



Education and Human Resource Management Model for Effective Digital Governance Implementation

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ABSTRACT

Digital transformation has become a national priority in improving the efficiency and quality of public services in Indonesia. While technology infrastructure plays an important role, the success of digital governance initiatives also relies heavily on the readiness of human resources (HR) and the responsiveness of the education system. This study investigates the role of human resource management (HRM) and education in supporting digital transformation through qualitative case studies conducted in several Indonesian government institutions. Data were collected through semi-structured interviews with policymakers, HR managers, and training officials, as well as an analysis of institutional transformation program documents. The findings of the study show that institutions that have integrated digital competency training and adaptive Human Resources Management policies, such as digital performance management, competency-based recruitment, and cross-sector training partnerships, show higher levels of readiness and success of digital implementation. The study concludes that effective digital governance requires coordinated education reform and HR innovation, and recommends policy integration to strengthen workforce agility and digital competencies in the public sector.

INTRODUCTION

Digital transformation has become a top priority for governments around the world, including in Indonesia, to improve the efficiency and quality of public services. Digital governance, defined as the application of information and communication technology (ICT) to simplify government processes and improve interaction between government and society, plays a key role in creating a more transparent, responsive, and accountable system of government (Li & Shang, 2020). In Indonesia, various digitalization initiatives have been launched, ranging from e-government services to business registration and immigration services. However, the successful implementation of digital governance depends not only on sophisticated technological infrastructure, but also on the readiness of existing human resources (HR) (Junaidi et al., 2024).

One of the most important factors in supporting the digital transformation of government is the quality of human resources in the public sector. Human resources who have adequate digital competence will be able to utilize technology to improve the quality of public services provided to the community (Atmoko et al., 2024). Without skilled human resources, even though technology is available, digitalization efforts will be hampered and will not achieve the desired goals. Therefore, the readiness of human resources is the main key in ensuring the success of digital transformation in government. However, the main challenge facing Indonesia is the gap between the readiness of technological infrastructure and the readiness of human resources to support digital governance. Inadequate education and training are often obstacles in creating a workforce that is ready to face the demands of digitalization (Sungkono et al., 2024). Education must be able to develop relevant technical skills, such as programming, data management, and digital literacy, which are urgently needed to support the shift towards digital governance. In addition, soft skills such as problem-solving, creativity, and adaptability are also very important in dealing with the dynamics of digital transformation (Hamzah et al., 2024).

For this reason, the education system in Indonesia needs to reform to adapt to the increasingly rapid needs of digital transformation. Education should not only focus on mastering technical skills alone, but should also prepare individuals with broader skills, which can facilitate adaptation to rapid technological changes (Sungkono et al., 2024). This is a major challenge for existing educational institutions, which are often unresponsive to changing industrial and technological needs. In addition, human resource management (HRDM) in the public sector also plays an important role in supporting digital transformation. Human Resources must focus on developing digital competencies for civil servants, by implementing policies that support continuous learning and career development based on digital competencies (Kurniasih et al., 2023). However, many government agencies in Indonesia still use traditional Human Resources practices that emphasize more on administration and compliance, without paying attention to the development of digital competencies needed in digital governance (Elenezi et al., 2017a).

In this context, education and human resources must work together to ensure that the public sector workforce has the skills to match the demands of digital governance. This collaboration can help bridge the gap between the existing educational curriculum and the practical needs faced by government agencies in the face of digital change. Therefore, it is important for governments and educational institutions to build close partnerships, in order to develop training programs that are relevant to the needs of the increasingly digital world of work (Akhoirshieda et al., 2024). It is important to note that although various digitalization initiatives have been implemented in Indonesia, there is still a gap between the readiness of technology and the readiness of human resources to support the implementation of digital governance. This gap occurs because education and human resources have not been fully integrated to address these challenges (Gong, 2024). Education that is not responsive to technological changes causes the resulting graduates to not be fully prepared to adapt to an increasingly digital work environment. Meanwhile, Human Resources policies that still use traditional approaches often do not pay attention to the development of much-needed digital competencies.

This study aims to explore how the role of education and HRM can support the implementation of effective digital governance. This research also focuses on identifying key factors in education that can improve the digital readiness of human resources, as well as Human Resources practices that can support digital transformation in the public sector (Marlina et al., 2023). It is hoped that the results of this research can make a significant contribution to the development of theory and practice in the field of education and human resource management, especially in supporting the digital transformation of government in Indonesia.

Finally, this research is expected to provide deeper insights into how education and HRM can collaborate to create a workforce that is ready to face the challenges of digital governance. Thus, this research will not only enrich the existing literature, but also provide practical policy recommendations for policymakers in Indonesia to design more effective education and HRM strategies in supporting successful digital governance (Ramli, 2017).

THEORETICAL FRAMEWORK

Digital transformation in government can be explained by integrating two main theories, namely Human Capital Theory and Institutional Theory. Human Capital Theory emphasizes that investment in education and training can improve the quality of human resources, which in turn will increase the productivity and efficiency of the organization (Gong, 2024; Kurniasih et al., 2023). In the context of digital governance, this theory is relevant because it shows that the development of digital competencies through education and training can prepare individuals to face the Digital transformation in government can be explained by integrating two main theories, namely Human Capital Theory and Institutional Theory. Human Capital Theory emphasizes that investment in

education and training can improve the quality of human resources, which in turn will increase the productivity and efficiency of the organization (Gong, 2024; Kurniasih et al., 2023). In the context of digital governance, this theory is relevant because it shows that the development of digital competencies through education and training can prepare individuals to face the challenges of digitalization in the public sector. Therefore, investment in education and human resource development is essential in achieving effective digital governance.

Meanwhile, Institutional Theory provides a different perspective by emphasizing the importance of structures, norms, and cultures in organizations that influence the behavior of individuals within them. This theory is relevant in the context of digital governance because structural and cultural changes in the public sector are indispensable to support a successful digital transformation (Elenezi et al., 2017b; Scupola & Mergel, 2022). In the implementation of digital governance, changes in HR policies and organizational reforms focused on developing digital competencies are key to creating an environment that supports the effective adoption of new technologies.

Human Capital Theory and Institutional Theory complement each other in explaining the success of government's digital transformation. Education that is responsive to technological developments, such as the development of digital competency-based curriculum, plays a role in providing a workforce that is ready to face the demands of digital governance (Hamzah et al., 2024; Sungkono et al., 2024). On the other hand, Human Resources practices that support the development of digital competencies through continuous training, digital competency-based recruitment, and technology-based performance appraisal systems, will ensure that existing human resources continue to develop in accordance with evolving technological needs (Kurniasih et al., 2023; Pardo, n.d.).

The importance of integration between education and human resources in supporting digital governance can also be seen from the perspective of these two theories. Human Capital Theory supports the creation of a workforce that has the technical and non-technical skills necessary in the face of digital transformation, while Institutional Theory suggests that government organizations must make structural and cultural changes that support technology adoption. By integrating these two theories, an ecosystem will be formed that supports the development of competent human resources in supporting the implementation of effective digital governance (Akhoirshieda et al., 2024; Alwaely et al., 2024).

LITERATURE REVIEW

Digital governance is a concept that refers to the use of information and communication technology (ICT) to improve the efficiency, effectiveness, and

transparency of public services. Government digitalization includes the transformation of various government processes such as data management, online service provision, and interaction between the government and the community through digital platforms (Santa et al., 2019; Zorali & Kanipek, 2023). This transformation allows the government to provide services that are more responsive and in accordance with the needs of the community, as well as increase accountability through greater transparency. While the application of technology can bring many benefits, challenges in its adoption and implementation, such as inadequate infrastructure, resistance to change, and low digital literacy among people, are still major obstacles to the success of digital governance (Budiman & Syafrony, 2023).

In Indonesia, although various digitalization initiatives have been implemented by the government, such as e-government services involving business registration, permit application, and immigration services, there is still a gap between technological readiness and human resource readiness to support the implementation of digital government (Atmoko et al., 2024). This reflects the importance of attention to education and training that can equip the workforce with the digital competencies needed. Education in Indonesia must transform to be able to prepare individuals with relevant technical skills, such as programming, data analysis, and information systems management (Sungkono et al., 2024). However, there are still major challenges related to the quality of education and inequality of existing educational infrastructure, especially in remote areas.

In addition to technical skills, education also needs to focus on developing soft skills that support adaptation to technological dynamics. Skills such as problem-solving, creativity, and adaptability are critical in supporting the success of digital transformation. Education that not only teaches technical skills, but also the ability to adapt to change, will help the workforce to be better prepared for the digital challenges of the future (Hamzah et al., 2024). Therefore, the integration between education, digital skills development, and values that support a culture of innovation needs to be a major concern in education reform to support digital governance.

The role of human resource management (HRM) in the public sector is also very important in supporting the digital transformation of the government. Human Resources Management in the public sector is not only responsible for recruiting employees, but also must ensure that existing employees have the right competencies to support the use of technology in public services. Effective HR practices, such as continuous training, competency-based career development, and technology-based performance appraisal systems, can improve human resource readiness to support digital governance (Harrison et al., 2011; Santa et al., 2019). However, many government agencies still implement traditional Human Resources Management practices, which focus more on

administration and compliance, without paying enough attention to the development of the necessary digital competencies.

Studies on education and human resources in the public sector show that collaboration between educational institutions and the government in developing curricula that suit the needs of the world of work is very important to create human resources that are ready to support digital governance. This collaboration can be in the form of joint training programs, internships, or research projects involving the public sector and the education sector, resulting in programs that are more relevant to the government's digitalization needs (Akhoirshieda et al., 2024). In addition, a more adaptive Human Resources Management policy to technological changes and evolving job needs should be introduced to ensure that public sector human resources are always ready to face the ever-evolving challenges of digital transformation.

On the other hand, although education and human resources play a major role in supporting digital governance, there are still many challenges related to its implementation. One of them is the lack of close cooperation between the education sector and the government sector in designing training programs that are in accordance with the needs of government digitalization. Education that is not fully responsive to technological developments often results in graduates who are not prepared to face the demands of an increasingly digital world of work. Therefore, there is a need for policies that integrate education and human resources to create a workforce that is ready to face the digital era and support the success of digital governance in Indonesia (Gong, 2024; Junaidi et al., 2024).

METHODOLOGY

This study uses a qualitative approach with a case study method to explore the role of education and human resource management (HRM) in supporting the implementation of effective digital governance. The qualitative approach was chosen because it allows to explore an in-depth understanding of the practices and challenges faced in the integration of education and human resources in the context of digital governance. Case studies were conducted in several government agencies in Indonesia that have implemented digital transformation programs, to gain insights into how education and human resources policies support or hinder the implementation of technology in public services (Junaidi et al., 2024). Data was collected through semi-structured interviews with policymakers, HR managers, and training officials at relevant agencies, as well as analysis of existing transformation program documents.

The data collection process is carried out by exploring various perspectives from various stakeholders who are directly involved in the implementation of digital governance. In addition to interviews, this study also analyzed relevant documents, such as digital transformation program reports and HR policies implemented in each agency. This method allows researchers to obtain rich and holistic information on education and HRM practices relevant to digital governance. Data analysis is carried out using thematic analysis techniques to identify and group the main themes that emerge related to human

resource readiness, challenges faced, and policies that can improve the success of digital governance (Kurniasih et al., 2023; Scupola & Mergel, 2022).

RESULTS AND DISCUSSION

The Role of Education in Digital Government

Education has a very important role in preparing the workforce that is ready to face digital transformation in the public sector. Education that is responsive to technological change can produce a workforce that has not only technical skills, such as programming and data management, but also non-technical skills that support adaptation to change, such as creativity and problem-solving skills (Hamzah et al., 2024; Sungkono et al., 2024). Digital competency-based education that is relevant to the needs of digital government will improve the quality of human resources that can directly contribute to the success of technology implementation in public services. Therefore, the educational curriculum in Indonesia needs to integrate more digital skills training to ensure that the graduates produced are ready to participate in digital governance.

In addition to technical skills, education also plays a role in creating an inclusive digital culture. Education that promotes digital literacy ensure that all levels of society, including those in remote areas or those who are economically disadvantaged, have equal access and opportunities to participate in the digital ecosystem (Hamzah et al., 2024). Training programs for teachers and educators are also important to accelerate technology adoption and ensure that the entire education system in Indonesia can prepare individuals who can support digital transformation in the public sector. Thus, education is not only a provider of skills, but also an agent of change that can drive the adoption of technology and innovation in digital governance (Sungkono et al., 2024).

The Role of Human Resources in the Public Sector

Human Resource Management (HRM) in the public sector plays an important role in supporting the implementation of digital governance. Effective HR practices, such as continuous training, digital competency-based career development, and technology-based performance assessment, can increase human resource readiness to face digitalization challenges (Harrison et al., 2011; Kurniasih et al., 2023). However, many government agencies still use traditional Human Resources approaches that focus on administration and compliance without paying attention to the development of digital competencies needed to meet the demands of digital governance. Therefore, more adaptive and competency-based Human Resources Management reforms are needed to create a workforce that is ready to support digital transformation in the public sector.

Human resources reform in the public sector must include the development of policies that support continuous learning, digital competency-based recruitment, and the integration of technology in employee performance

assessment. A more flexible and responsive HR policy to technological developments will ensure that human resources in the public sector continue to develop relevant skills and are able to adapt to evolving digital needs. Without an adaptive Human Resources Management policy, the public sector will find it difficult to create an environment that supports the effective implementation of new technologies (Kurniasih et al., 2023).

Integration of Education and Human Resources for Digital Government

The integration between education and human resources is critical to supporting the success of digital governance. Education that provides the digital skills needed must be balanced with HR policies that ensure employees have the opportunity to develop those skills in their work. Cooperation between educational institutions and government agencies in designing training programs in accordance with the needs of government digitalization is urgently needed to accelerate technology adaptation in the public sector (Akhoirshieda et al., 2024). Joint training programs, internships, and research projects involving the education sector and government can help bridge the gap between the theories taught in educational institutions and practical applications in the field.

This collaboration can also create training programs that are more relevant to the government's digital needs, such as training in big data management, cybersecurity, or information systems management. Thus, the workforce in the public sector not only has the basic skills needed to work in a digital environment, but also the specific skills needed to support the technologies and innovations implemented in digital governance (Junaidi et al., 2024). This integrated education and human resources can create a workforce that is not only technically skilled, but also able to adapt and innovate in the face of rapid technological changes.

Furthermore, the integration between education and human resources will also strengthen an organizational culture that supports continuous learning and innovation. Education that instills an adaptive and innovative mindset, combined with Human Resources Management policies that encourage the development of digital competencies, will accelerate the adoption of new technologies in the public sector (Alwaely et al., 2024). Without a good integration between education and human resources, the public sector will have difficulty in producing human resources that can support digital transformation effectively. Therefore, it is important for governments and educational institutions to build close partnerships to create a workforce that is ready to support a successful digital government.

Education and Human Resources Model for Digital Government Model Development

The development of an effective education and human resource management (HRM) model to support the implementation of digital governance requires the integration between a digital competency-based education curriculum and an HRM policy that supports continuous learning and digital skills development in the public sector. This model should be designed to address the challenges of rapid digital transformation and the need for a competent workforce in information technology management in the public sector (Sungkono et al., 2024). The model consists of several key components: (1) an educational curriculum that integrates digital skills such as programming, data management, and cybersecurity, (2) a digital competency-based Human Resources Management policy, and (3) a training program that is sustainable and relevant to evolving technological needs.

Education needs to prepare individuals with technical skills relevant to digital governance, as well as non-technical skills such as adaptability, creativity, and the ability to solve problems in a digital context (Hamzah et al., 2024; Sungkono et al., 2024). Human resource policy, on the other hand, must ensure that civil servants have the opportunity to continuously develop their digital competencies. This includes continuous training, digital competency-based recruitment, and a performance appraisal system that is integrated with technology (Kurniasih et al., 2023). As such, the development of this model requires close collaboration between education, government, and the private sector to ensure that all relevant elements function synergistically in support of digital transformation.

Collaboration between Educational Institutions

Collaboration between educational institutions and government agencies is essential in developing effective models to support digital governance. Educational institutions need to work with the government to design a curriculum that not only meets academic standards, but is also relevant to practical needs in an increasingly digital world of work. One way to increase this synergy is through joint training programs, internships, and research projects involving both sectors. With these partnerships, education can provide the skills needed, while the government can provide insights into the specific skills needed to support the application of technology in public services (Akhoirshieda et al., 2024).

This collaboration could also include the development of training in more specific areas, such as big data management, data analytics, and cybersecurity, which are particularly relevant in the context of digital governance. This more targeted and needs-based training program will ensure that public sector employees not only gain basic technical skills, but also the ability to adapt to evolving technological needs (Junaidi et al., 2024). In addition, with this collaboration, the educational curriculum can continue to be updated in accordance with technological developments and the needs of the dynamic

world of work, so that the graduates produced are better prepared to face the challenges of digital government that continue to change.

It is also important to involve the private sector in this collaboration, particularly companies focused on technology and innovation. Private companies can play a role in providing digital skills training that is more focused, based on the latest technology, and relevant to the government's digitalization needs. In addition, partnerships with the private sector can accelerate the transfer of knowledge regarding new technologies, which will support education and digital competency development in the public sector (Alwaely et al., 2024). Thus, collaboration between educational institutions, government, and the private sector will create an ecosystem that supports the creation of human resources who are ready to contribute to digital governance.

POLICY RECOMMENDATIONS

Enhanced Digital Leadership Training

Digital leadership training is essential to ensure that leaders in the public sector can lead digital transformation effectively. Therefore, the government needs to implement policies that prioritize digital leadership training for public officials at all levels of government. This training program should include an understanding of the latest technologies, digital change management, as well as how to lead teams in the adoption and implementation of new technologies. Digital leadership training focuses not only on technical skills, but also on the development of managerial skills, such as data-driven decision-making and problem-solving arising from technological changes (Kurniasih et al., 2023; Scupola & Mergel, 2022). By engaging leaders in this training, they will be better prepared to address the challenges that arise in the digitalization process and be able to provide clear direction and support digitalization initiatives within their organizations.

The policy should also include the establishment of the latest technology-based digital training programs, such as big data analytics, artificial intelligence, and blockchain, that can provide practical insights for leaders in managing technology in public services. The training program can be organized through collaboration with universities, professional training institutions, and the private sector that have expertise in the field of technology. Thus, digital leadership training will accelerate the adoption and utilization of technology in government and support the success of broader digital transformation in the public sector (Akhoirshieda et al., 2024; Harrison et al., 2011).

Overcoming Budget and Infrastructure Constraints

One of the main challenges in the implementation of digital governance is the limited budget and adequate infrastructure. For this reason, the government needs to formulate policies that focus on budget optimization in a more efficient and targeted way to support digitalization. One approach that can be taken is to allocate sufficient funds for the construction and maintenance of digital infrastructure that supports government operations, such as data centers,

information management systems, and hardware needed for the implementation of e-government (Alwaely et al., 2024). In addition, the budget must also be directed to support continuous training for civil servants in the development of digital skills, so that human resources can continue to adapt to technological changes.

Governments can also consider establishing public-private partnerships in the development of digital infrastructure, such as the construction of data centers or more efficient communication networks. Through this partnership model, the government's budget burden can be reduced, while the private sector can contribute with its technology and expertise. This will accelerate the development of the digital infrastructure needed to support digital governance, especially in areas that lack infrastructure or are difficult to reach. The government must also evaluate budget policies that support the implementation of more efficient technology, such as the use of cloud computing solutions and the use of open-source-based software that can reduce operational costs (Gong, 2024; Santa et al., 2019).

Focus on Sectors in Need of Digitalization

The government needs to focus digitalization on sectors that have a direct impact on public services and more efficient governance. Sectors such as health, education, and immigration services are areas in dire need of digitalization to improve the quality of services and achieve higher efficiency. Policies that support digitalization in these sectors must be prioritized, given their important role in public services and the success of the government's digital transformation (Junaidi et al., 2024). For the health sector, for example, the government can focus on developing an integrated health information system, so that patient data can be managed more efficiently and can support faster and more accurate medical services.

In addition, the education sector must also be a top priority in digitalization. With the development of educational technology, such as online learning and the use of technology-based learning platforms, the government can increase access to education throughout Indonesia, especially in remote areas that have limited access to educational facilities (Sungkono et al., 2024). Therefore, policies that support the development of technological infrastructure in the education sector must be accelerated. Training programs for teachers and educators on the use of digital technology in the learning process must also be encouraged to ensure that education in Indonesia can keep up with rapid technological developments. By focusing digitalization efforts on sectors in need, the government will be able to optimize the use of technology to improve the quality of public services and create a government that is more efficient and responsive to the needs of the community (Alwaely et al., 2024; Hamzah et al., 2024). With this focused approach, the digital transformation process in Indonesia will be more targeted and can have a greater impact in improving the quality of life of the community through better public services.

CONCLUSION

Digital government is an important step in realizing public services that are more efficient, transparent, and responsive to people's needs. However, to achieve this goal, it is necessary to have competent human resources (HR), who not only master technical skills, but also non-technical skills such as adaptability and problem-solving. Therefore, education and human resource management play a crucial role in supporting the implementation of effective digital governance. Education that is responsive to technological changes, as well as Human Resourcing Management policies based on digital competencies, will produce human resources who are ready to face the challenges of digitalization.

However, despite the various digitalization initiatives that have been launched, there are still major challenges in terms of infrastructure and human resource readiness. The gap between available technology and the readiness of human resources to utilize this technology needs to be addressed immediately through policies that support the sustainable development of digital competencies. In addition, closer collaboration between educational institutions, the government, and the private sector is urgently needed to create curricula and training programs that are more relevant to the needs of the public sector.

The policy recommendations proposed in this study, such as improving digital leadership training, efficient budget and infrastructure management, and focusing on sectors that need digitalization, are expected to accelerate the government's digital transformation process. The government needs to ensure that Human Resourcing Management policies are more adaptive and based on digital competence, while the education sector must play a more active role in producing graduates who are ready to support digital governance. By integrating education and Human Resources Management in one coordinated model, digital governance can be realized more effectively, creating better public services and more responsive to technological developments.

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