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Application of Digital Maturity Framework in Improving the Performance of Public Sector Organizations in Indonesia

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Abstract

This study aims to evaluate a mature digital framework for improving the performance of public sector organizations in Indonesia. The method used is qualitative with a bibliometric approach based on data from Scopus (2019–2024), which was analyzed using RStudio and VOSviewer. The study focuses on three main aspects: technology, processes, and human resources. The results showed that the public sector has progressed in adopting digital technologies such as cloud computing and data analytics. However, challenges such as limited system interoperability and low automation are still barriers. From a process perspective, data for decision-making has begun to be implemented, but operational efficiency still needs to be improved. Meanwhile, the digital competence of the apparatus is still limited, so continuous training and capacity building are needed. This study concluded that systematic guidance is needed to assess readiness and design digital strategies to be effective. Technologies like the Internet of Things (IoT), artificial intelligence (AI), and blockchain have great potential to improve performance. Still, their success depends on strong governance, risk management, and system integration. Policy implications include the need for adaptive regulation, strengthening cross-agency coordination, and long-term investment in digital infrastructure and human resource development. However, the bibliometric approach has limitations in exploring the empirical context directly in the field and does not include the dynamics of specific implementation in each institution.

Keywords: *Digital Maturity, Public Sector, Framework*

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INTRODUCTION

Background

Digital transformation has become a key strategy for organizations to survive and thrive in the modern era. It includes digital technology in developing new models and strategies to increase efficiency, accelerate innovation, and create added value in services and businesses (Büyüközkan dan Güler 2020). In the public sector, digital transformation is essential to answer society's increasingly high expectations for efficient, transparent, and responsive services.

Even so, many government agencies in Indonesia are still lagging in integrating digital technology comprehensively. Problems such as sluggish bureaucracy, limited access to services, and low transparency indicate that digital adoption is not optimal. Digital transformation is not only about technology but also includes restructuring organizational processes and culture to strengthen public service performance (Puchiar et al., 2022).

The success of digital transformation depends on the extent to which organizations can manage and align the use of technology with its institutional strategies and structures—in this case, known as the level of digital maturity. Organizations with a high level of digital maturity can better manage change, optimize resources, and ensure technology alignment with strategic goals.

Various frameworks have been developed to assess and improve digital maturity, such as the Digital Capability Framework (DCF), the Deloitte Digital Maturity Model (DMM), and the model from MIT Sloan. This framework generally includes digital strategy, technological infrastructure, administrative processes, and innovation culture (Guarino et al., 2020). However, its application in the public sector, especially in Indonesia, is still very limited and has not been explored in depth.

Previous research has focused more on the private sector, while the relationship between digital maturity and improved public service performance has not been comprehensively studied. In addition, many studies have not explicitly linked how digital maturity directly impacts the performance of public sector organizations, which is the main dependent variable in this study. Therefore, it aims to explore the extent to which public sector organizations in Indonesia have achieved digital maturity, their challenges, and how implementing the digital maturity framework can drive significant improvements in the efficiency, transparency, and quality of public services.

Problem Statement

While accelerating digital transformation, public sector organizations must improve efficiency, transparency, and service quality through technology. However, many agencies face fundamental barriers in accurately measuring and understanding their digital maturity levels. The absence of a clear mapping of the organization's digitalization position causes technology adoption to be partial and not integrated, thus hindering the achievement of operational efficiency and innovation in public services (Haryanti et al., 2023).

Various frameworks, such as the Digital Capability Framework, Deloitte's Digital Maturity Model, and DX-SAMM, have been developed to assess an organization's digital maturity (Algazo et al., 2024). However, its implementation in the Indonesian public sector has not been effective due to a lack of understanding of key indicators, limited competence of Human Resources, and lack of integration of technology in institutional strategies. This research aims to explore digital maturity that is more contextual, adaptive, and applicative to encourage the performance of the public sector that is more responsive, accountable, and oriented to the needs of the community.

Research Objectives

This research aims to analyze and evaluate the level of digital maturity of an organization, as well as identify areas that need development. In addition, this study can examine how a digital maturity framework can contribute to improving organizational performance. This research is expected to significantly contribute to the academic literature and business practice in digital transformation through a data-driven approach and

structured methods. Thus, this structured approach also examines the relationship between an organization's digital maturity level and various performance indicators. It can provide strategic direction for organizations in planning and implementing effective digital transformation to improve operational efficiency, competitiveness, and adaptability to changes in the digital era

LITERATURE REVIEW

This study used a qualitative approach to gain a deep understanding of digital-based public services in public sector organizations in Indonesia. The public sector in Indonesia is a dependent variable in this study. Collaborative efforts from various parties, including the government, non-governmental organizations, and the private sector, are needed to overcome challenges and maximize the potential of digital-based public services in Indonesia. Equitable expansion of technological infrastructure, increasing digital literacy in society, and developing a more user-friendly platform are key steps that need to be taken to provide effective and inclusive public services in this digital era.

However, the main obstacles are significant challenges, such as lack of access to digital technology and low levels of digital literacy among the public. To overcome this issue, cross-sector cooperation between governments, non-governmental organizations, and the private sector is crucial in expanding technological infrastructure, improving digital literacy, and developing more user-friendly platforms. With these steps, it is hoped that digital-based public services can gain better effectiveness, inclusivity, and responsiveness in facing the demands of the Indonesian people in the digital era.

On the other hand, there is great potential for digital-based public services to increase public participation in the decision-making process and monitoring of public services. With a digital platform that facilitates public participation, as expressed by the public, the public can more actively participate in providing input and feedback on government performance.

The government must develop adequate technological infrastructure to support digital public services, including a wide and secure internet network. Furthermore, public sector organizations must design and implement user-friendly digital platforms that provide various services needed by the community, such as online payments, permit applications, and complaints. In addition, training on digital literacy is also important to improve people's ability to use public services online. Cooperation between the government, non-governmental organizations, and the private sector is also needed to create a supportive and sustainable ecosystem in developing digital-based public services.

Digital-based public sector organizations in Indonesia are becoming increasingly important in line with the push towards digital transformation in implementing public services. Information and communication technology development has allowed the adoption of digital solutions that can improve the efficiency and quality of services provided to the community. The Indonesian government has adopted various digital strategies and initiatives in response to these developments.

With these efforts, digital-based public services in public sector organizations in Indonesia can continue to develop and provide greater benefits to the community. This digital transformation creates administrative efficiency and a foundation for improving all citizens' quality of life and services. The following are digital transformations in the public sector and other efforts to improve the performance of the public sector:

Digital Transformation

Digital transformation in the public sector is a multifaceted process integrating advanced technologies to improve service delivery, accountability and operational efficiency. Digital transformation in the public sector is also a fundamental process undertaken by government agencies and public organizations in adopting digital technologies (Nodehi et al., 2022). This transformation is not only about technology adoption but also involves building trust among stakeholders and developing dynamic organizational capabilities. Several key aspects

need to be considered in the process. First, integrating cloud computing, data analytics and automation technologies can streamline operations and improve data management (Ikwuanusi et al., 2024). Second, public sector organizations must develop dynamic capabilities to adapt to environmental changes and effectively manage collaboration (Santos, 2024).

Digital trust is also an important element in this transformation. Trust in public institutions and technologies is necessary to ensure optimal acceptance and use of digital services. Building trust encourages public engagement and improves service delivery (Kożuch & Sienkiewicz-Małyjurek, 2024). However, digital transformation also presents several challenges. Resistance to new technologies and cybersecurity risks are often significant barriers to implementation. Investment in ongoing training and infrastructure development is necessary to ensure the sustainability of digital transformation efforts (Alzarooni et al., 2024). In addition, public sector employees lack knowledge and skills, especially in cities with inadequate infrastructure. (Subramaniam et al., 2024)

To overcome these obstacles, the city government has implemented a strategy focusing on resource allocation and goal setting, emphasizing innovation and external value creation. However, there is a tendency to prioritize short-term activities over long-term strategic planning, which may reduce the overall impact of digital transformation (Dossou et al., 2024). In practice, digital transformation is expected to improve the quality of public services, administrative efficiency and transparency, although the speed and success of its adoption varies across regions. (Carlsson, Matteby, Magnusson, et al., 2023)

Digital transformation in the public sector involves new ways of working with stakeholders, building innovative frameworks for service delivery, and creating more dynamic forms of relationships. This transformation requires fundamental changes in existing operations and strategies to improve efficiency and effectiveness in public service delivery (Carlsson, Matteby, & Magnusson, 2023). While digital transformation offers significant benefits, its success requires careful challenge management. Balancing technology adoption with building stakeholder trust and organizational readiness is key to achieving successful outcomes in the public sector.

Thus, the main goal of this process is to improve the efficiency, effectiveness, transparency, and accessibility of services to the public. The implementation of technologies such as cloud computing, artificial intelligence (AI), data analytics, Internet of Things (IoT), blockchain, and mobile-based applications provide opportunities for governments to deliver better services, improve operational efficiency, and strengthen accountability through transparency in policy and budget management (Samad et al., 2023). In addition, this transformation allows for more data-driven decision-making so that policies can be more targeted.

The Concept of Digital Maturity

Digital maturity concepts are tools used to assess an organization's current level of digital maturity and provide a roadmap for improvement. These models typically include various dimensions and stages, allowing organizations to evaluate their progress and identify areas for development. (Thordsen & Bick, 2023a) . Digital maturity refers to an organization's ability to effectively integrate digital technologies and processes, reflecting its readiness and commitment to digital transformation (de Paula Ferreira et al., 2022).

The concept of digital maturity encompasses various key elements. First, strategy and leadership are important in guiding the digital transformation journey, including setting the vision, aligning digital initiatives with business goals, and creating a culture that embraces change (Stromberg et al., 2020). Second, technology becomes a key foundation by adopting and integrating advanced technologies such as AI, IoT and cloud computing, and ensuring a robust and disruptive technology infrastructure (Kumar et al., 2023). Furthermore, processes need to be digitized and optimized to improve organizational efficiency and agility, including automation of routine tasks and utilization of data analytics for better decision-making (Volf et al., 2024). Understanding these com-

ponents is essential for assessing and improving digital maturity.

Digital maturity is often illustrated through a series of stages. This process starts from "awareness", when organizations begin to realize the importance of digital technologies, followed by "initiation", which includes initial attempts to implement technologies on a small scale. Next, the "integration" stage sees the technology be integrated into key business processes, followed by the "optimization" stage, where digital processes are optimized to increase efficiency and innovation. Finally, the "digital leadership" stage reflects the organization's position as a pioneer in digital transformation in its industry. Digital maturity can be defined as a measure of an organization's digital readiness and the level of integration of digital tools in its operations, as Sobolev (2024) proposed.

Digital maturity is a framework that enables organizations to evaluate the quantitative and qualitative aspects of the digitization process. The Digital Maturity Framework is designed to support organizations in assessing, planning, and managing their digital transformation journey (Eisner et al., 2022). According to Thordsen & Bick's (2023b) systematic structure, this framework allows organizations to evaluate how digital technologies, processes, cultures, and strategies have been adopted and integrated into their business operations and strategies. There are various framework models, such as:

Digital Capability Framework

The Digital Capability Framework is a framework that aims to help organizations identify, develop, and manage their digital capabilities to support the digital transformation process. These digital capabilities include various aspects, such as skills, technology, processes, and culture, enabling organizations to adapt quickly to changes in the digital era. This framework is essential in improving operational efficiency and creating value for customers and stakeholders. (Thordsen et al., 2020) . The Digital Capabilities Framework encompasses a range of models designed to improve digital literacy and skills across different sectors, particularly in education and micro-enterprises. The Framework is important in preparing individuals and organizations with the necessary capabilities to succeed in the digital economy. The following outlines some of the key aspects of the framework.

Deloitte Digital Maturity Model

The Deloitte Digital Maturity Model is a framework designed by Deloitte to help organizations evaluate their level of digital maturity. The model provides structured insights into the extent to which digital technologies have been adopted and integrated into an organization's strategy, operations and culture. By leveraging these, organizations can identify their strengths and weaknesses and find opportunities to improve their digital transformation efforts. (Robert, Ehrensperger., Clemens, Sauerwein., Ruth, Breu. 2021). The Deloitte Digital Maturity Model is a strategic framework for organizations to assess and improve their digital capabilities. It evaluates the organization's digital readiness and provides a roadmap to achieve a higher level of digital maturity. This model is essential for navigating the complexities of digital transformation in various sectors.

MIT Sloan Digital Maturity Framework

The MIT Sloan School of Management designs the MIT Sloan Digital Maturity Framework to help organizations assess their level of digital maturity. The framework focuses on two main dimensions: Digital Capabilities and Leadership Capabilities. With this framework, organizations can gain deep insights into their ability to effectively leverage digital technologies to manage digital transformation, create value, and improve overall business performance. (S., Hosseininasab.2024). This framework highlights the importance of understanding an organization's digital maturity level, which can significantly affect its governance mechanisms and decision-making processes.

Application of Digital Maturity Framework in the Indonesian Public Sector

The Digital Maturity Framework in

Indonesia's public sector drives digital service transformation and improves governance. The framework is designed to guide public institutions in effectively adopting digital technologies to improve operational efficiency, transparency and public satisfaction. In its implementation, the framework emphasizes using cutting-edge technologies to create public value, focusing on optimizing more efficient services and responsive bureaucracy (Pramono et al., 2023). The concept is based on a meta-synthesis of life cycle stages and supporting components, validated through surveys and interviews with practitioners in various Indonesian public institutions. The digital maturity framework in Indonesia's public sector aims to measure and improve organizational readiness in utilizing digital technology to improve public administration performance.

With a focus on technology adoption, optimizing administrative processes, and improving the quality of services to the public, the framework serves as a foundation for evaluating the level of digital readiness of government agencies, identifying challenges faced, assessing achievements made, and making policy adjustments that support sustainable digital transformation. In its application, the digital maturity framework in Indonesia includes several key dimensions (Mylrea & Robinson, 2023). These include technological readiness, which includes digital infrastructure and software capabilities; human resources, which focuses on improving employee competencies in utilizing digital technology, processes and operations; and analyzing the efficiency of technology integration in administration. The quality of digital-based public services, as well as policies and governance, encourage innovation and integrity in the use of technology (Taqafi et al., 2023). The Indonesian government has launched digital transformation initiatives, such as the Electronic-Based Government System (SPBE) and the 100 Smart Cities program, to encourage using information and communication technology (ICT) in public services.

These initiatives aim to create a more integrated and efficient public administration system. (Anas & Cahyawati, 2023) . Various frameworks and models have been applied to assess the readiness and maturity of digital transformation in various sectors. For example, the Digital Governance Assessment Framework (KPTD) is used to evaluate the readiness of land services. At the same time, ICT maturity in healthcare is assessed using a specialized tool designed for middle-income countries. In addition, digital maturity models, such as the SPBE maturity model, help assess the maturity level of ministries, agencies and local governments. These models comprehensively evaluate digital public services from the inputs, processes, and outputs to identify areas that require improvement and guide further transformation efforts. (Yusni & Sigalingging, 2021)

However, significant challenges include cybersecurity issues, data privacy, and better data governance. Recommendations to address these challenges include improving data management, strengthening ICT infrastructure, infrastructure gaps between urban and rural areas, lack of digital competency among employees, resistance to organizational culture change and cybersecurity threats and reducing variations in ICT readiness across regions (Amaral & Peças, 2021). The impact of digital transformation initiatives includes increased efficiency and transparency, aiming to reduce bureaucracy, improve interactions between government and citizens, and increase the efficiency of public services. In addition, digital transformation aims to create higher public value through increased citizen satisfaction, government budget efficiency, and simpler bureaucracy. (Aisyah et al., 2024)

Despite these challenges, Indonesia has succeeded in digitizing public services like e-KTP, online driving licenses, and electronic tax payments. Smart city initiatives in major cities such as Jakarta, Bandung, and Surabaya have improved public services and technology-based governance (Mohammadi et al., 2023). In addition, collaboration between the central government, local governments, and the private sector also contributes to accelerating the digitalization process. A digital maturity framework in Indonesia's public sector has been an important step in modernizing public administration. While there has been progress in efficiency and transparency, continued efforts are needed to

address challenges related to ICT infrastructure, data governance, and regional gaps in digital readiness. With a consistent focus on these areas, Indonesia can achieve a mature, integrated digital government system that provides maximum benefits to society. (Mirza Harwanto & Nizar Hidayanto, 2022)

Further studies identified eight main factors that influence e-government maturity, which are grouped into three categories: technology, organization, and environment (Yeremias et al., 2024). Factors such as digital infrastructure, human resource competencies, and societal well-being play an important role in the success of digital transformation initiatives. However, while much progress has been made, challenges such as data security and limited technological access remain significant barriers (Gusman, 2024). To address this situation, the Indonesian government has launched a training program to improve digital literacy among public sector employees and strengthen their readiness for change.

The digital maturity framework also brings important policy implications, such as strengthening national digital infrastructure for lagging regions, increasing investment in training and developing digital competencies of public sector employees, developing regulations that support innovation and data security, and an inclusive approach that ensures equitable digital access for all levels of society (Vargas et al., 2024). By integrating technology, human resources, and supportive policies, a digital maturity framework provides a great opportunity for Indonesia's public sector to improve efficiency, transparency, and service quality sustainably.

However, this framework is faced with the challenge of different levels of readiness and availability of resources in different regions of Indonesia. This mismatch demands a flexible strategy tailored to the local context to implement digital transformation inclusively and equitably. With a structured yet adaptive approach, the digital maturity framework has great potential to create a more efficient, transparent and citizen-centered government.

METHOD

The method used in this research was a qualitative method with a bibliometric approach to examine further the digital maturity framework in improving the performance of public sector organizations in Indonesia. Bibliometric analysis is a quantitative method to evaluate and visualize research trends, publication patterns, and citation metrics in various fields. This approach uses software tools such as VOSViewer to map the relationship between research topics, authors, and institutions, providing insight into the development and impact of a particular field of study (Delly, M., Habibi, F., & Purnama, I. 2024). This study also used the Scopus database, which allows users to efficiently analyze journal metrics, authors, and affiliations to help researchers identify trends in relevant journals (Mackenzie, Hilton 2024). This data was taken from January 1 2019-December 12, 2024, with the keywords "maturity and framework". Data from Scopus is used to collect and analyze relevant literature comprehensively and systematically

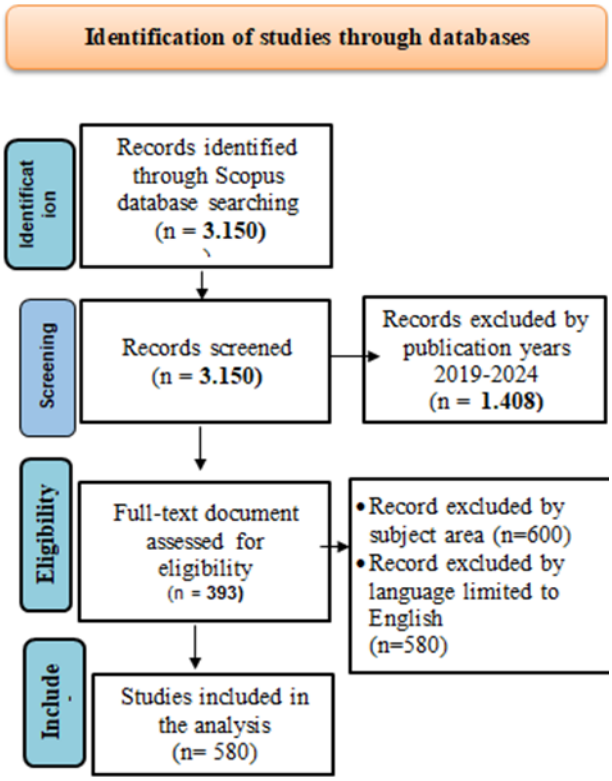

Figure 1. PRISMA diagram

Figure 1 shows that the PRISMA diagram is useful for scientific authors in com-

piling systematic review reports. This process is designed to facilitate data screening and selection. Initially, 3,150 documents were identified, which were then filtered by year of publication from 2019 to 2024, resulting in 1,408 documents. Furthermore, a feasibility assessment was carried out on 393 full-text documents considered relevant initially. However, several documents were filtered again because many did not meet the criteria. Screening is carried out by subject field, resulting in 600 documents. Finally, filtering by language yielded 580 documents. These measures ensure that the selected literature is of high quality and relevant, following the PRISMA guidelines for transparency and reproducibility, thereby enhancing the credibility and reliability of the review.

The resulting datasets were then exported in CSV format and imported into RStudio and Vosviewer applications for visualization and analysis. In this study, RStudio played an important role in the analysis relating to the level of digital maturity of organizations in the public sector and its impact on their performance. It supports large data processing, such as survey data and data cleansing, and enables the application of various statistical methods, including multivariate analysis and SEM (Structural Equation Modeling) models. In addition, RStudio offers effective data visualization facilities, with graphs and charts that make it easy for readers to understand the differences in digital maturity levels between organizations.

On the other hand, VOSviewer serves as an important bibliometric analysis tool for understanding the relevant literature in the context of this study. It enabled the analysis of the relationship between the literature on digital maturity and public sector performance and the creation of bibliometric maps based on keywords such as "digital maturity" and "public sector performance." VOSviewer also contributes to identifying research trends, both globally and locally, as well as revealing patterns of collaboration among authors, institutions or countries in similar research. It all supports efforts to identify research gaps. These tools play an important role in the methodological framework of scientific reviews, allowing researchers to visualize patterns, map bibliometric networks, and synthesize data efficiently. By utilizing RStudio and Vos Viewer, the understanding of the collected literature can be enhanced, allowing for a more in -depth analysis of the data retrieved from Scopus.

However, it is necessary to realize that the bibliometric approach has certain limitations. Although this method can provide a comprehensive overview of trends and research maps in digital maturity, it cannot directly capture the empirical realities in the field, such as implementation challenges, institutional contexts, and social dynamics in public sector organizations. Therefore, the analysis results are descriptive and exploratory, so it is important to complement these findings with future field-based empirical studies to obtain a more contextual and applicable understanding.

RESULTS

This results and discussion section presents an in-depth analysis of the digital maturity framework's application in Indonesia's public sector organizations. This analysis aims to evaluate the extent to which digital transformation has been integrated to improve organizational performance. The assessment focused on three main dimensions, technology, processes, and human resources (HR), key elements in the digital maturity framework. The evaluation results showed that although the public sector has begun to adopt various digital initiatives, the level of digital maturity still varies across dimensions. In the technological dimension, there have been significant advances in digital infrastructure, although there are still challenges related to interoperability and system integration. (Kumar et al., 2023) showed that organizations with mature digital infrastructure could improve administrative efficiency and transparency of public services. However, the study found that the level of automation in Indonesia's public sector is still low compared to global standards, as described in the study (Carlsson et al. 2023), which shows that organizations with high automation can improve performance more significantly.

There are indications of adopting a data-driven approach in processes, but the low

level of automation results in the need to improve operational efficiency. These results confirm the findings of (Stromberg et al. (2020) 's findings, revealing that data analysis in public business processes still faces technical and cultural challenges. Therefore, this study emphasizes the importance of a more structured digital transformation strategy to overcome these obstacles. Meanwhile, in the HR dimension, employee digital competence is still low, with an urgent need for training and capacity building. (Taqafi et al.2023) emphasized that low digital competence can hinder the success of digital transformation in the public sector. Therefore, this study highlights the need for a more systematic training program, in line with the recommendations of (Vargas et al.2024) research on strengthening human resource capabilities in the digital era

Figure 2. Word Cloud, Rstudio

Figure 2. above is a word cloud that displays a variety of important keywords related to the topic "Application of Digital Maturity Framework in Improving the Performance of Public Sector Organizations in Indonesia. " Prominent words, such as "Maturity Model" and "Decision Making," emphasize the primary focus on evaluating the level of digital maturity as well as the importance of data-driven decision-making in organizations. In addition, terms such as "Deep Learning" and "Internet of Things (IoT)" reflect the potential use of advanced technologies to support digital transformation. The word "Sustainability" is also a key factor, highlighting the need for sustainability in digitization. In addition, "Information Management" and "Software Design" demonstrate the strategic role of information management and software development in creating an integrated digital system. Last, "Risk Assessment" underscores the need to manage risks that may arise during this transformation process. Overall, this word cloud reflects the various dimensions that need to be considered in implementing a digital maturity framework to improve the efficiency and performance of public sector organizations.

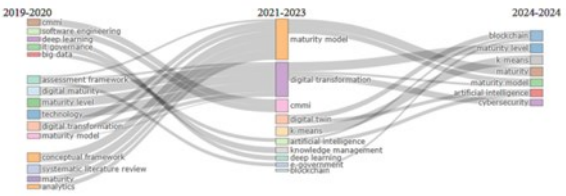

Figure 3. Thematic Evolution, Rstudio

Figure 3 illustrates the thematic evolution in the research, covering the development of the theme from 2019 to 2024 with a focus on "Application of Digital Maturity Framework in Improving the Performance of Public Sector Organizations in Indonesia." In the 2019-2020 period, the main attention was on the foundations of digital transformation, including CMMI, software engineering, and IT governance. " In the 2019-2020 period, the main focus was on the fundamentals of digital transformation, including CMMI, software engineering, and IT governance. This theme revolves around technology management and utilizing advanced technologies such as big data and deep learning. In addition, concepts such as maturity models, digital maturity, and assessment frameworks are highlighted as important in evaluating digital maturity. In contrast, conceptual approaches and literature analysis, such as conceptual frameworks and systematic literature reviews, form the basis of this study.

In 2021-2023, the research focus will shift to applications and further development, with themes such as maturity models and digital transformation remaining at the core. New technologies such as digital twins, artificial intelligence, and blockchain have begun to emerge, along with information management and public services technology through knowledge management and e-government and analytic methods

such as k-means. In 2024, attention increasingly turns to cutting-edge technologies and security issues, such as blockchain, artificial intelligence and cybersecurity, reflecting efforts to protect digital systems in the public sector. Maturity models and maturity levels remain important for assessing digital transformation progress. This figure reflects the journey of digital maturity research moving from concept development to advanced technologies, emphasizing security and efficiency in digital transformation in the public sector.

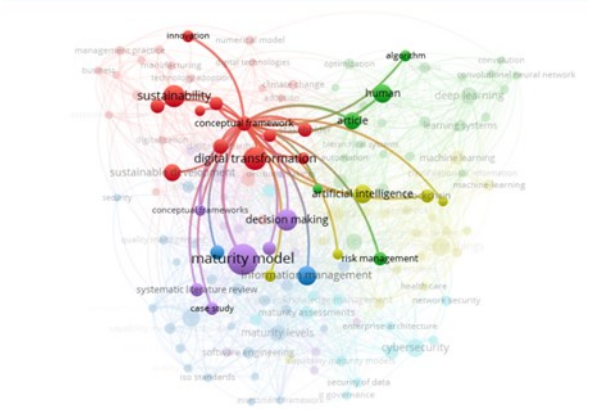

Figure 4. Network Visualization, Vosviewer

Figure 4 is a network visualization generated by VOSviewer, illustrating the relationship between the main keywords in the study titled "Application of Digital Maturity Framework in Improving the Performance of Public Sector Organizations in Indonesia". The color, size, and connectivity between nodes reflect the frequency of occurrence, relevance, and relationships between the various concepts in the topic." The red cluster, which focuses on digital transformation and sustainability, shows that digital transformation includes technology adoption and contributes to organizational sustainability. Keywords such as conceptual framework, sustainable development, and innovation support the idea that integrating innovative approaches is essential in the digital transformation process to support sustainability goals.

The purple cluster highlights the importance of maturity models for decision-making, information management, systematic literature review, and maturity levels. Digital maturity models are a key framework for evaluating and managing progress in digital transformation with a data-driven approach. On the other hand, the yellow cluster centers on artificial intelligence, connected with keywords such as risk management, blockchain, and the Internet of Things (IoT), which shows how advanced technologies can strengthen risk management and develop more efficient digital systems. The green cluster focuses on deep learning and other technologies like machine learning, algorithms, and learning systems. It emphasizes the importance of machine learning methods in the digital transformation process. Finally, the blue cluster is about cybersecurity, connected to keywords such as data security, network security, and enterprise architecture. It highlights the importance of digital security in maintaining system reliability and integrity during the digital transformation process in the public sector.

Overall, this visualization indicates that digital transformation in the public sector depends on technology adoption and requires a strategic approach that includes sustainability, security, risk management, and data-driven decision-making. With a focus on digital transformation, integrating various elements such as maturity models, advanced technology, and digital security is key to improving the performance of public sector organizations in Indonesia.

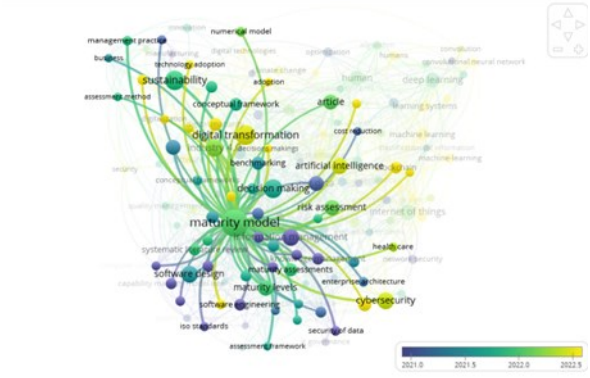

Figure 5. Overlay Visualization

Figure 5 is an overlay visualization of VOSviewer that illustrates the relationships between key keywords or concepts in the related research. This visualization is very useful to understand the patterns of relationships and trends, especially in this study. From this visualization, several key

elements can be identified. The node or circle in this image is a term or keyword relevant to the research topic, where the size of the circle describes the frequency of occurrence of the term in the literature. The larger the circle, the more often the term appears. The lines connecting the circles show the occurrence between keywords. Line thickness describes the strength of the relationship. The thicker the line, the more often the two terms appear together in the study.

Circle colors group terms based on a specific theme or thematic relationship. For example, the green group includes terms such as "digital transformation" and "maturity model," suggesting that these concepts are inextricably intertwined. The yellow group highlights the latest trends, such as "artificial intelligence," "cybersecurity," and "internet of things," that reflect the latest technological developments. Meanwhile, the purple group focuses more on terms related to "software design" and "assessment framework," which are often associated with evaluation approaches. Additionally, the color gradation of the nodes indicates a time trend, with the blue node representing terms that appeared earlier in the literature around 2021, while the yellow node indicates more recent terms relevant to recent research developments in 2022 and beyond.

In the paper's title, this visualization confirms that the digital maturity framework is at the center of the research's attention, with a close relationship with terms such as "digital transformation," "maturity model," "decision-making," and "information management." In addition, the term "sustainability" is located within the green cluster, which shows its relevance to digital transformation and public sector management. It highlights the importance of modern technology in supporting the transformation of public organizations. Terms such as "assessment framework," "maturity level," and "systematic literature review" also underscore how important it is to implement an evaluation framework to measure the level of digital maturity and improve organizational performance.

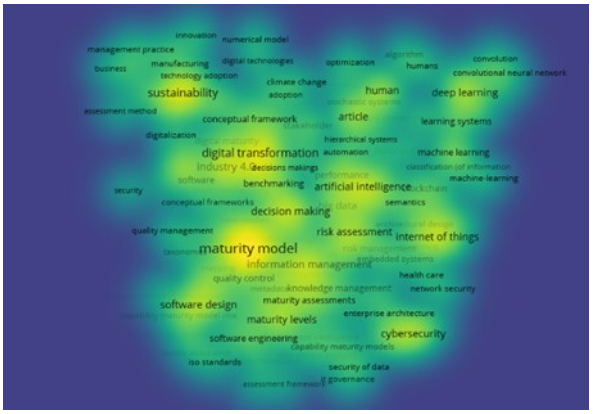

Figure 6. Density Visualization

DISCUSSION

Digital transformation has become a crucial strategic necessity for public sector organizations in Indonesia, aiming to improve operational performance, transparency, and quality of services to the community. This research reveals that digital maturity frameworks support the transformation process. The framework offers systematic guidance for organizations to evaluate their readiness, identify areas for improvement, and design a sustainable digital transformation strategy. However, significant challenges remain, such as resistance to change, limited infrastructure, and low digital competence among public sector employees.

This study conducted a literature study on the digital maturity framework to Improve the performance of public sector organizations in Indonesia. The researchers present a bibliometric analysis showing a large variation in the level of digital maturity in various public sector organizations in Indonesia. According to (de Paula Ferreira et al.2022), digital readiness highly depends on government policies, technology investments, and organizational culture. In the technology dimension, progress looks promising with adopting digital infrastructure such as cloud computing and data analytics. However, the issue of system interoperability is still an obstacle that must be overcome. Carlsson et al. (2023) stated that unintegrated systems can hinder the effectiveness of digital transformation in the public sector.

In the process dimension, although there are indications of using a data-driven approach, the low level of automation ham-

pers operational efficiency. This study supports the findings of Stromberg et al. (2020), which revealed that the public sector often lags in automation compared to the private sector. Therefore, this study highlights the need for greater investment in automation technology to improve administrative efficiency and service quality. The application of advanced technologies such as the Internet of Things (IoT), artificial intelligence, and blockchain is starting to emerge in several public sector initiatives. However, the success of this implementation is highly dependent on strong governance, digital trust, and cross-system integration. This research emphasizes that adopting digital technology in the public sector without supportive regulations and policies will not provide optimal results.

Data visualization using tools such as RStudio and VOSviewer shows that digital transformation in the public sector depends on technology adoption and requires strategies that include sustainability, risk management, and digital security. It emphasizes the importance of careful planning and collaboration between agencies in implementing digital transformation programs. Thus, the results of this study underscore that the success of digital transformation in Indonesia's public sector requires a more comprehensive approach, which integrates technology, human resources, and policies that support the sustainability of digital innovation.

CONCLUSION

This research revealed that a digital maturity framework plays a central role in improving the performance of public sector organizations in Indonesia. Through a systematic approach, the framework enables organizations to assess their digital readiness, identify strengths and weaknesses, and formulate effective transformation strategies. The results showed that despite significant technological progress, such as adopting digital infrastructure and data analytics, major challenges remain, including system interoperability issues and low levels of automation. In terms of processes, public sector organizations have started using data-driven approaches, but operational efficiency needs to be improved through further automation. In addition, the human resources dimension requires special attention, especially in developing employees' digital competencies.

Advanced technologies, such as the Internet of Things (IoT), artificial intelligence, and blockchain, are increasingly visible in various public sector initiatives; however, their success relies heavily on strong governance, integration between systems, and proper risk management. Digital transformation in the public sector requires collaboration between institutions, infrastructure investment, and policies supporting digital sustainability and security. With a strategy that focuses on sustainability and risk management, a digital maturity framework has the potential to help Indonesia's public sector achieve higher efficiency, transparency, and better service quality. Continuous efforts in training, capacity building, and regulatory strengthening are required to maximize these benefits.

In the future, the government can use the Digital Maturity Framework (DMF) as a strategic tool in the policy planning and decision-making process at the managerial level. The Digital Maturity Framework can be used as a reference for developing a digitalization roadmap, prioritizing institutional interventions, and sustaining the impact of data-driven policies. Future research should combine bibliometric approaches with case-based field studies to strengthen the empirical foundation of such policies. This approach will holistically enrich the dynamics of public sector digital maturity and open up space for model innovation that is more adaptive and contextual to local needs.

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