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Digital Transformation Readiness Model in Government

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Abstract: Along with the rapid development of information technology, Digital Transformation (DT) has become a part of everyday life. The COVID-19 pandemic has triggered the occurrence of DT at every level of society in the daily use of technology. However, the implementation of DT is very slow and inefficient and even becomes a problem for employees and the organization. DT implementation in the public sector is expected to be the key to the Government's success. However, many governments fail to implement DT because it only focuses on modernizing technology, not as a whole. Therefore, it is necessary to conduct a study to analyze the marwanfactors of Digital Transformation (DT) Readiness in Government. This research is a qualitative research method with thematic analysis and Fuzzy Delphi method by conducting a Systematic Literature Review (SLR) first for literature study. Based on the results of the SLR, found five dimensions and 19 factors that affect DT Readiness in Government. The five dimensions are People, Process, Technology, Organization, Environment. Based on the thematic analysis results, three additional factors were found in the people dimension: mindset, and organizational factors, namely risk management and knowledge management. This study also provides a model proposal based on the analysis results presented in a conceptual model with 21 analyzed factors. The research can provide understanding factors that affect the readiness of DT in the Government and as the basis for decision-making by stakeholders in the Government.

Keyword: Digital Trasformation, Factors, Government, Readiness.

INTRODUCTION

Technological developments are in line with the development of information systems, especially research related to Digital Transformation (DT) strategy research. Along with these changes, DT gradually became a part of everyday life (C. Matt et al, 2015). According to (Fitzgerald et al, 2013) DT uses digital technology such as social media, mobile, analytics, or embedded devices to improve customer satisfaction, align operations, or create new business models. However, according to Vial (G. Vial, 2019) DT is also a process that aims

to significantly increase change by combining information, communication, and connectivity technology to make it more effective and efficient. The existence of the Coronavirus Disease (COVID-19) pandemic has also increasingly encouraged the realization of DT, such as the implementation of virtual meetings, distance learning (N. Edelman et al, 2021). Most of the DT that has been done is very slow, inefficient, and even adds to problems for the employee or organization (M. Baker, 2015) Based on the research conducted by Juk et al. (Y. Juk Et al, 2021) the Covid-19 pandemic is a catalyst for digital transformation in the Brazilian Government. However, it cannot be interpreted as an efficient and inclusive transformation. DT is not limited to using technology where initially manual processes become automated. Automation is the initial stage of digital transformation. DT has a broader meaning that includes changes in an organization's business processes. The organization has not carried out DT if it only applies information technology but does not change its business processes.

One of the Government's strategies to encourage excellent public services with technical support is through Digital Transformation (DT) (J. J Pittaway et al, 2020). According to Danielsen (F. Danielsen, 2021). if public organizations can implement digital transformation well, the organization's performance will be more efficient, effective, flexible, quality at a lower cost and is expected to form an organization that can keep up with changing situations in unstable conditions. However, there are still many DT problems in the Government. One of which is the Russian Government which already has a "Digital Government" policy but has not implemented digitalization in real terms. Research results show the system has not met the needs on all indicators, and there is only infrastructure modernization (M. Ivanova et al, 2019) In Europe, DT has even become a measure of the success of intelligent European cities (Y. Charalabidis et al, 2020). In the Bahía Blanca municipal government in Argentina, governments need to focus on planning a clear and coherent digital strategy and managing the cultural issues that may hinder the adoption and support of e-government initiatives (Peraturan Presiden Republik Indonesia, No. 95, 2018)

In Indonesia, the implementation of digital transformation in the Government is based on Presidential Regulation Number 95 of 2018 about Electronic-Based Government System (SPBE) (Peraturan Presiden Republik Indonesia, No. 95, 2018). However, regulations regarding digital transformation in the Government do not yet exist fully. In addition, based on the research of (Kusmiarto et al, 2021). which tested the readiness of digital transformation at the Land Office, it showed that there are still many factors that must be improved so that the organization is ready to provide good digital services. Research is needed to study and examine the factors to form an appropriate and efficient digital transformation. Another challenge in developing a digital readiness assessment model for Government in Indonesia is the large area and diverse conditions. Relevant factors are needed to measure digital transformation readiness (Kusmiarto et al, 2021). So that a digital transformation readiness model is needed that is by the state of the Indonesian Government.

This study uses the Kitchenham Systematic Literature Review (SLR) approach (B. Kitchenham 2004), (B. Kitchenham et al, 2007). to get readiness factors based on previous research. Then the results of these factors were further analyzed using qualitative methods with experts in the field of Government. Research on DT Readiness has been carried out by researchers (M. Deja et al, 2021) – (A. Kutnjak et al, 2020). However, research that has a government context is still limited. This study has two research questions, namely:

1. RQ1. What factors influence the readiness of digital transformation in Government?
2. RQ2. What models can be used to measure digital transformation readiness in Government?

This study aims to obtain digital transformation readiness factors in Government and propose a digital transformation readiness model in Government. In the academic field, this research provides an understanding of the factors that affect digital transformation readiness

in the Government and practitioners. It can assist practitioners in evaluating the readiness of digital transformation in the Government and provide an overview to stakeholders in making decisions before implementing digital transformation in the Government. This research can be one of the Government's guidelines in conducting digital evaluations to prepare for the implementation of digital transformation maturely and measurably to avoid failure.

METHOD

This research uses a qualitative research method with a case study approach, an in-depth and detailed research method for individuals and groups that extract and describe a phenomenon (J. Forman et al, 2008). As shown in Figure 1, the research stages begin with formulating the problem, determining the research object, and conducting a literature study using the Kitchenham Systematic Literature Review (SLR) (B. Kitchenham et al, 2007). method. Analyzing the literature study produces factors that affect the readiness of DT in Government. These factors were then used as research instruments. Experts conduct an assessment of these factors. Then thematic analysis and the Fuzzy Delphi method were carried out.

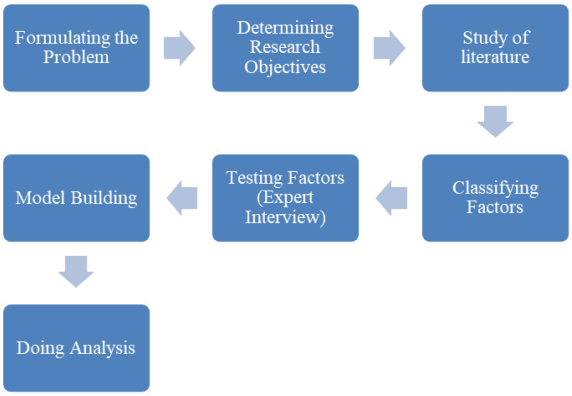

Figure 1. Research stages

Systematic Literature Review

An SLR is a study that identifies and maps earlier research by categorizing primary findings according to predefined criteria. There are three stages carried out in the SLR: planning, implementation, and reporting. The planning consists of identifying SLR requirements and compiling a review protocol. The purpose of SLR is to conduct a literature study to determine what factors influence the readiness of Digital Transformation (DT) in the government sector, formulated in several dimensions and factors.

The search is based on the primary term in the research question and synonyms for each corresponding string. The search string in this study is ("digital transformation" OR dt) AND (readiness OR model OR assessment OR measure) AND (Government OR "public sector" OR institution OR ministry OR agency). The selected keywords use words that can get journals related to digital transformation in Government—using the synonym of the word "digital transformation" or its abbreviation—and looking for research related to digital transformation readiness or models or digital transformation assessment processes. The search scope is limited to government agencies, ministries, or public sectors. The selected publications are from 2018 to 2021. Furthermore, publication sources are from popular databases such as ACM Digital Library, Emerald Insight, ProQuest, SCOPUS, and Science Direct. With Mendeley Software, it is helpful to save all references and make citation settings.

Many irrelevant papers were excluded based on the title and abstract in the search stage. Then the appropriate paper through the second selection stage using inclusion and

exclusion criteria can obtain the appropriate paper. Moreover, before the final process, a full-text-based review process on the suitability of the content is carried out. Figure 2 describes an explanation of the selection process.

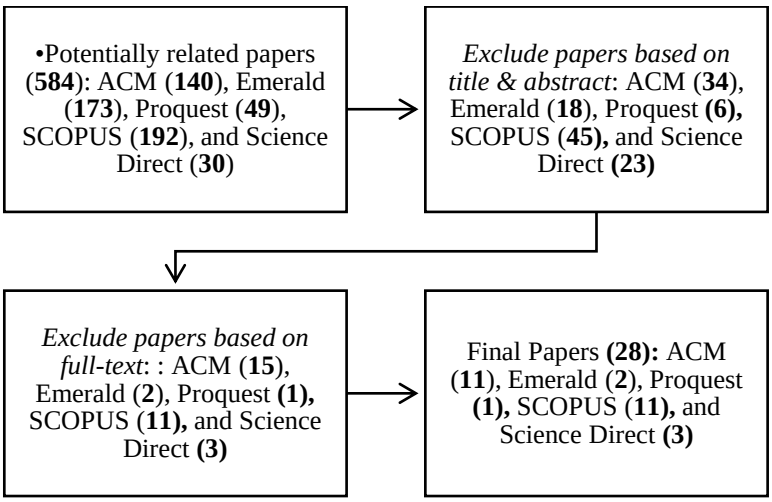

Figure 2. The selection process of final papers

The criteria for inclusion and exclusion in this literature review were devised in response to the research objectives and were used to ensure that the data produced were reliable by Kitchenham's standards (B. Kitchenham et al, 2007).With these standards, it is hoped that the quality of the paper understudy can be appropriate and have good quality. Inclusion criteria are articles containing DT Readiness keywords, articles written in English, full-text papers, and articles published in the last four years (2018-2021). Exclusion criteria are criteria outside of those stated in the inclusion criteria, such as non-English, outside 2018-2021. Since DT research is a multidisciplinary study, it does not limit computer science, so the search results reach 584 papers. Finally, out of 584 papers that took the quality test, 28 papers were selected, including those from ACM (11), Emerald (2), ProQuest (1), SCOPUS (11), and Science Direct (3). The data extraction method used in this study was a review of the paper with annotated bibliography. This annotation aims to determine the source's relevancy, correctness, and quality.

Qualitative Method

Qualitative data was collected using a semi-structured interview method. Interviews were conducted between 1 to 20 December 2021 with a purposive sampling method. In this study, the case studies used were two government agencies in Indonesia, namely agency A and agency B. The case studies were selected based on national-scale ministry or agency agencies and had coverage to the provisional areas in Indonesia where both agencies have branch offices in each province in Indonesia. So that it can describe the state of Government to the lower levels, with this background, the two agencies were selected to investigate the factors required for DT readiness. From the two institutions, six experts were selected. Experts are officials who understand DT Readiness in the Government. Information about the experts involved in this interview is presented in Table 1. The expert criteria in this study are people who understand the digital transformation process within the organization and have a minimum of 10 years of work experience related to digital transformation. Expert judgment is carried out by conducting semi-structured interviews through the zoom application. Then interview transcripts were conducted, and analysis was carried out using thematic analysis techniques with NVIVO tools and analyzed using the Fuzzy Delphi method.

Table 1. Interviewed experts

Code	Profession	Experience
E1	Government Data Service and Dissemination Officer	13 years
E2	Government IT Network and Referral Officer	21 years
E3	Government Data Processing Integration Officer	20 years
E4	Government Information Technology Standardization Officer	20 years
E5	Government Information Technology Standardization Expert	18 years
E6	Government Bureaucratic Reform Evaluation Officer	10 years

After the data collection process is complete, the analysis process is carried out using the NVIVO. The data analyzed in this study are in the form of texts derived from transcripts of interviews and supporting documents related to the readiness of Digital Transformation in Government. This study uses a qualitative data analysis method, namely thematic analysis, to find the factors that influence the readiness of Digital Transformation in Government. According to Braun & Clarke (V. Braun et al, 2006), qualitative data analysis with thematic analysis consists of six stages: familiarizing yourself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report.

One way of solving problems in the consensus expert is using the fuzzy Delphi method (A. Ishikawa et al, 1993). Fuzzy theory is used to save time and solve the fuzziness of expert understanding (A. Arifin et al, 2018). The fuzzy theory is used by Ishikawa (A. Ishikawa et al, 1993) to compile expert opinion in the form of fuzzy numbers. The advantages of using the Fuzzy Delphi Method can shorten the time on the questionnaire, reduce costs, express their opinions in full, maximally, and consistently, and still pay attention to ambiguity in giving opinions.

RESULTS AND DISCUSSION

Dimensions and Factors of Digital Transformation Readiness

In mapping, the Digital Transformation (DT) readiness factors, classified according to their dimensions. Dimensions exist as a measurement instrument for the DT. Each dimension translated into more specific substances that contain more objective measurement criteria. To limit the dimensions of this study, the authors used references from the research conducted by Pihir et al. (I. Pihir et al, 2018). Five dimensions are suitable for classifying the extraction results from the review, namely people, process, technology, organization, and environment. The dimensions are based on the People Process Technology (PPT) theory found in research by Chen & Popovich (I. J. Chen et al, 2003). and the Technology Organization Environment (TOE) theory proposed by Tornatzky and Fleischer (L. Tornatzky et al, 1990).

The PPT theory and TOE framework have been used in several previous studies. One of the studies conducted by (Kurnia et al, 2015) where the study used the TOE framework to determine factors related to technology adoption in an organization. The TOE framework can see that digital transformation readiness in organizations is influenced by factors related to the dimensions of technology, organization, and the external environment. Table 2 shows DT Readiness dimensions and factors based on SLR results.

Table 2. Dimensions Digital Transformation Readines

Dimensions	Factors
People	Capabilities [6], [8], [10], [11], [13], [28]–[31]; Leadership [13], [28]; Motivation [4], [32];
Process	Automation [9], [33], [34]; Service Convenience [6], [35], [9], [10], [13], [36]; Process Management [30], [37];
Technology	Infrastructure [7], [8], [36], [38]–[42], [10], [11], [13], [28], [29], [31], [32],

	[35]; Architecture [4], [30], [38], [41], [43]; Security [9], [13], [44]; Integration System [7], [41]; Data Management [10], [32];
Organization	Culture [13], [29], [39], [40]; Funding [8], [9], [28]; Strategy [7], [11], [46], [13], [33], [35], [37], [38], [40], [43], [45]; Project Management [11], [30], [37], [45]; Policy [7]–[9], [13], [28], [29], [39], [43], [45], [47];
Environment	Political [6], [29], [45]; Law/Regulation [8], [13], [28], [38], [43]; Collaboration [8], [10], [11];

People are one of the critical dimensions besides organization. This dimension includes human factors such as technical implementers and users, organizational culture, and human resources quality (M. Jneid et al, 2019). DT needs to have professional human resources both as managers and users because humans themselves as brainwaves of transformation. Socio-cultural is the experience, habit, paradigm, and mindset of people (employees & the public) solving a problem or running an organization's business process. Traditional values that become work culture are barriers to cultural change, especially in adopting new technology (J. Y Hur et al, 2019).

Process dimensions are aspects related to the procurement process and the development of Digital Transformation, starting from planning to the development and procurement process. Automation is the Automation of Digital Transformation based on the interface and the work process. High costs usually hamper integration and interoperability problems. Swedish municipalities use Robotic Process Automation (RPA) to automate administrative tasks (I. Lindgren et al 2021).

Technology is a dimension in the readiness of Digital Transformation, which covers all aspects related to technology and information and communication technology (ICT) infrastructure. It comprises the input and output data quality and the information and compatibility of the necessary core technology infrastructure [28]. Technology is defined as systematic knowledge that is transformed or embodied in tools. The technology context relates to the technology available in the organization, i.e., focuses on the characteristics of the technology that can influence the adoption process [26].

Organizational factors strongly influenced DT's success in a government, both the central Government, local governments, and organizations under the Government. It is undeniable because all activities in the Government are highly structured and tend to be rigid, so the success of DT is highly dependent on the vision, mission, and direction of the highest leadership policies, which stakeholders influence (M. Jneid et al, 2019). Organizational context relates to organizational characteristics, which focus on organizational processes and structures that require or facilitate the adoption and implementation of innovations (H. J Wang, 2016).

The environment is very influential in the occurrence of changes in the organization. It will impact the DT strategy carried out, so it is essential to elaborate on the environment. The context of the external environment relates to the arena in which the organization does business, including external factors such as industry, competitors, regulations, and others

Thematic Analysis

Thematic analysis was carried out using the NVIVO application to obtain the factors that influence Digital Transformation readiness in Government based on interview transcripts in helping the coding process. The coding process uses an open coding technique as Weldon

et al.'s research (A. Waldon et al, 2021). finds critical terms that will later be categorized into four groups. This study uses a combination of People Process Technology (PPT) and Technology Organization Environment (TOE). The results of the interview transcript process are grouped by themes or context of people, processes, technology, organizations, and the environment.

The results of the grouped coding are then combined with the description of the theory in the interview results. Then an analysis was carried out to identify specific factors from the identified themes to produce the correct name and definition for each factor found. Based on the analysis of the coding results in the context of technology, organization, and environment, it is known that many sentences have the same meaning spoken by the same person many times, and some sentences have the same meaning that comes from the opinions of different people. Therefore, coding with the same meaning or redundancy is then grouped and reduced based on the existing theoretical background to summarize the factors that affect Digital Transformation readiness in Government shown in Table 3. From this result, several new factors were found, namely the mindset factor in the theme of the community and risk management and knowledge management factors on the organization's theme.

Table 3. Summary of factors influencing DT Readiness in Government

Themes	Factors	Expert	Coding
People	Capabilities	6	7
	Leadership	6	8
	Motivation	5	5
	Mindset	3	3
Process	Automation	3	3
	Service Convenience	6	11
	Process Management	5	9
Technology	Infrastructure	5	7
	Architecture	3	3
	Security	5	5
	Integration System	6	9
	Data Management	6	8
Organization	Culture	5	13
	Funding	4	6
	Strategy	6	8
	Project Management	4	4
	Policy	5	11
	Risk Management	3	3
	Knowledge Management	4	5
Environment	Political	1	1
	Law/Regulation	6	7
	Collaboration	6	10

Fuzzy Delphi Method Analysis

Fuzzy Delphi method analysis is used to obtain consensus on the factors that influence Digital Transformation among the experts. In the fuzzy Delphi method, two requirements must be met before ranking the consensus results: the threshold value (d) ≤ 0.2 and the percentage consensus of Expert more than 75% agreed Expert. It is used to check whether the factors are acceptable for further research (A. Arifin et al, 2018). The experts in this analysis are the same as the previous thematic research, namely six experts from government agencies who have more than ten years of experience in Government, especially in the IT field. Table 4 shows the results of the analysis using the fuzzy Delphi method.

Based on the results of the analysis of all factors, the defuzzification process can be accepted and continued to determine the ranking of the results of the Fuzzy Delphi analysis. The leadership factor has the highest fuzzy score of 0.800 and the lowest in the political

factor of 0.267. According to experts, the leadership factor is the most influential factor on Digital Transformation readiness in Government. While political factors still have an influence but the effect is negligible. Another exciting thing is that there are six factors in second place with a score of 0.733. The six factors are mindset, comfort services, Funding, project management, law, and collaboration. It shows that six factors are equally important in influencing digital transformation readiness after the leadership factor.

Table 4. Expert consensus about DT Readiness factor based on a threshold (d) value and percentage

Factors	Threshold	Percentage	Fuzzy Score	Rank
Capabilities	0,1	100%	0,700	8
Leadership	0,0	100%	0,800	1
Motivation	0,1	100%	0,733	2
Mindset	0,2	83%	0,667	11
Automation	0,2	76%	0,600	21
Process Management	0,2	76%	0,633	18
Service Convenience	0,1	83%	0,733	2
Architecture	0,1	83%	0,633	18
Infrastructure	0,2	83%	0,700	8
Security	0,2	76%	0,667	11
Data Management	0,2	76%	0,667	11
Internal System Integration	0,1	100%	0,667	11
Culture	0,2	76%	0,633	16
Funding	0,1	100%	0,733	2
Policy and regulation	0,2	76%	0,667	11
Strategy	0,1	83%	0,733	2
Project management	0,1	83%	0,633	18
Risk management	0,1	100%	0,700	8
Knowledge Management	0,2	76%	0,633	16
Law	0,1	83%	0,733	2
Collaboration	0,1	100%	0,733	2
Political	0,1	100%	0,267	22

People Dimension

Capabilities

Expert (E2) stated that “A person's ability greatly influences digital transformation, especially a person's competence to familiarize himself with his information technology skills whether to use, manage or plan.” Likewise, Expert (E3) said that “A person's capabilities and abilities must influence digital transformation and the values that must be possessed are like competence, at least having the ability to carry out that transformation.” In addition, Expert (E6) argues that “capability is very influential because human resources who have an understanding or vision for the future encourage the realization of an information technology-based work system.”

Based on the capabilities factor analysis results, it has a fuzzy score of 0.700. It means that the capabilities factor is accepted. The capabilities factor has a significant influence on digital transformation readiness. It is in line with the research results by P. Mittal (P. Mittal, 2020). that capability has a significant effect on government digital services. Governments should invest in building data capabilities and employee development on technology. The responses from these experts show that the capabilities possessed by a person affect digital transformation. One of the capabilities here is having a vision and mission for the future and understanding and using, managing, and planning information technology.

Leadership

According to Expert (E1), “The leadership factor is significant because it must provide an example, especially in an application like this.” Expert E3 stated that “Certainly if the

leadership supports it, the new transformation can take place, so it is encouraged at the leadership level. If there is no leadership support, it may not work, even though all team members want to run. If the leadership does not want it, it still cannot run." Agree with Expert (E2) "..... So, it will be hampered if there is no support. It means that leadership support can make someone want to be honest or not depend on the leadership." Expert (E4) said that "leadership in digital transformation has a big impact if we transform. In Government, leaders should have leadership, which means visionary, that is, they know how to take steps to achieve goals efficiently." Expert (E5) argues that "Leadership is very influential because it determines the future direction of implementing digital transformation and also the services that will run for the community'" Expert (E6) responded that "In developing the implementation of tasks and functions, ... it is necessary to encourage leadership changes in the digital era to increase innovation or creativity rather than human resources themselves."

Based on the Fuzzy Delphi method analysis, the leadership factor was ranked first with a fuzzy score of 0.800. It means that the leadership factor is accepted. All experts agree that the leadership factor significantly influences digital transformation readiness. It is similar to the research results by Tangi et al. (L. Tangi et al, 2021). that leadership is relevant to management effectiveness in digital transformation. Support from leaders can remove cultural barriers. Where without leadership can hinder digital transformation. Leaders must be wise in determining the steps to achieve digital transformation. A leader must be able to change the work culture in the organization. The leader must be a guide who can be the hope of everyone in the organization. Leadership is influential because it determines the future direction of implementing digital transformation and services to the community. In addition, leadership is expected to increase employee innovation and creativity.

Motivation

A project needs to communicate, align, and revise short-term and long-term project objectives using motivation and control to make performance in line with the organization's strategic objectives to be successful (T.M Lappi et al, 2018). Expert (E6) response "Motivation matters because motivation makes us bring out innovation or creativity to think about how we can do our work or services more quickly through information technology." In addition, Expert (E4) argues that "One way to improve human resources is through awarding ..... agencies often give awards to their employees is a good culture. It makes people more excited, especially if they are given a reward."

Based on the analysis of motivational factors, it has a fuzzy score of 0.733 and is in second place. It means that the motivational factor is accepted. Motivational factors have a significant influence on digital transformation readiness. Leaders must be able to build the morale of their employees. Leaders who cannot build enthusiasm and want to build a culture will find it challenging to transform. One form of motivation can be in the form of rewards. Giving rewards to employees is a good culture. Employees will be enthusiastic about working with rewards. It is because employees feel that their work is appreciated. So that employees can produce new creativity and innovation, do not let the organization use personnel outside the organization to be more valued than its employees.

Mindset

Expert (E1) argues that "It is necessary to change the mindset of employees by shortening the bureaucracy in utilizing technology." Expert (E5) stated that "The mindset is very influential because the digital transformation will not work when the mindset still tends to be transactional where corrupt mindsets and extortion are still more likely to be carried out." Expert E6 agrees that "A change in our mindset in providing services to be faster and

more transparent is indeed necessary. Information technology can cut practices that are not allowed in Government. It is going to happen with those changes going to be very influential."

Based on the mindset factor analysis results, it has a fuzzy score of 0.667. It means that the mindset factor is accepted. The mindset factor has a significant influence on digital transformation readiness. It is in line with the research results by Parra and Saenz [42], which state that mindset is one indicator of digital transformation related to improving public services. With the mindset that information technology can simplify the bureaucracy in the Government. So that it can facilitate service to the community, destructive mindsets such as corruption and extortion must be prevented.

Process Dimension

Automation

One example of the Automation of sending data to government agencies is done automatically through the information system used by government agencies and stakeholders. Transformation changes the administration system using technology. Public administration information systems must optimize the human factor and minimize errors. Automation ensures objective decision-making based on real-world analysis results and modern technology. It is necessary to expand the range of interaction between the state and citizens through information systems or applications. Digitizing public administration can increase its efficiency and productivity (A. Misra et al, 2018).

Expert (E3) argues that "Automation is one of them, which is usually paper-based, now it is digital-based. I think it is good to leave the conventional ways. Because the Government saves more money and faster data entry." Expert (E4) stated that "what public services in our ministry are not automated, even to borrow meeting rooms, we have automated them. Our ministry is almost 90% automatic." Expert (E6) said that "Yes, it has an effect ... in the context of our duties and functions at the ministry, we as coaches and facilities to provide assistance or reinforcement that used to have to come to branch offices in regions now no longer, then the data first in the form of hardcopy with automation now data in soft file form ..... make innovations by building an information technology that can support our tasks and functions and make it easier to do monitoring and evaluation .... with the application everything can be resolved and that very effective and efficient."

Based on the results of the analysis of the automation factor has a fuzzy score of 0.600. It means that the automation factor is accepted. The automation factor has a significant influence on the readiness for digital transformation. It is in line with the research results by Fedotova (G. Fedotova, 2020) that a critical factor for digitizing services is the need to ensure automatic processing of information originating from submitted documents to improve decision-making efficiency. Automation is the initial stage of change. Digital transformation has a broader meaning, such as changing an organization's business processes by automating conventional work using paper into technology-based ones. It helps and facilitates the completion of the work. With Automation, work can be completed effectively and efficiently.

Process Management

According to Expert (E4), "process management is important if in my opinion with good process management with a good understanding our transformation can certainly be achieved faster." Expert (E5) stated that "It is very influential, especially on the SOP (Standard Operating Procedure) of the government service itself. Digital transformation must follow SOPs that already exist in the regulated regulations." Expert (E6) said that "One of the requirements in building an information technology application must be supported by process management such as planning and supervision, which is very much needed. Before building a

digital technology, we must plan first. We must first see whether it is effective and make it easier or even more difficult. Then supervision must continue to be carried out or monitor the system we build. So, process management is essential because it is a series of planning and monitoring activities."

Based on the analysis results, the process management factor has a fuzzy score of 0.633. It means that the process management factor is accepted. Process management factors have a significant influence on digital transformation readiness. It is similar to the research results by Tangi et al. (L. Tangi et al, 2021) which states that one element in the organization is the process. The process is part of the technical system associated with digital transformation from input to output. A good understanding of process management can encourage digital transformation readiness. In the process, management must set the standard operating procedure for government services where standard operating procedures are regulated in administrative regulations. In addition, process management also includes planning and monitoring in the development of information systems within the organization.

Service Convenience

Expert (E5) argues that ease of service significantly affects digital transformation, especially for the community. Because the community is the main priority in providing services." According to Expert (E6), "When we talk about community services, what we want to achieve is community satisfaction, the level of public trust in the services we provide and transparency in service delivery." Expert (E4) stated that "..... our way to help digital transformation is to make our government services easier and easier for others..... Our service as Government serving the community is not measured by money but transparency and quality of our services."

Based on the analysis results, the service convenience factor has a fuzzy score of 0.733 and is in second place. It means that the service convenience factor is accepted. The service convenience factor has a significant influence on digital transformation readiness. It is in line with the research results by (Gong et al. 2020) where the core of digital transformation in Government is service, where service change and service improvement is a measure of DT change in the public sector. Services affect digital transformation readiness. The satisfaction and trust of the public depend on the ease, transparency, and quality of the services they receive.

Technology Dimension

Architecture

Enterprise architecture is useful for integrating data between organizations, generating organizational and technical benefits, and potential gains in knowledge exchange [38]. Expert (E2) response "The goal is to form such an integrated architecture but do not know when and where, but that is what everyone hopes to achieve." Expert E3 explained that "The architecture still running is not at a good level. For example, a VPN, ideally all devices can directly access the VPN, you do not have to use additional applications that use a username account." Meanwhile, Expert (E6) said that "Architecture affects, we here in this agency have information technology architecture to do the mapping." Expert (E4) stated that "all of that is in the e-government architecture, so the dimensions include the security dimension, data dimension, application management, and risk management. It is all regulated in the architecture, and each person plays a role in their respective fields to support that digital transformation can be carried out."

Based on the analysis of architectural factors, a fuzzy score of 0.633. It means that the architectural factor is accepted. Architectural factors have a significant influence on the readiness for digital transformation. It is in line with the research results by (Rodrigues et

al.2021), enterprise architecture is an aspect that influences digital transformation in Government. Information technology architecture influences digital transformation readiness. Information technology architecture is regulated by several things such as data security and information technology, data management, application management, risk management, and information system integration.

Infrastructure

According to Expert (E1), "In carrying out digital transformation, it is necessary to strengthen infrastructure. The main infrastructure is the bandwidth because the outgoing bandwidth is still small. Server requirements should also be increased because it requires a bigger server." Expert (E3) agrees that "Because the system is server-based, the problem is on the server itself. There must be improvements on the server if you want to focus on the technology." Expert (E4) stated that "All expenditures must go through the information technology provider unit then be checked by the auditor unit and then also approved by the planning unit. It is an important part of the changes that occur regarding digital transformation."

Based on the analysis results of infrastructure factors, a fuzzy score of 0.700. It means that the infrastructure factor is accepted. The infrastructure factor has a significant influence on the readiness for digital transformation. In the study of (Charalabidis et al. 2020), infrastructure is one of the critical areas of service, which is also included in the leading digital transformation strategy at Kavala and skills, entrepreneurship, and open data. Optimal infrastructure can provide both internal employees and external services to the community. The infrastructure here includes networks, servers, bandwidth. In addition, the infrastructure procurement must go through the inspection and approval of the relevant units so that the infrastructure has good quality and is by the organization's needs.

Security

Expert (E5) argues that "IT security itself is very influential because problems such as leakage of personal data in government services are very crucial. This problem also has implications for criminal matters if it is not handled properly in the digital transformation process." Expert (E6) states that "security matters a lot. There needs to be security in the sense that there are compassionate things, so we cannot convey them, and secondly, security in the sense that the facilities are stable so that the security of the information technology that we build is guaranteed to be optimal or maximal in its use."

Based on the analysis results, the security factor has a fuzzy score of 0.667. It means that the security factor is accepted. The security factor has a significant influence on the readiness for digital transformation. It is similar to the research results by (Balashov et al. 2020) that information security in the digitalization process is a significant concern discussed by researchers from various countries. According to the Expert, security affects the readiness of digital transformation. Security is in the form of data security and information technology infrastructure security. Data security is necessary to avoid leakage of personal data on government services, so that the security factor is an essential factor that must be considered in building information technology-based services.

Data Management

Expert (E5) argues that "Data management is very influential, especially when there is an exchange of data between agencies so that data exchange can be adjusted to the needs and also the limitations when inter-agency exchanges data." Expert (E4) said that "Next year we plan to focus more on data, we plan to make regulations on one data (open data)." According to Expert (E6), "Data management is vital, because it must be managed properly in terms of

regulators and also process data safely, so good data management is needed. It is influential because it can provide great value to a government agency. After all, the data can become a problem."

Based on the factor analysis results, data management has a fuzzy score of 0.667. It means that the data management factor is accepted. The data management factor has a significant influence on digital transformation readiness. Data management affects the readiness of digital transformation. Data management is needed to regulate data storage and exchange between government agencies. In data management can take advantage of technologies such as the cloud. In addition, within government agencies, it is necessary to make rules and regulations related to data management. Good data management can generate value from a government agency. The "Brazil Mais Digital" Program is an example of financing governance interventions for DT, modernization, simplification of procedures and services, technology tools and platforms, policy, and data management, developed by (Rodrigues et al. 2021)

Internal System Integration

Expert (E4) argues that "transformation is much broader in meaning, so talk about integration." Expert (E6) said that "It is very influential because integration is essential to make it easier for people to receive our services. For example, when you enter the agency's website, there are services for all units in our agency. So that integration supports the preparation for digital transformation." Expert (E5) response "In system integration, current technology development does not have to rely on cable-to-cable but can use web services/APIs in exchanging data."

Based on the analysis of internal system integration factors, it has a fuzzy score of 0.667. It means that the internal system integration factor is accepted. Internal system integration factors have a significant influence on digital transformation readiness. It is in line with the research results by (Rodrigues et al. 2021), which explains that the integration and interoperability of information systems and databases are pillars of the Corporate Architecture for DT. System integration is needed to provide integrated services to the community. In providing integrated services, technology such as web services or APIs can be used in the data exchange process. People only need to access one website to use services at government agencies. It will undoubtedly make it easier for the community and make services more efficient. So that system integration affects the readiness of digital transformation.

Organization Dimension

Culture

Expert (E6) stated that "work culture is very influential in supporting digital transformation." Expert (E1) argues, "So culture is important, individuals who are afraid of change, do not want to know, I do not think that is good either." According to an expert (E4), "the hardest thing in work culture, we do not want to change. The challenge of the digital transformation felt is the quality of our human resources, our work culture. If the work culture in the organization does not support it, someone who has a high capacity will decline."

Based on the analysis of cultural factors, a fuzzy score of 0.633. It means that the cultural factor is accepted. The culture factor has a significant influence on the readiness for digital transformation. According to the research results by Sanchez & Zuntini [11], collaborative culture is a must-have factor in measuring digital readiness. Work culture can be a collaborative culture where everyone helps each other achieve organizational goals—a culture of discipline in completing work on time and providing good service to the

community. With good work, culture can encourage individual capabilities within the organization.

Funding

Expert (E1) argues that "Funding is necessary. There should also be Funding to increase employee competence in the IT field." Expert (E2) agrees that "It is also important that there is funding to increase competence." Expert (E3) stated that "There needs to be a budget that can support this transformation, which does not have to be in the form of money, for example, the facilities that support it. There is no funding for education in the office even though it is an important thing." According to Expert (E5), "The budget issue is a classic problem and also significant because currently digital transformation still requires a large budget. However, the hope in the future is that digitization will also reduce the need for existing ASN so that from an economic point of view, it is expensive in the short term. However, in the long run, it becomes much cheaper."

Based on the analysis results, the funding factor has a fuzzy score of 0.733. It means that the funding factor is accepted. The funding factor has a significant influence on the readiness for digital transformation. According to the research results by (Mendybayev & Burbayeva, 2021) cost and resource planning must be considered in improving management in supporting digital transformation. Funding is needed to prepare for digital transformation, such as to provide infrastructure and supporting facilities. In addition, Funding is needed to increase the competence of human resources in the organization. This Funding can be in the form of training funds or education funds. Increasing the competence of human resources can drive digital transformation to be stronger.

Policy and regulation

According to Expert (E5), "The policies outlined in the regulations are very influential because they will determine the digital transformation process in which services run in line with applicable laws and regulations." Expert (E3) stated that "Policies regarding digital transformation are still mostly directive, so they have not been written in detail. So it should be made and documented so that the results of the policy itself can be disseminated." Expert (E4) said that "This year we made two regulations which I think are more or less helpful to focus on digital transformation. We help make laws and regulations, especially regulations that contain the implementation of an electronic-based government system, which is also related to data and its integration. How data and applications can help and support existing business processes."

Based on the analysis results, the policy and regulation factor has a fuzzy score of 0. 667. It means that the policy and regulation factor is accepted. Policy and regulation factors have a significant influence on digital transformation readiness. According to the research results by (Balashov et al. 2020), the policy determines the clarity of digital technology that must be adopted in providing digital services in the digital transformation process. Policies and regulations within the organization affect the readiness for digital transformation. Policies are made in regulations containing several things, including plan maps, architecture, business processes, knowledge management, and risk management.

Strategy

Expert (E5) stated that "Strategy is vital, especially when making plans and frameworks on digital transformation that will be and are being carried out so that the direction is by the goals of the vision and mission of the government organization itself." Expert (E3) argues that "The strategy starts with a change in the desire to use better technology such as using applications to make activities easier." According to Expert (E4), "We can learn from what

we did yesterday. Then we will focus more on where to go in the future. What are our goals and strategic steps."

The strategy factor has a fuzzy score of 0.733 based on the analysis results. It means that the strategy factor is accepted. The strategy factor has a significant influence on the readiness for digital transformation. It is similar to the research results by (Misra et al. 2018), strategy is a factor that supports the innovative use of ICT, and policies are aligned in digital transformation. Strategy is needed in preparing for digital transformation. We can evaluate our previous performance. It can be used as a reference in planning future strategies to realize digital transformation. The strategy developed must be in line with the goals of the organization. It is hoped that the digital transformation process can run well with a good strategy.

Project management

Expert (E2) argues that "In a project, you still have to think about digital transformation, yes, how to use it like what to support it so that it can be more helpful and accelerate." Expert (E6) stated that "Project management related to information technology management has made a grand design related to information technology in the agency environment. So, there will be no overlapping of information technology in this agency."

The strategy factor has a fuzzy score of 0.633 based on the analysis results. It means that the project management factor is accepted. Project management factors have a significant influence on digital transformation readiness. It is in line with the research results by (Sanchez 2019), the success of a project depends not only on traditional criteria such as time, budget, and conformance to specifications but on the quality and usability of the solution. The development of suitable projects on a digital transformation can improve the quality of success. Project management is needed in digital transformation readiness. It is related to the management of information technology development. A plan or grand design is needed to move project management according to the expected goals. With the project management, it is hoped that the system built does not meet the specifications of the organization's needs. Furthermore, avoid the development of almost the same system.

Risk management

Expert (E5) stated that "Risk management has a very influential role because the impact of digital transformation will also increase risk in various ways so that risk management can minimize the existing impact." Agreeing with this, Expert (E6) said that "It is very influential. Whatever we do, we need risk management because it controls the obstacles. So risk management is essential."

The risk management factor has a fuzzy score of 0.700 based on the analysis results. It means that the risk management factor is accepted. The risk management factor has a significant influence on digital transformation readiness. It is in line with the research results by (Meyerhoff 2019), that stated that risk mitigation and stakeholder influence are part of the IT development model. The IT development model has several limitations regarding change management during and after ICT initiatives in digital transformation. Experts argue that risk management affects digital transformation readiness. Risk management can predict the risks to minimize the impact and control the obstacles.

Knowledge Management

Expert (E4) thinks that "About business processes from a cultural perspective, it is knowledge management and risk management." Expert (E1) stated that "Equitable education is needed. In the future, education needs to be added so that the transformation takes place

and is accompanied by education." According to Expert (E6), "Sharing knowledge is fundamental. It can be used as material for developing and improving digital transformation."

Based on the analysis results, the knowledge management factor has a fuzzy score of 0.633. It means that the knowledge management factor is accepted. The knowledge management factor significantly influences the readiness for digital transformation. According to (Pittaway and Montazemi, 2020), the failure of the digital transformation process is the failure of the organization to capture the knowledge that is fundamental in making change. Knowledge management can be in education provided by the organization and knowledge sharing among employees. Knowledge management can improve the competence of each individual in the organization. In addition, knowledge management helps document the knowledge possessed by experts in solving a problem. It can encourage the digital transformation process.

Environment Dimension

Law

Expert (E5) argues that "Collaboration between government agencies is very influential because this is where coordination goes." According to an expert (E3), "Now the culture of collaboration should have started towards one data (open data)." Expert (E4) stated that "Coordination and data integration can be done between ministries. It is just a problem with measurement. When we determine something, there must be a measure if collaboration there is no measure." Expert (E2) thinks that "Collaboration is important because we are connected with stakeholders so that it is easier to help between agencies."

Based on the collaboration factor analysis results, it has a fuzzy score of 0.733. It means that the collaboration factor is accepted. The collaboration factor has a significant influence on digital transformation readiness. According to (Jneid 2019), digital transformation will be challenging to implement due to the lack of collaboration between different actors from the system. Collaboration with external parties can coordinate and cooperate between government agencies or stakeholders. A goal will be easy to achieve with collaboration and digital transformation. Digital transformation requires collaboration with various parties to be successful. One of the results of agency collaboration is open data government.

Collaboration

Expert (E6) said that "of course, a policy or legal basis is needed, it is needed in supporting digital transformation." Expert (E5) argues that "The rule of law in digital transformation in government is very influential because it is the basis and also the limit, especially to existing data and information." Expert (E2) stated that "If there are regulations that regulate digital transformation, it might be better, yes, more focused, better know where it is moving." Response from Expert (E3) "There is a need for legality in this digital transformation, especially to protect against cybersecurity."

Based on the law factor analysis results, it has a fuzzy score of 0.733. It means that the law factor is accepted. The law factor has a significant influence on the readiness of digital transformation. According to (Rodrigues et al. 2021), regulation is an aspect that influences digital transformation in Government. The rule of law is needed in readiness for digital transformation as a basis and guidance in regulating unwanted matters such as cyber security crimes and data and information theft.

Political

According to an expert (E1), "So far, there has been no political interest that has hindered digital transformation." The Expert (E2) "If there is political support, maybe there

will be no effect on digital transformation in the agency." Expert (E4) argues that "leadership statements .... include leadership instructions and wishes. Politics will determine the ranks under him. I do not think it can be measured, and no one has done any research related to politics on digital transformation readiness."

Experts argue that politics has not affected digital transformation readiness in the Indonesian Government. Based on the analysis of political factors, a fuzzy score of 0.267. It means that political factors are rejected. Political factors do not influence digital transformation readiness.

Digital Transformation Readiness Model In Government

Based on the results of The Fuzzy Delphi method assessment and analysis, a model of readiness for digital transformation in the Indonesian Government was developed. The model can be seen in Figure 3.

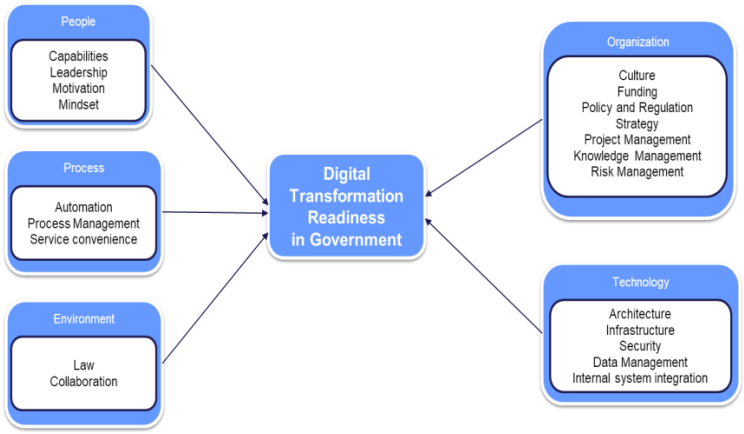

Figure 3. Digital Transformation Readiness Model in Government

Based on the literature review results, 19 factors affect the Digital Transformation of Readiness in Government. These factors are then categorized into five dimensions. Then based on these 19 factors, a thematic analysis with a qualitative method was carried out, resulting in three additional factors, becoming 22 factors. Furthermore, the Fuzzy Delphi method analysis to determine factors that experts can accept produces 21 relevant factors. The only factor the Expert considers to be inappropriate is political. The DT Readiness model in the Government can be used to form a framework to measure DT readiness effectively and efficiently.

CONCLUSION

This research was conducted to identify and explain the factors influencing digital transformation readiness in The Indonesian Government. Based on the analysis results, 21 factors affect digital transformation readiness in the Government of Indonesia. It factors are capabilities, leadership, motivation, mindset, Automation, process management, service convenience, architecture, infrastructure, security, data management, internal system integration, culture, Funding, policy and regulation, strategy, project management, risk management, knowledge management, law, and collaboration where these factors are categorized into five dimensions, namely people, process, technology, organization, and environment.

This research has succeeded in classifying 21 factors that influence the readiness for the digital transformation of Government into five dimensions: people, process, technology, organization, and the environment through qualitative analysis. Researchers propose a conceptual model that can later be formed into a framework to measure digital readiness for

transformation in Government efficiently and effectively. Furthermore, it can assess the dimensions and factors so that government organizations are considered not ready or ready. So the Government can focus more on the right digital transformation, not just technology modernization.

Future research can explore the relationship between factors and identify factors that significantly influence digital transformation readiness in the Indonesian Government. This study relies on expert interviews so that subsequent research can use a quantitative survey or mixed methods. In addition, further research can explore other central or regional agencies to get more holistic results to describe the context of digital transformation readiness in the Indonesian Government.

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