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The Function of Digitalization to Increase the Effectiveness and Efficiency of Public Service (Case Study in Dili Municipal Authority)

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ABSTRACT

This study investigates how digitalization functions to improve the effectiveness and efficiency of public services within the Dili Municipal Authority. Motivated by global and regional efforts to modernize public administration, the research examines the implementation and impact of specific digital systems Portal Munisipal, Balkaun Uniku, and Baze Biometric on service delivery, transparency, accountability, and operational performance. The primary objective is to evaluate whether and how digital tools transform citizen access to services, reduce process time and manual workloads, and inform policy recommendations for broader municipal digital transformation.

A mixed-methods case study approach was employed. Quantitative data were collected from municipal service records, system usage logs, and performance indicators (e.g., transaction processing times, service uptake rates) before and after system deployment. Qualitative data were gathered through semi-structured interviews with municipal officials, frontline staff, and service users, complemented by direct observation of service points and review of relevant policy documents. Triangulation of data sources supported validity and provided a nuanced understanding of technological, organizational and user-level factors shaping outcomes.

The research findings such as The Portal Munisipal and Balkaun Uniku increased public access to service information and status tracking, leading to improved visibility of processes and reduced opportunities for informal practices. Automation and digital workflows reduced average processing times for many services, decreased reliance on physical queuing, and improved record-keeping accuracy. Baze Biometric improved identity verification speed and reduced errors in beneficiary identification. The benefits of digital systems were constrained by limited staff competence in information systems and digital tools. Training gaps and resistance to change affected optimal utilization of technologies. The digital divide characterized by limited internet access, inadequate devices, and intermittent power and connectivity in remote and peri-urban areas restricted citizen uptake and prevented full migration from manual to digital procedures. Certain processes (e.g., document collection, specific payment channels) continue to rely on offline mechanisms, reflecting regulatory, technical, and cultural barriers to end-to-end digitalization.



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INTRODUCTION

Digital transformation has become the main basis for improving governance in the modern era. Technological change through information and communication technology (ICT) has brought about major changes in various sectors and also in everyday life, including in governance and public service delivery. Based on the United Nations E-Government Survey 2020, more than 80% of countries around the world have implemented some form of e-government, indicating a strong global trend towards the benefits of technology to improve public services.

Digitalization is a strategic necessity in the delivery of public services in the modern era. Its main function is to provide faster, more transparent administrative governance, and to meet the increasingly complex needs of the public. In the context of public services, digitalization is not only the application of technology but also an instrument of bureaucratic reform aimed at improving the effectiveness and efficiency of service delivery. Digital transformation in public service also requires a change in mindset and work culture among public servants. Public servants need to be more adaptive to technological change, have good technology adaptive skills, and be able to collaborate with various parties in the digital ecosystem. Therefore, the digitalization of public services is not only about the use of digital applications and platforms, but also about developing high-quality and competitive human resources.

However, the implementation of digitalization also presents its own challenges, incompatible infrastructure, the digital divide, and the threat of cybersecurity are issues that need to be addressed. Therefore, a comprehensive and integrated strategy is needed to ensure that digitalization can provide optimal benefits for improving the quality of governance and public services. This issue is linked to (Heeks 2002), he thought when he identified that, e-government projects in many developing countries are failed due to lack of preparation of institutions and inadequate human resource skills.

This study aims to understand how the function of digitalization to increase the effectiveness and efficiency of public services, especially in the Dili Municipal Authority. The results of this study will give a real contribution to the local government, especially the Dili Municipal Authority to formulate policies and strategies of digitalization well, so as to realize public services that give satisfaction and ensure the welfare of the community.

1.1 Digitalization

Digitalization is the process of converting non-digital information into digital form (Heiskala et al., 2016 in Wardani, R. 2023). Academically, the concept of digitalization was first introduced in the context of analog to digital data conversion (Brennen & Kreiss, 2016). Digitalization theory also refers to the transformation process that occurs when information and services are converted into digital formats. Brynjolfsson and McAfee (2014), continue to expand this understanding by saying that digitalization is not only about

processing and storing information, but also changes the fundamental operating model of organizations, including the way government institutions respond to public needs. Thereby, digitalization is not only a technical tool, but an instrument for institutional transformation. Meanwhile Irfan, (2023), defines that digitalization is the process of converting information or data from physical form to digital format that can be processed using information technology. In an effort to improve the quality of public services, the government needs to utilize various online platforms such as websites, mobile applications, and social media. This step aims to strengthen the e-government system and facilitate public access to information and services provided by the government.

Based on the definitions mentioned above, it can be concluded that digitalization is a modern transformation change, which not only impacts the private and public sectors but also strongly influences public interaction. Digitalization has become a fundamental phenomenon in various aspects of life, including in all sectors. digitalization not only changes the operational mechanisms in government services but also has implications for social interaction from the community everyday. With advanced technological change, it is important for us to understand how digitalization can become a tool to improve the quality of government services to the public.

1.2 Effectiveness

Generally efficacy refers to the belief of an individual or group, with their ability to achieve specific goals. In a broader context, the concept of effectiveness can be applied to a variety of domains, including organizations and systems. Albert Bandura, in his Social Cognitive Theory, introduced the concept of self-efficacy as an individual's belief in their ability to organize and execute the actions necessary to produce some achievement. Efficacy is not just the expectation of an outcome, but the belief in one's ability to produce that outcome. He emphasizes Self-efficacy as the belief in the ability of an individual to organize and perform a series of actions deemed necessary to achieve the desired outcome (Bandura 1997 in Widaryati 2013). The opinion of (Widaryati, 2013) is also not separated from Bandura's opinion that self-efficacy is the belief in the ability of an individual and the belief to complete the tasks encountered, overcome obstacles and achieve the desired objectives. Self-efficacy is important for everyone to perform tasks in a variety of situations, from manual work systems to digital-based work systems. This is reinforced by the results of the research conducted by Belz and Hackett in 1983 (in Pajares, 2002), which is stated that a high level of self-efficacy indicates that an employee can more easily pass the training given to them, thus reflecting on their final performance, which tends to indicate a successful employee compared to lower self-efficacy.

Based on the above definitions and insights it can be concluded that, self-efficacy is key in influencing how one feels, thinks, motivates themselves, and adapts quickly. People with high self-efficacy tend to want to face difficult tasks as challenges to be overcome rather than threats to be avoided. They show greater interest in the activities they are involved in and are committed to their goals.

1.3 Efficiency

Efficiency is an important concept in various fields, emphasizing the optimal use of resources to achieve maximum results. Various definitions by experts indicate that efficiency is not only about reducing costs, but also about getting work done in a clear and correct way. (Indrayani, H. 2012) emphasized that, efficiency should be considered as a measure of the quality of work output within a technology. In other words, organizational efficiency relates to how well an organization implements a particular technology. Efficiency based on Seville in Grandmedia Blog 2022 that is to maximizing the results of a task with minimal resources, such as funds, manpower, or time. Based on this definition, the fewer resources or funds used in a business or process, the more efficient it becomes. In other words, efficiency emphasizes doing things clearly.

Based on the above definitions and ideas, it can be concluded that efficiency is also a term that describes the success of a person or organization in their efforts, and measured by the amount of resources used to obtain the results of their activities. However, implementing efficiency is not easy. It requires strong commitment from all elements of the organization, from leadership to employees. In addition, clear systems and procedures are needed, as well as strict supervision to prevent irregularities. The use of information technology is one of the keys to increasing efficiency. Digitalization can speed up administrative processes, reduce paper usage, and facilitate public access to information. Efficiency can be achieved through a variety of means, such as the use of appropriate technology, employee skills development, and effective resource management. Thus, efficiency not only reduces costs but also increases the value and quality of a service or services offered.

1.4 Public Service

Public service is the central function of government to serve the public. Public service is an important part of a country, represented by the government to interact with its community. Many experts have given different definitions of public service. The basic word "service" according to Pasalong (2010:128), is defined as the activity of people, groups and/or organizations either directly or indirectly to meet needs. Meanwhile, (Widodo 2001) defines public service as providing services to meet the needs of the community that are of interest to the person according to established rules and basic procedures.

Based on the above opinions and official sources, it can be concluded that public service is an activity carried out by the government and related institutions to meet the public's needs for goods and services. The primary objective of public service is to improve public welfare, ensure justice, and create good governance. In the context of modern development, public service is not only an administrative obligation but also a strategic tool to strengthen public trust in government.

THE METHOD

This research uses a qualitative approach with a case study method. According to (Creswell & Creswell, 2018), it is stated that qualitative research can reveal the meanings and experiences of individuals that cannot be obtained through quantitative methods. This type of research will also involve document analysis and in-depth interviews with staff and stakeholders in the institution. This aims to gather comprehensive data on the use of information technology and its

impact on public services. The population in this study is the public service in Dili Authority Municipal, but the researchers only choose 6 to be informants in this research.

Table 1. Number of Respondent

Position	Informant
Director STAE Dili Municipal Authority	1
Coordinator of Balkaun Uniku	1
Vocal Point of Dili Authority Municipal Portal	1
AMD reinforcement ICT officer	1
Selected candidates	2

RESULTS AND DISCUSSIONS

The presentation of the research results in accordance with the formulation of the problem with its analysis and interpretation is in accordance with the method of observation and interview directly with the respondents through the request and response session. In this context, the Dili Municipal Authority faces the challenge of integrating information technology into strategic services, including information management. This research aims to understand the role of digitalization in increasing the effectiveness and efficiency of service delivery, by highlighting the digitalization process, the obstacles encountered, and the resulting impact on service quality. The data presented below are the result of observations, interviews and documentation that comprehensively describe the dynamics of the application of digitalization to services in the Dili Municipal Authority.

3.1 Function of Municipal Portal in Dili Municipal Authority

Based on the questions that the researchers have conducted two (2) weeks of research at Dili Authority Municipal. Currently, the Municipal Authority of Dili has implemented digitalization according to Government Decree No. 5/2021, which creates the Municipal Portal, an electronic platform to ensure public access to information on administrative activities, development plans, budgets and municipal services. Based on field observations through digital platforms such as the Municipal Portal which provides an online document submission system and website-based information, officials feel more confident in handling public requests. Thus, public appearance can take place in digital form, which gives action to transparency, accessibility and civic participation, according to Article 15, paragraphs a), c) and d). The vocal point also adds that; "Digitalization makes services effective because electronic systems, such as the Municipal Portal, allow citizens to receive services and information without having to go to the office. For example, people can apply for passports or BI online through the portal, which saves time and reduces unnecessary movements. The Municipal Portal provides free access to information on local services, laws, and programs, which helps people to obtain official data quickly. Therefore, people do not have to ask repeatedly in the public office, which increases administrative efficiency.

3.2 Challenges of Digitalization Implementation in Dili Municipal Authority

The implementation of digitalization of public services in the Dili Municipal Authority faces various obstacles in the field. The main obstacle is having limited technological infrastructure, particularly

unstable internet access and limited support resources. Based on the field observation of the researcher, that this condition often causes technical disruptions and delays in the operation of digital systems. Limited human resource capacity within the Authority also poses a challenge, as not all employees have the technical skills to operate digital systems at their best. Another obstacle identified was the lack of integration of digital systems between departments, resulting in some administrative processes still requiring manual processing. . Meanwhile, the vocal point of the municipal portal also explained that: The biggest challenges that we and our teams have faced are: Lack of technological infrastructure, such as internet and inappropriate facilities; Limited technical capacity for staff; System not integrated between different departments; It is necessary to update information regularly in the Municipal Portal (Article 18); The security and protection of personal data shall be guaranteed (Article 15(g)); Change work culture, because some employees are not adapted to the digital system. To overcome this, continuous training for all employees, investment in infrastructure, and technical support from the Ministry of State Administration are needed.”

Based on the explanation of the vocal point of the municipal portal, it can be concluded that the implementation of digitalization in public services in the Dili Municipal Authority will still face various obstacles that affect the effectiveness and efficiency of program implementation. The main obstacle is the limited information technology infrastructure, with unstable internet access and lack of human resource capacity, thus making it very difficult to support electronic-based service systems.

3.3 Transformation Public Service: Manual to Digital

The shift from manual processes to digital systems in public services is part of the government's efforts to transform bureaucracy into a more modern and responsive system to meet public needs. Before digitalization, most public services were carried out manually through various meetings, physical documents, and paper-based administrative records. This often results in duplicate problems, delays in file processing, and dependence on specific personnel for data verification. This manual work model is not only time-consuming but also opens up opportunities for errors and lack of transparency in the service process. The ICT officer supporting the municipal service also explained that, changes from manual processes to digitalization is not easy, as an IT officer I want to say that it is necessary to increase the capacity of human resources through training and workshops. Therefore, currently as ICT officers to support municipal services we are supporting the services of the Municipal Portal to improve the portal itself and we are also preparing to provide training to AMD employees who are more related to how to prepare for the change of service culture through digitalization.

Based on this explanation, the researcher would like to suggest that investment in human resource capacity building plays an important role in changing the work culture. Because in general, the transformation of public services through the process of digitalization is a significant step to create more effective and innovative governance. While still in the development phase, this change shows the commitment of the Dili Municipal Authority to adapt to the demands of the digital era, while also laying the foundation for faster, more transparent, and more citizen-focused public services.

3.4 Factors Supporting and Challenging Digitalization in Dili Municipal Authority

The main supporting factors for digitalization in the Dili Municipal Authority include central government policy on digital bureaucratic reform, technology budget support, and commitment from institutional leaders. However, challenging factors have also been identified, such as limited technological infrastructure, lack of staff training, and digital literacy levels that have not kept pace with the condition of the public. In addition, technical disruptions, such as unstable internet connections, pose significant challenges to the implementation of digitalization. Other challenges include data security and privacy, which are key concerns in this digital age. There needs to be increased awareness of the importance of personal data protection and the implementation of robust security systems to prevent errors.

3.5 Implications of Research Results

The implications of this research result consist of theoretical implications and practical implications.

3.5.1 Theoretical Implication

Contribution to Public Administration Science: This research makes a significant theoretical contribution to the development of Public Administration, particularly within the framework of bureaucratic digitalization theory and public service effectiveness and efficiency theory. Based on the Public Service Efficacy Theory (Bandura, 1997), efficacy is here defined as employees' confidence in their ability to use digital systems to complete service tasks. The research findings indicate that the higher the level of digital literacy and organizational support, the higher the individual and collective efficacy in performing service delivery. Thus, digitalization has been shown to increase employee effectiveness through increased self-reliance, easier access to information, and reduced administrative barriers. These findings also enriched Weber's Theory of Bureaucratic Efficiency (1947), which emphasized the importance of rationality and structure in public organizations. Through digitization, efficiency is gained by minimizing red tape, speeding up decision-making processes, and optimizing the use of human resources and technology.

3.5.2 Practical implications.

The results of this study have a number of important practical implications for improving the performance of public services within the Dili Municipal Authority and other government institutions in Timor-Leste.

1. The research results confirm that digitalization should be accompanied by enhancing human resource capacity. The implementation of digital technology will not be optimal without adequate competence of employees in the use of information systems and digital devices. Therefore, the government needs to design training programs and invest in improving the quality of human resources and infrastructure.
2. Practically, this research shows the need to strengthen information and communication technology (ICT) infrastructure at the local level. Stable internet access, adequate technology facilities, and robust data security systems are the keys to efficient and reliable digitization of services. The central government needs to make

strategic investments in digital infrastructure to ensure the sustainability of technology-based public services.

- Integration of Manual Processes into Digital Systems: In order to optimize digitalization in the public service, the systems that have been implemented, such as the municipal portal system, single channel, biometric basis must be further integrated with existing manual processes, such as collection and payment of documents.

CONCLUSION

Based on the introduction above, the results of the analysis and the implications of the research results, the writer concluded that digital implementation, such as Portal Municipal, Balaakun Uniku, Baze Biometric has a positive impact on transparency and accountability, efficiency and effectiveness in public services. These systems allow the public to access service information more openly and reduce reliance on manual procedures, such as physical queuing. However, although digitalization has contributed to efficiency and effectiveness, this research finds that the application of technology still faces significant challenges, especially related to the digital divide and limited technological infrastructure in remote areas.

REFERÊNSIA

- Amirullah, I. (2023). Pengaruh Teknologi Informasi Dan Komunikasi (TIK) Dalam Administrasi Publik. *Sammajiva: Jurnal Penelitian Bisnis Dan Manajemen*, 1(4), 383-391.
- Asaniyah, N. (2017). Pelestarian informasi koleksi langka: Digitalisasi, restorasi, fumigasi. *Buletin Perpustakaan*, (57), 85-94.
- Afdila, A., & Adnan, M. F. (2022). Digitalisasi Administrasi Publik Sebagai Salah Satu Perwujudan Reformasi Birokrasi. *Jurnal Ilmiah Ekotrans & Erudisi*, 2(2), 27-32.
- Brennen, J. S., & Kreiss, D. (2016). Digitalization. *The international encyclopedia of communication theory and philosophy*, 1-11.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. WW Norton & company.
- Brown, D. (2005). Electronic government and public administration. *International Review of Administrative Sciences*, 71(2), 241-254.
- Christover, D., Hidayattulah, A. S., & Mawarni, I. (2023). Penerapan Konsep-Konsep Digitalisasi dalam Pelayanan Publik di Kantor Desa Manunggal Jaya Kecamatan Tenggara Seberang Kabupaten Kutai Kartanegara. *Journal of Research and Development on Public Policy*, 2(2), 199-214.
- Castells, M. (2011). *The rise of the network society*. John wiley & sons.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications
- Dwiyanto, Agus, dkk. 2008. *Reformasi Birokrasi Publik di Indonesia*. Gadjah Mada University Press. Yogyakarta.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Fauzi, A. R., & Hakim, A. (2024). Digitalisasi terhadap Pelayanan Publik (Implementasi Digitalisasi Terhadap Pelayanan Publik di Pemerintah Kota Kediri dan Kabupaten Jember). *Jurnal Kolaboratif Sains*, 7(10), 3727-3734.
- Fang, Z. (2002). E-government in digital era: concept, practice, and development. *International journal of the Computer, the Internet and management*, 10(2), 1-22.]
- Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *Milbank Quarterly*, 82(4), 581-629.
- Gunungsitoli: Analisis terhadap prosedur kendala dan rapat evaluatif. *Jurnal Ilmu Ekonomi, Pendidikan Dan Teknik*, 1(2), 32-39.
- Harahap, A. F. R., & Harahap, A. M. (2023). Peran Digitalisasi dalam Meningkatkan Partisipasi Publik pada Pengambilan Keputusan Tata Negara. *Jurnal EDUCATION (Jurnal Pendidikan Indonesia)*, 9(2), 769-776. <https://doi.org/10.29210/1202323208>
- Heeks, R. (2002). Information Systems and Developing Countries: Failure, Success, and Local Improvisations. *The Information Society*, 18(2), 101-112. DOI: 10.1080/01972240290075039
- Irfan, B., & Anirwan, A. (2023). *Pelayanan Publik Era Digital: Studi Literatur*. Indonesian Journal of Intellectual Publication, 4(1), 23-31.
- Indrajit, R. E. (2002). *Electronic government: strategi pembangunan dan pengembangan sistem pelayanan publik berbasis teknologi digital*. Andi.
- Indrayani, H. (2012). Penerapan teknologi informasi dalam peningkatan efektivitas, efisiensi dan produktivitas perusahaan. *Jurnal El-Riyasah*, 3(1), 48-56.
- Lahagu, P., Ndraha, A. B., & Halawa, O. (2023). Pengaruh efikasi diri terhadap perencanaan karir pegawai dengan motivasi karir sebagai variabel mediasi pada kantor camat Medang Deras Kabupaten Batu Bara. *Jurnal Ilmiah METADATA*, 5(3), 1-18
- Moleong, L. J. (2006). *A. Metode Penelitian*. Bandung: PT RemajaRosdakarya.
- McKinsey. (2015). *Industry 4.0 How to navigate digitization of the manufacturing sector*. McKinsey Digital, retrieved from [Industry-40-How-to-navigate-digitization-of-themanufacturing-sector.ashx \(mckinsey.com\)](https://www.mckinsey.com/industries/manufacturing/how-to-navigate-digitization-of-the-manufacturing-sector)

Books

- Widodo, J., (2001.) *Pelayanan Publik*. Jakarta: PT. Bumi Aksara
- Weber, M. (1947). *The Theory of Social and Economic Organization*. (A. M. Henderson & T. Parsons, Trans.). New York: Oxford University Press.

Disertation

- Wardani, R. (2023). *Digitalisasi Pelayanan Publik: Studi Fenomenologi Tentang Makna Teknologi Informasi Dalam Meningkatkan Kualitas Layanan Publik= Digitalization Of Public Service: A Phenomenological Study Of The Meaning Of Information Technology In Increasing The Quality Of Public Services* (Doctoral Dissertation, Universitas Hasanuddin).

Website

- [Kompas.com](https://www.kompas.com)"4PilarPeningkatanKualitasPelayananPublik",:

<https://nasional.kompas.com/read/2022/03/10/03000071/4-pilar-peningkatan-kualitas-pelayanan-publik>

Série I No 5 ,PUBLICAÇÃO OFICIAL DA REPÚBLICA DEMOCRÁTICA DE TIMOR - LESTE.

SIPAS, R. (2024, August 24). *SIPAS*. Retrieved from SIPAS:<https://www.sipas.id/blog/>.

Asian Development Bank (ADB). (2022). *Initial Poverty and Social Analysis: e-Government Development and Infrastructure Project, Timor-Leste.*

United Nation Economic and Social Commission for Asia and the

Pacific (UNISCAP). 2019. *Regulatory Policies and ICT Trends: Insights from Timor-Leste, Bnagkok.*

