonnet & Westerman, 2020; Westerman et al., 2011; Westerman, 2016). Westerman (2016) has emphasized the importance of aligning digital transformation initiatives with organizational objectives in order to improve performance and establish competitive advantage. According to Kane et al. (2015), organizations that exhibit a high level of digital maturity are more innovative, agile, and capable of making data-driven decisions that enhance their operational efficiency.

One critical component of digital maturity is the creation of digital maturity models that offer organizations a framework for evaluating their current digital capabilities and pinpointing areas for improvement. In addition to digital leadership, digital strategy, technology infrastructure, and workforce capabilities, these models frequently incorporate these dimensions. Westerman (2016) has developed the Digital Maturity Model, which identifies stages of digital maturity. These stages range from beginners with limited digital engagement to leaders who have thoroughly integrated digital technologies into their primary operations. According to Kane et al. (2015), these models are advantageous instruments for organizations that intend to chart their digital trajectory and prioritize investments in areas such as technology adoption and employee training.

Human factors are a critical component of digital maturity that cannot be exaggerated. The actual movers of digital maturity are the individuals within an organization, even though technologies are essential for digital transformation. Effective leadership is necessary for cultivating an environment that encourages continuous learning and innovation. In addition, organizations that have a digitally mature workforce are more likely to achieve superior performance outcomes and employee engagement (Aral & Weill, 2007). To guarantee that technology adoption is consistent with organizational culture and long-term success it is essential to invest in digital skills, leadership development, and change management. The foundation for attaining digital maturity and realizing its maximum potential is the interplay between human capabilities and technological infrastructure in this context (Erevelles et al., 2016)

Many studies have been conducted regarding digital maturity. Research conducted by (Tutak & Brodny, 2022) discusses the Digital Maturity of Business in Europe and the Implications for Open Innovation. Digital transformation of production and service companies has become a general development direction in all economic sectors. The idea of Industry 4.0 has become synonymous with innovation and has become the basis for business development. The role and importance of this transformation are also recognized by the E.U., which has been promoting and supporting the development of an innovative digital economy for many years. Research from (Eremina et al., 2019) discusses digital maturity and company performance: The Case of the Baltic Countries. While there is a positive relationship between some financial indicators (e.g. sales growth), it is still too early to see a positive impact of digital maturity on company stock performance. Then, research from Teichert (2019) discusses digital transformation maturity: A systematic literature review. Revealing that most existing models provide an incomplete picture of digital maturity, while the cultural attributes reflecting digital culture are incompletely systematically integrated, and digital maturity models specific to service domains are clearly underrepresented.

Based on previous research that has been carried out. Research focuses more on identifying research developments, the contribution of particular authors or groups of researchers and comparisons between emerging research topics. This not only provides a broad overview of the current situation but also highlights knowledge gaps that may need to be filled in future research. By using bibliometric analysis, this research will produce practical recommendations and guidelines for viewing digital maturity trends.

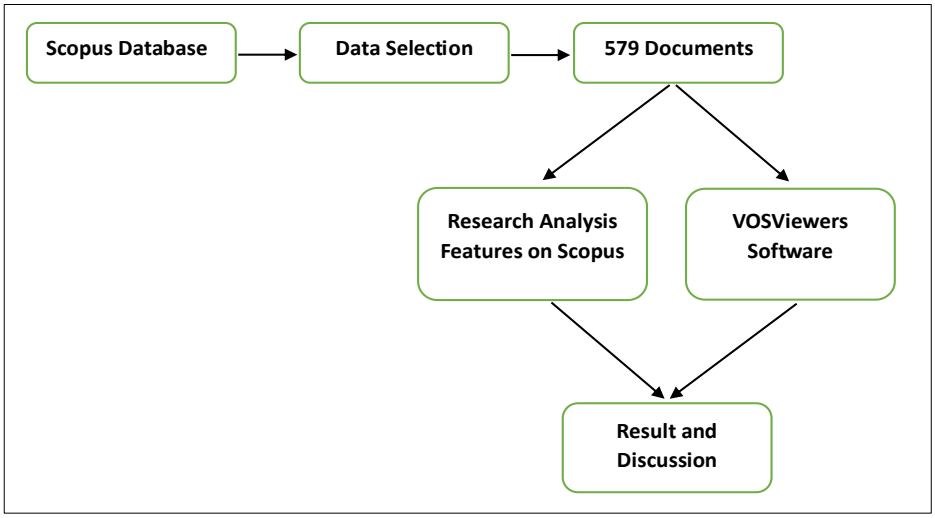
This approach allows us to detail significant research trends, identify key concepts that dominate, and describe the network of collaboration between authors, institutions, and countries in the related literature. Therefore, this research aims to analyze bibliometrics and digital maturity.

METHODOLOGY

This research is a type of qualitative research with a literature study approach. Qualitative research methods with library study techniques are data collection techniques that are based on finding written data such as notes, books, papers or articles, journals, and other format (Subekti, 2022). In bibliometric studies, data can be obtained from primary, secondary or tertiary journals covering a period and analyzed from various angles to determine whether the data displayed are documents by country or region, documents by type and documents by year (Subekti et al., 2022). This research uses the Scopus search engine to identify research related to Digital Maturity from 2014 to 2023. There were 579 research publications related to Digital Maturity from 2014 to 2023. The Scopus database has become a significant study source for evaluating scientific research. As one of the largest data centres in the world, Scopus can index scientific literature to provide accurate information about the metadata of each scientific article, including data publication, abstracts, references, and other information (Herawati et al., 2022). Figure 1 shows the stages in data collection and analysis of data processing obtained in the Scopus database.

Figure 1

Research Stages



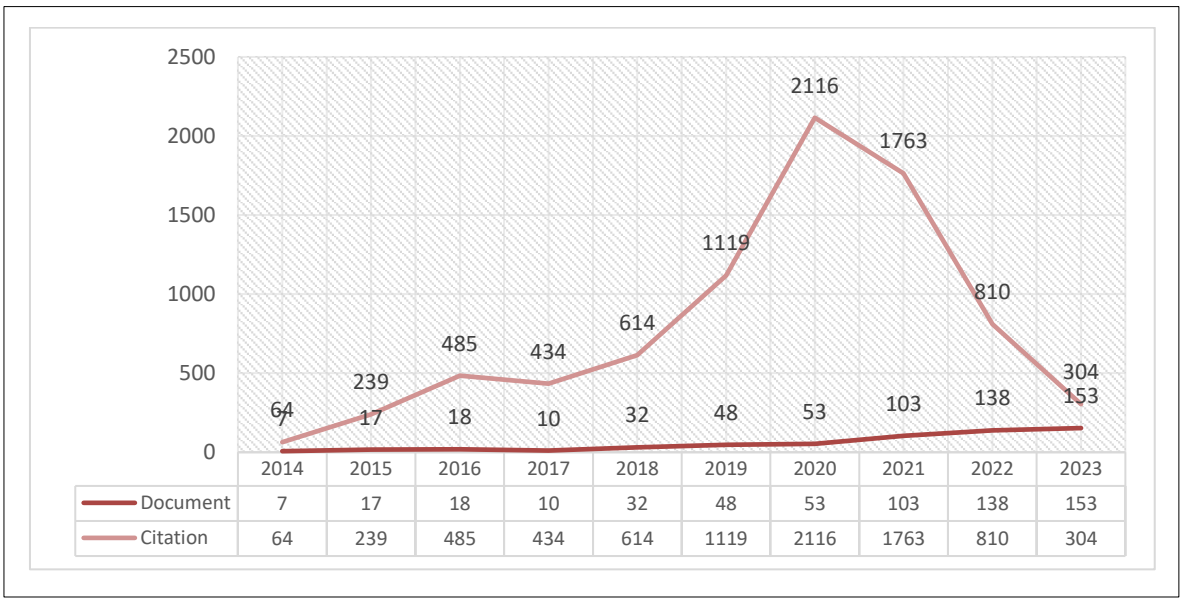
This study also uses VOSviewer to map scientific research publications with Digital Maturity. This study uses VOSviewer for publication visualization analysis in co-occurrence analysis. VOSviewer pays special attention to the graphical representation of bibliometric maps. VOSviewer is a software tool for building and visualizing bibliometric networks (Soesanto & Handalani, 2023). The VOSviewer functionality is useful for displaying large bibliometric maps in a way that is easy to interpret (Soesanto & Handalani, 2023). This research sends research map information using export data to RIS export file format, which is then processed using VOSviewer to determine the extensive data that will be analyzed to obtain comparative data results for this research with previous research.

RESULTS AND DISCUSSION

The results of the analysis of 579 scientific publications from the Scopus database produced diverse and varied data. Scientific publications related to Digital Maturity from 2014 to 2023 have diverse points of view. The study analyzes and classifies data starting from the year of the document, identifying interesting trends and patterns. Not only that, but this analysis also identifies the countries that contribute the most scientific publications, the journal sources that are most frequently used, the most productive authors and the institutions that are active in this research. These diverse data provide rich insights into the dynamics of research in this domain, which can help us understand how research develops and how various related aspects interact to influence future research directions.

Figure 2

Global Trends in Publications on Digital Maturity from 2014 to 2023 and Average Article Citations per Year



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Document	7	17	18	10	32	48	53	103	138	153
Citation	64	239	485	434	614	1119	2116	1763	810	304

The image above shows research publications with the theme of digital maturity from 2014 to 2023. The number of documents has generally increased significantly over time. In 2014, we can see that Scopus successfully indexed seven published documents; later in 2015, 17 documents were published. Furthermore, in 2016, 18 documents were published, which marks a good start for understanding this topic. However, in the following year, namely 2017, we recorded a slight decline, with only 10 documents published. However, since then, the number of documents has consistently increased. 2018 saw a marked jump to 32 documents, while 2019 saw a further increase to 48 documents. This positive trend continued in 2020, with 53 documents recorded, then continued in 2021, with 103 documents, and then in 2022, there were 138 documents. The significant increase continues until 2023 when the number of documents reaches its peak at 153 documents. These positive trends reflect an increasing interest and focus in digital maturity research, marking its increasingly important role from an academic and scientific perspective. This drastic increase may also reflect a response to technological developments or important issues motivating further research in this area.

The statement can also be observed from the picture above that the journal documents with high citations were those published in 2020, with a total of 2116 citations. Then, it was in second place with

1763 citations in 2021, and in 2019, with 1119 citations, it was in third place. The finding shows that the last ten years of documents with the most citations are from 2019 to 2021. This overall picture shows the complex evolution of demand and research focus in the field of interest over the observed 10-year period.

Figure 3

Countries with the Most Contributions in the Field of Digital Maturity

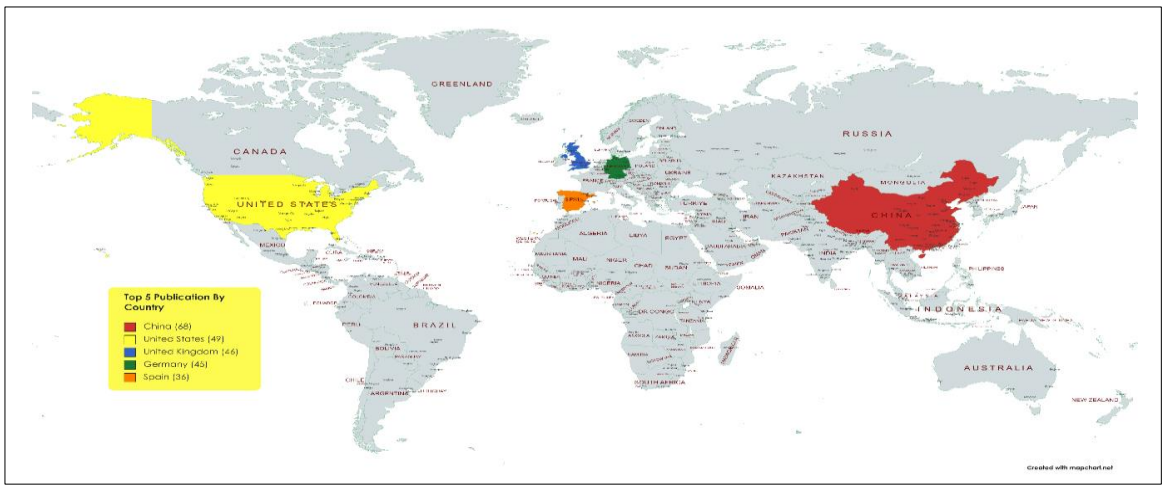


Figure 3, China is the country that contributed the most scientific research publications indexed by Scopus with the Digital Maturity theme from 2014 to 2023. The data shows that China is ahead by printing 68 documents, making it the undisputed leader in this contribution. In second place, the United States also made a significant contribution with 49 papers. Behind it, United Kingdom took an active part, contributing 46 documents, showing their important role in developing knowledge in this area. Apart from that, Germany also played a role by contributing 45 papers. No less important, Spain also contributed by donating 36 scientific research documents throughout the period 2014 to 2023, adding to the diversity of knowledge sources in the Digital Maturity theme.

Figure 4

Most Contributing Authors in Digital Maturity

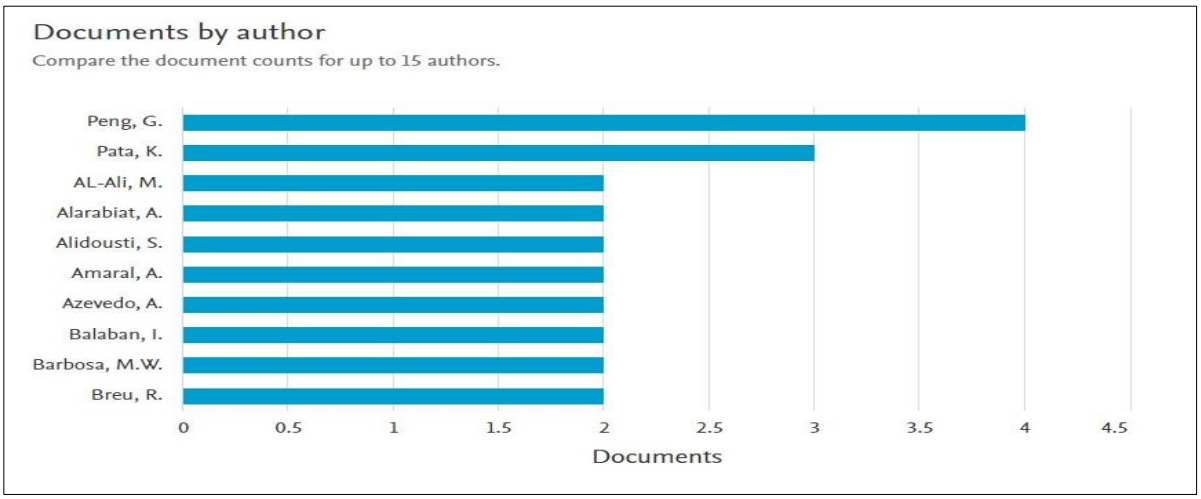
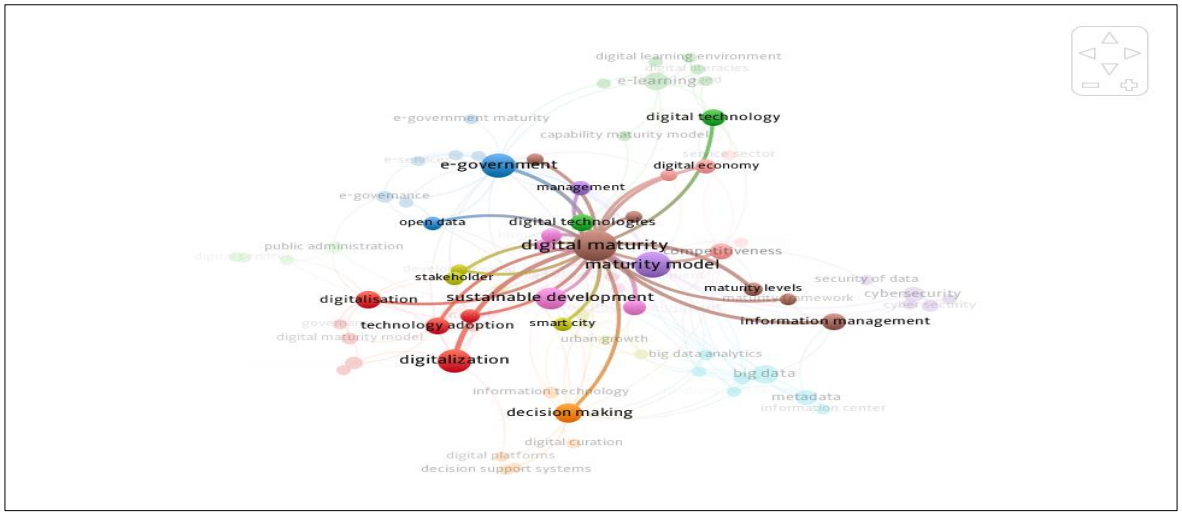


Figure 4, clearly reveals the extraordinary dominance of the authors Peng, G. in scientific research on Digital Maturity from 2014 to 2023 indexed by Scopus. During this period, Peng and G. have succeeded in contributing 4 significant documents in this field. This achievement reflects the critical role and consistent contribution of (Peng et al., 2022) in shaping and enriching our understanding of digital maturity. Apart from that, Pata, K. also showed a significant impact by contributing 3 documents during the same period.

Furthermore, several other researchers have also been involved in this domain. Al-Ali, M., Alarabiat, A. and Alidousti, S. have each contributed 2 scientific research documents related to Digital Maturity. This shows that a number of researchers have succeeded in making substantial contributions to developing insight and understanding regarding digital maturity.

Figure 5

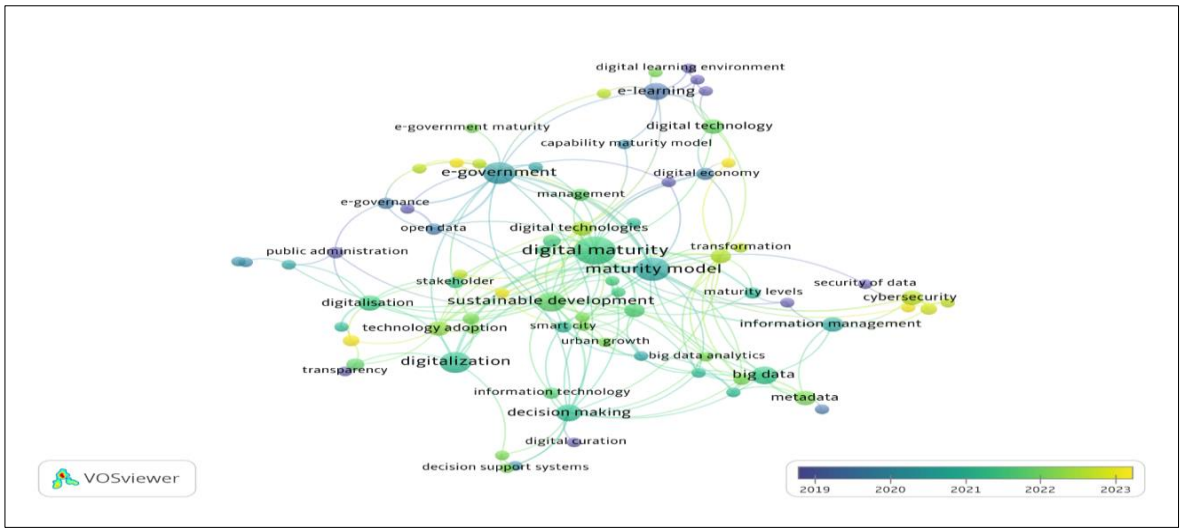
Network Mapping Based on Keywords



Labels on images indicate keywords or terms that frequently appear, while colours indicate clusters. Clustering is used to obtain insight or an overview of bibliometric groupings, while image mapping is used to get a comprehensive overview of a bibliometric network (Subekti et al., 2022). Each circle represents a frequently occurring keyword or term. The size of the circle indicates the number of publications associated with that term in the document title. The larger the circle size, the greater the number of documents relevant to that keyword or term (Prastya et al., 2021). Figure 5 shows that the large node size or keyword is Digital Maturity. Digital maturity is the subject of in-depth discussion and attention in the context of digital maturity research. Apart from that, other keywords that are relevant to digital maturity are maturity model, e-government, sustainable development, digital technologies, etc. The different colours of the connecting lines in the image above indicate the existence of cluster relationships on the Digital Maturity theme.

Figure 6

Portrait of the development of studies on Digital Maturity (2014-2023)



The data in Figure 6 shows that from 2019 to 2023, research on digital maturity experienced a significant increase in discussions and research. There are several main focuses in this research, including maturity models, e-government, sustainable development, digitalization and cybersecurity, reflecting the complexity and relevance of the digital maturity concept amidst the ongoing digital transformation. Increased awareness of the importance of a deep understanding of digital maturity levels is driving researchers to develop frameworks that can help organizations measure and improve their maturity. In addition, the spotlight on aspects such as maturity models, e-government, sustainable development, digitalization and cybersecurity shows that digital maturity research increasingly involves a holistic perspective that includes environmental, social, security and digital transformation impacts.

Figure 7

Digital maturity overlay visualization (2014-2023)

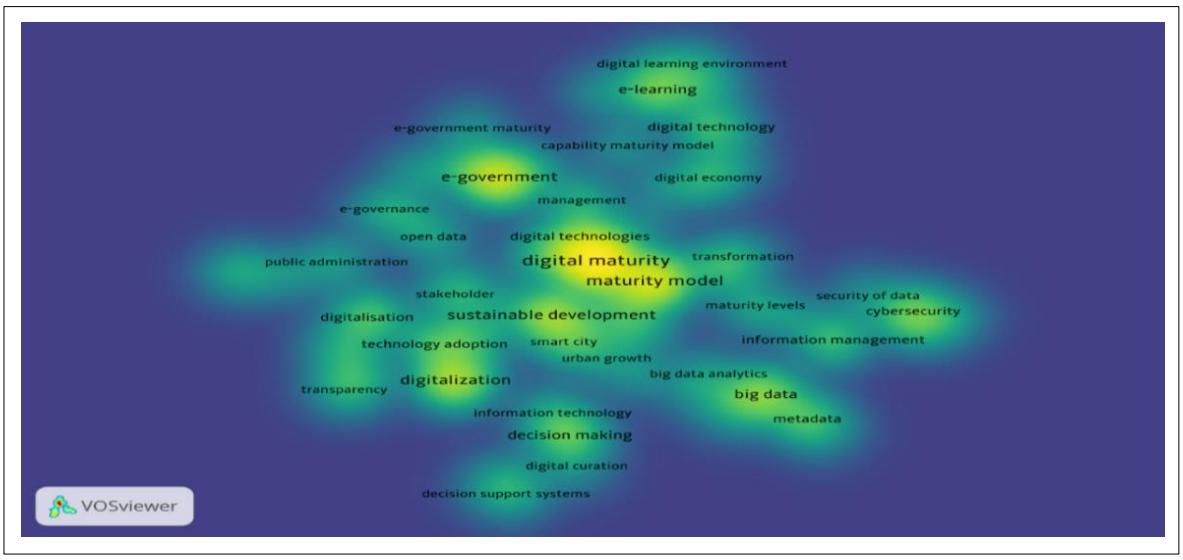


Figure 7 is the result of the VOSviewer analysis using the density visualization feature. Density analysis in VOSviewer is one way to present topics that are often discussed and still have the opportunity to be addressed further in research on the theme of digital maturity. In other words, density is used to search for and find novelty for further research related to the theme of digital maturity. In the concept of using density in VOSviewers, it can be seen that the yellow colour indicates the topics that are most frequently discussed, while the green colour represents topics that have not been widely researched, which can then be a finding for further research. Figure 7 shows that the issues coloured yellow are digital maturity, maturity model, e-government, sustainable development, smart city, digitalization and cybersecurity, indicating that these topics have become the main focus in digital maturity research.

The high yellow colour indicates that these topics have received considerable attention in the scientific literature. On the other hand, the green colour covers public administration, maturity levels and capability maturity models. The green colour indicates that these topics have not been explored much in digital maturity research. In other words, they are areas that are still open to further study. This creates opportunities for researchers to investigate these dimensions and bring new contributions to the understanding of digital maturity. It is essential to continue to expand research and knowledge in these underexplored areas, as this can provide more comprehensive insight into readiness and maturity in adopting digital technologies. Thus, further research in these areas could help fill knowledge gaps and make a valuable contribution to advancing understanding of digital maturity in relevant contexts.

Digital maturity is an essential indicator in evaluating the extent to which an organization or entity has successfully integrated digital technology into its operations, as well as the extent to which they are ready to face the challenges and opportunities associated with digital transformation (Issa et al., 2018). Therefore, research on digital maturity in recent years has become abundant. This is because the rapid development of digital technology has encouraged increased interest in understanding maturity readiness in adopting technology. Digital technologies have a significant transformational impact on a variety of sectors, including government, business, health, transportation and the environment. This has stimulated interest in understanding the extent to which these entities are ready to adopt digital technology. Therefore, this research is needed to explain this extraordinary research trend both from the publication findings, which increase every year, and the contribution of countries and authors related to the theme of digital maturity. Furthermore, narrative mapping and finding topics that have the opportunity to be studied further are also the reasons for the importance of this research. This is necessary as an effort to find a common thread related to the theme of digital maturity.

Other relevant studies supporting the findings of this research were also conducted by (Aljowder et al., 2023), which reveals the connection between digital maturity and smart cities. In the context of the article, a maturity model is used to evaluate the extent to which a city has progressed in implementing the clever city concept. Maturity models for assessing innovative city initiatives can be used to identify various focus areas that are important for smart city success, such as ICT infrastructure, digital transformation, environmental management, transportation systems, etc. After that, the model provides a framework for assessing the city's maturity level in each of these focus areas by establishing certain levels of maturity or achievements that must be achieved in each of these areas. By using this maturity model, city governments and other stakeholders can conduct a comprehensive evaluation of a city's progress in implementing smart city initiatives. As such, this maturity model can be a valuable tool in directing investment and resources to the areas that need the most attention, thereby allowing cities to continue to progress towards more excellent smart city status. In the research conducted (Glebova et al., 2023). It reveals the importance of digital transformation for regional development and provides valuable insights for policymakers, stakeholders, and the scientific community involved in evaluating

the effectiveness of developing the region's digital potential and promoting digital transformation. Research from Awdziej et al. (2023) explains that it is essential for all stakeholders, including governments, educational institutions, non-profit organizations, and the private sector, to promote digital maturity. Digital maturity refers to an individual or organization's ability to understand, adopt, and effectively utilize digital technologies. The promotion of digital maturity plays a key role in ensuring that society can seize the opportunities offered by digital technologies and overcome the challenges that arise in the digital transformation process.

The digital maturity theory refers to Eichholz et al. (2023), often measured using a maturity model, which assesses the current state of an organization and provides a roadmap for improvement. By understanding where the organization is on the maturity scale, organizational leaders can identify areas for improvement and develop a roadmap to reach higher levels of maturity. This enables organizations to face environmental changes more effectively and increase their competitiveness in facing the complex challenges of the digital era (Thordsen et al., 2020). Digital maturity can impact processes by enabling the use of more sophisticated methods, automation, and greater data processing. Thus, digital maturity is not only about having digital technology but also about the ability to use that technology effectively in improving operational processes and decision-making. Therefore, this research explains that it is interesting to see publication trends every year that the digital maturity research theme is relatively high. In fact, 2023 is the year with the highest publications in the last 10 years. Our finding shows that digital maturity has become an interesting topic for researchers and academics; it can be caused by the rapid development of digital technology and its broad impact on aspects of life and organizations. Apart from that, awareness of the importance of digital maturity in facing challenges and exploiting opportunities in the digital era has also contributed to increased interest in this topic. Although, of course, the phenomena or points of view will differ depending on the country and the focus of the discussion.

In the period 2014 to 2023, Scopus publications on the topic of digital maturity experienced an increasing trend, as seen in Figure 2. Thus, this period covers a period where digital technology is increasingly permeating various aspects of life and business, encouraging increased awareness of the importance of digital maturity in facing challenges and taking advantage of opportunities in the digital era. Thus, the relationship between this period and digital maturity is a reflection of the shift towards more mature and effective adoption of digital technology in various contexts, as well as an increased focus on developing concepts, practices and understanding related to digital maturity to optimize the potential of digital technology in achieving individual goals organizations and society at large.

The countries around the world also contributed to scientific publications on the theme of digital maturity from 2014 to 2023, which were indexed by Scopus. This study found that countries make relatively high contributions to digital maturity. China is one of the countries that contributes the most to scientific research publications indexed by Scopus with the Digital Maturity theme. This is confirmed by research from (Han et al., 2022) titled "Study on the digital transformation capability of cost consultation enterprises based on maturity model", which explains that the digital maturity model (DMM) can help companies evaluate their digital maturity level scientifically, identify their weaknesses, and then formulate further improvement strategies. Most of the existing relevant studies focus on the Internet industry, new retail industry, and manufacturing industry.

Peng et al. (2022) are authors who contributed the most to research publications on the theme of digital maturity. This is because he is an expert researcher interested in the field of digital maturity. One of his studies was published in 2018 with the title "Crosswalks among stewardship maturity assessment

approaches promoting trustworthy FaIR data and repositories". Explains how to measure data ownership maturity, highlight gaps in their practices, and improve sustainability. This study also shows the importance of having data that is discoverable, accessible, interact with other data, and can be easily reused (Peng et al., 2022).

Moreover, the visualization of a network based on keywords uses co-occurrence analysis to identify research directions and popular themes, which has been proven to help track the progress of research and science programs (Gao et al., 2017). This research displays 11 clusters with different colours. The colours indicate groups, while image labels indicate keywords or terms that appear frequently. Clustering is used to gain insight or a comprehensive picture of a bibliometric network (Liu et al., 2019). Thus, this research found that scientific research publications on the theme of digital maturity from 2014 to 2024 indexed by Scopus have a strong relationship with the Maturity model, e-government, sustainable development, smart city, digitalization and cybersecurity.

See Figure 7; the density visualization is used to visualize the level of density or the number of problems being studied in a domain or field of study. This density visualization can provide a clearer picture of the research focus, trends, and interconnections between these topics or concepts. The more nodes that are yellow, the more research has been done on the problem. On the other hand, the more green or knot, the less research has been done on the topic. Therefore, this research also explains that issues such as public administration, maturity levels and capability maturity models still have an excellent opportunity to become material for future research related to the theme of digital maturity because of their strong relevance to digital transformation. In an era where digital technology continues to change the way organizations and institutions operate, further research into how this technology influences public administration practices and the level of readiness and ability of organizations to adopt digital technology is essential.

Additionally, these concepts continue to experience development and innovation, allowing future research to explore how they adapt to the ever-changing development of digital technology. Better evaluation, identification of key factors that influence maturity levels, and strategies to increase an organization's digital maturity also remain relevant research focuses. The significant implications for organizational effectiveness and efficiency in adopting digital technology also make these topics intriguing subjects for further study in the future.

This research explains that digital maturity plays a vital role in facing the rapid and extensive changes brought by digital technology in various aspects of life and organizations. By understanding the level of readiness and maturity in adopting and utilizing digital technology, researchers can help organizations, institutions, and society face challenges and take advantage of opportunities that arise in this digital era more effectively. This includes developing models, strategies, and practices that can increase digital maturity and have a positive impact on progress and transformation in various fields. Thus, research on digital maturity in the context of public administration, maturity levels and capability maturity is not only relevant but also essential to study significantly in future research. This research study is recommended as an effort to understand and deal with ongoing changes in an increasingly digitalized environment.

CONCLUSION

Digital maturity research in the last ten years has been very dynamic and developing, with 579 scientific publications from 2014 to 2023 on digital maturity proving significant growth in interest and research on this topic. The positive trend in the number of publications reflects a good response to technological developments in the digital era. China leads as the most significant contributor, with 68 documents discussing various aspects of digital maturity. Meanwhile, authors such as Peng, G. Pata K. and others provide consistent contributions. Visual mapping shows that issues such as digital maturity, maturity models, e-government, sustainable development, digitalization, and cybersecurity are the focus of digital maturity research. However, there are still several topics, such as public administration, maturity levels and capability maturity models, that are open to discussion. Further study and research trends show increasing focus throughout the decade. The increasing emphasis on digital maturity reflects a paradigm shift in understanding and dealing with the challenges and opportunities faced by society in this digital era. This research provides rich insights into the direction and development of digital maturity research and shows the potential for further exploration of the various dimensions of this topic. These findings can help guide future research and contribute to our understanding of digital maturity.

Even though this research succeeded in explaining the development map of research on "Digital Maturity", this research has limitations in the source of data taken namely the data analyzed was only taken from the Scopus database and did not use data sourced from the Web of Science. Thus, further research development needs to be studied in more depth using Web of Science or compared with data from the Scopus database, supported by other Vosviewer software compositions that were not used in this research. (Teichert, 2019)

ACKNOWLEDGEMENT

We thank the Department of the Doctoral Program of Government Studies Universitas Muhammadiyah Yogyakarta for assisting with this research article.

REFERENCES

Alimam, H., Mazzuto, G., Tozzi, N., Ciarapica, F. E., & Bevilacqua, M. (2023). The resurrection of digital triplet: A cognitive pillar of human-machine integration at the dawn of industry 5.0. *Journal of King Saud University-Computer and Information Sciences*, 101846.

Aljowder, T., Ali, M., & Kurnia, S. (2023). Development of a maturity model for assessing smart cities: A focus area maturity model. *Smart Cities*, *6*(4), 2150–2175. https://doi.org/10.3390/smartcities6040099

Aral, S., & Weill, P. (2007). IT assets, organizational capabilities, and firm performance: How resource allocations and organizational differences explain performance variation. *Organization Science*, *18*(5), 763–780.

Aslanova, I. V., & Kulichkina, A. I. (2020). Digital maturity: Definition and model. *2nd International Scientific and Practical Conference "Modern Management Trends and the Digital Economy: From Regional Development to Global Economic Growth" (MTDE 2020) Digital*, *138*(Mtde), 443–449. https://doi.org/10.2991/aebmr.k.200502.073

Astuti, M., Arifin, Z., Mutohhari, F., & Nurtanto, M. (2021). Competency of digital technology: The maturity levels of teachers and students in vocational education in Indonesia. *Journal of Education Technology*, *5*(2), 254–262. https://doi.org/10.23887/jet.v5i3.35108

Awdziej, M., Jaciow, M., Lipowski, M., Tkaczyk, J., & Wolny, R. (2023). Students digital maturity

and its implications for sustainable behavior. *Sustainability (Switzerland)*, *15*(9), 7269. https://doi.org/10.3390/su15097269

Bonnet, D., & Westerman, G. (2020). The new elements of digital transformation. *MIT Sloan Management Review*, *62*(2), 82-89.

Cha, C.-W., Lee, J., Jun, S., Kang, K., & Chang, T.-W. (2023). A maturity model for diagnosing the capabilities of smart factory solution suppliers and its pilot application. *Systems*, *11*(12), 569.

Cristobal-Fransi, E., Daries, N., Cardona, J. R., & Del Río-Rama, M. de la C. (2023). Challenges of digitization in the social economy in times of pandemic: The evolution of online presence and e-commerce in agri-food cooperatives. *Agricultural and Food Economics*, *11*(1), 49.

Da Col, A., Bentivoglio, F., Garcia, P., & Stutz, B. (2023). Modelling a latent heat thermal storage demonstrator and identification of the model key-parameters. *Journal of Energy Storage*, *73*, 109239.

De Castro, A. P., Guedes, C. C. F., Vesely, F. F., da Silveira, D. M., & Neves, L. F. (2023). Provenance, diagenesis and reservoir quality of sandstone facies of the Maracangalha Formation, Recôncavo Basin–Northeastern Brazil. *Marine and Petroleum Geology*, *158*, 106548.

Eichholz, J., Knauer, T., & Winkelmann, S. (2023). Digital maturity of forecasting and its impact in times of crisis. *Schmalenbach Journal of Business Research*, *75*(4), 443–481.

Eremina, Y., Lace, N., & Bistrova, J. (2019). Digital maturity and corporate performance: The case of the Baltic states. *Journal of Open Innovation: Technology, Market, and Complexity*, *5*(3), 54. https://doi.org/10.3390/joitmc5030054

Erevelles, S., Fukawa, N., & Swayne, L. (2016). Big Data consumer analytics and the transformation of marketing. *Journal of Business Research*, *69*(2), 897–904.

Gao, Y., Wang, Y., Zhai, X., He, Y., Chen, R., Zhou, J., Li, M., & Wang, Q. (2017). Publication trends of research on diabetes mellitus and T cells (1997–2016): A 20-year bibliometric study. *PLoS ONE*, *12*(9), 1–13. https://doi.org/10.1371/journal.pone.0184869

Gashkova, L. V, & Morozova, O. Y. (2023). Assessment of digitalization level of support service under sustained development. *AIP Conference Proceedings*, *2624*(1), 040017.

Glebova, I., Berman, S., Khafizova, L., Biktimirova, A., & Alhasov, Z. (2023). Digital divide of regions: Possible growth points for their digital maturity. *International Journal of Sustainable Development and Planning*, *18*(5), 1457–1465. https://doi.org/10.18280/ijsdp.180516

Han, X., Zhang, M., Hu, Y., & Huang, Y. (2022). Study on the digital transformation capability of cost consultation enterprises based on maturity model. *Sustainability (Switzerland)*, *14*(16), 1–18. https://doi.org/10.3390/su141610038

Haryanti, T., Rakhmawati, N. A., & Subriadi, A. P. (2023). The extended digital maturity model. *Big Data and Cognitive Computing*, *7*(1), 1–24. https://doi.org/10.3390/bdcc7010017

Herawati, P., Utami, S. B., & Karlina, N. (2022). Analisis bibliometrik: Perkembangan penelitian dan publikasi mengenai koordinasi program menggunakan Vosviewer. *Jurnal Pustaka Budaya*, *9*(1), 1–8. https://doi.org/10.31849/pb.v9i1.8599

Issa, A., Hatiboglu, B., Bildstein, A., & Bauernhansl, T. (2018). Industrie 4.0 roadmap: Framework for digital transformation based on the concepts of capability maturity and alignment. *Procedia CIRP*, *72*(1), 973–978. https://doi.org/10.1016/j.procir.2018.03.151

Kahmann, F., Honecker, F., Dreyer, J., Fischer, M., & Tönjes, R. (2023). Performance comparison of directed acyclic graph-based distributed ledgers and blockchain platforms. *Computers*, *12*(12), 257.

Kane, G. C., Palmer, D., Phillips, A. N., & Kiron, D. (2015). Is your business ready for a digital future? *MIT Sloan Management Review*, *56*(4), 37.

Lamptey, F. P., Teye, E., Abano, E. E., & Amuah, C. L. Y. (2023). Application of handheld NIR spectrometer for simultaneous identification and quantification of quality parameters in intact mango fruits. *Smart Agricultural Technology*, *6*(1), 100357.

Liu, S., Wang, X., Collins, C., Dou, W., Ouyang, F., El-Assady, M., Jiang, L., & Keim, D. A. (2019). Bridging text visualization and mining: A task-driven survey. *IEEE Transactions on Visualization and Computer Graphics*, *25*(7), 2482–2504. https://doi.org/10.1109/ TVCG. 2018.2834341

Park, S., Hong, Y., Park, S., Kim, W., Gwon, Y., Jang, K.-J., & Kim, J. (2023). Designing highly aligned cultured meat with nanopatterns-assisted bio-printed fat scaffolds. *Journal of*

Biosystems Engineering, *48*(4), 503–511.

Peng, G., Gross, W. S., & Edmunds, R. (2022). Crosswalks among stewardship maturity assessment approaches promoting trustworthy FAIR data and repositories. *Scientific Data*, *9*(1), 1–11. https://doi.org/10.1038/s41597-022-01683-x

Prastya, D. E., Misran, & Nurmandi, A. (2021). A bibliometric analysis of E-Democracy on government research. *Jurnal Ilmiah Mimbar Demokrasi*, *20*(2), 71–80.https://doi.org/10.21009/jimd.v20i2.19772

Sallam, S. H. A., Fouad, M. M., & Hemeida, F. (2024). Relationship between agile maturity and digital transformation success. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, *33*(3), 154–168. https://doi.org/10.37934/araset.33.3.154168

Soesanto, H., & Handalani, R. T. (2023). Analisis bibliometrik tentang tren penelitian mengenai manajemen pengetahuan berdasarkan afiliasi penulis dari Indonesia. *Andragogi: Jurnal Diklat Teknis Pendidikan Dan Keagamaan*, *11*(1), 1–10. https://doi.org/10.36052/andragogi.v11i1.304

Subekti, D. (2022). The communication in social media about COVID-19 vaccine: Mapping and bibliometrics analysis. *Jurnal Aristo (Social, Politic, Humaniora)*, *10*(2), 232–252.

Subekti, D., Nurmandi, A., & Mutiarin, D. (2022). Mapping publication trend of political parties campaign in social media: A bibliometric analysis. *Journal of Political Marketing*, *22*(1), 118. https://doi.org/10.1080/15377857.2022.2104424

Teichert, R. (2019). Digital transformation maturity: A systematic review of literature. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *67*(6), 1673–1687. https://doi.org/10.11118/actaun201967061673

Thordsen, T., Murawski, M., & Bick, M. (2020). How to measure digitalization? A critical evaluation of digital maturity models. *IFIP International Federation for Information Processing 2020*, *12066 LNCS*, 358–369. https://doi.org/10.1007/978-3-030-44999-530

Tönnißen, K., Krumm, S., Zielinski, W., & Süptitz, T. (2023). Die digitalisierung im rahmen des paktes für den öffentlichen gesundheitsdienst–ein puzzle mit fünf teilen? [Digitization in the context of the public health service pact – a five-piece puzzle?]. *Public Health Forum*, *31*(4), 353–356.

Trask, C., & Linderoth, H. C. J. (2023). Digital technologies in construction: A systematic mapping review of evidence for improved occupational health and safety. *Journal of Building Engineering*, *80*(1), 108082.

Tutak, M., & Brodny, J. (2022). Business digital maturity in Europe and its implication for open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(1), 27. https://doi.org/10.3390/joitmc8010027

Westerman, G. (2016). Why digital transformation needs a heart. *MIT Sloan Management Review*, *58*(1), 152-155.

Westerman, G., Calméjane, C., Bonnet, D., Ferraris, P., & McAfee, A. (2011). *Digital transformation: A road-map for billion-dollar organizations*. MIT Center for Digital Business and Capgemini Consulting, 1-68.