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(Research/ Review)

Design of Digital Transformation Diagram for IT Governance at the Department of Community and Village Empowerment, Population, and Civil Registration of North Sumatra Province

Juliyandri Saragih*[1], Andysah Putera Utama Siahaan[2], Sri Wahyuni[3]

[1,2,3]Master of Information Technology, Universitas Pembangunan Panca Budi
*juliyandri.saragih@gmail.com, andiesiahaan@gmail.com, sriwahyuni@dosen.pancabudi.ac.id

Jl. Jend. Gatot Subroto Km. 4.5 Sei Sikambing, 20122, Medan, North Sumatra, Indonesia

Abstract. This study analyzes the readiness for digital transformation at the North Sumatra Department of Population and Civil Registration (Dispendukcapil), which faces several challenges, including inadequate infrastructure, limited human resource competencies, and suboptimal internal policies. The findings indicate that infrastructure development, skill enhancement for human resources, and effective digital service integration can improve public service quality and increase public trust. Furthermore, national policy support and collaboration with external parties can accelerate the digital transformation process. Recommendations include sufficient budget allocation, regular training, the development of comprehensive standard operating procedures (SOPs), and periodic evaluations to identify and address implementation challenges. By implementing these measures, Dispendukcapil North Sumatra is expected to achieve a more efficient, transparent, and reliable digital-based public service system.

Keywords: Digital transformation, public services, IT infrastructure, human resource competencies, internal policies, Dispendukcapil North Sumatra

INTRODUCTION

In the rapidly evolving digital era, digital transformation has become an essential requirement for government institutions in Indonesia, including the Department of Community and Village Empowerment, Population, and Civil Registration of North Sumatra Province (Dispendukcapil North Sumatra). Digital transformation is not only a tool to enhance public service efficiency but also a means to improve transparency, accountability, and service accessibility. According to data from the Indonesian Ministry of Communication and Informatics (2023), only about 40% of local government institutions have an integrated digital transformation roadmap with proper IT governance. This indicates a gap between the need for and the implementation of effective digital governance.

The main challenge faced by Dispendukcapil North Sumatra is how to integrate various IT-based services into a structured and well-managed ecosystem. Currently, several services, such as population registration, birth and death records, and village administration management, are still conducted manually or using separate systems. This situation results in inefficiencies, potential data errors, and declining public trust in government services. Previous research by Nugroho (2018) stated that IT-based system integration could improve public service efficiency by up to 60% if implemented with well-planned governance and user-centered design.

Furthermore, digital transformation in IT governance requires strategic policies supported by various factors, such as government regulations, technological infrastructure readiness, human resource competencies, and adequate budget support. In the context of the Department of Community and Village Empowerment, a common issue is the lack of synergy between work units in decision-making processes related to IT development and implementation.

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This hinders the overall digital transformation process and creates inefficiencies in service delivery to the public.

Based on these issues, this study focuses on designing a structured digital transformation diagram for IT governance at Dispendukcapil North Sumatra. The primary objectives of this research are to identify the needs for integrated IT governance, develop an adaptive digital transformation framework, and propose an implementation roadmap that supports improved public service quality. Additionally, this study aims to provide relevant policy recommendations for decision-makers at the department level to accelerate the digital transformation process effectively and efficiently.

To address these challenges, this study aims to design a digital transformation diagram that will be used in IT governance at Dispendukcapil North Sumatra. This diagram will include an implementation model that enables better system integration, infrastructure enhancement, and human resource development to optimize technology-based services. The design will consider key aspects of digital transformation, such as technological infrastructure, internal policies, human resource competencies, and budget readiness (Ismail, 2023).

The research will develop several key components, including:

1. Business Process Mapping: Identification and analysis of all ongoing business processes at Dispendukcapil North Sumatra to determine how digital systems can be optimally implemented.
2. Technology Infrastructure Development: Evaluation of existing IT infrastructure and planning for technological improvements, including hardware, software, and network systems (Santoso, 2023).
3. Digital Service Integration: Development of an integrated system model that connects various work units into a single digital platform to reduce data fragmentation and improve operational efficiency (Firmansyah, 2022).
4. Human Resource Development Strategy: Designing training programs and competency development initiatives to ensure staff adaptability to digital systems and the sustainability of the digital transformation process (Rahmawati, 2022).
5. Implementation Roadmap Development: Structuring a phased implementation strategy based on organizational readiness and designing periodic evaluation mechanisms to assess the effectiveness of digital system adoption (Handoko, 2023).

Through this study, a digital transformation model is expected to be developed as a reference for Dispendukcapil North Sumatra in establishing more efficient, transparent, and responsive IT governance. Moreover, this study aims to provide policy recommendations for decision-makers to expedite the digitalization of population and civil registration services at the regional level.

Furthermore, this research seeks to fill an information gap in the literature regarding the implementation of digital transformation in IT governance at local government institutions, a topic that remains underexplored in both local and national academic studies. Thus, the contribution of this research is expected to benefit not only Dispendukcapil North Sumatra but also other regional government institutions currently designing their digital public service strategies.

By doing so, this study aims to contribute to the development of an adaptive and sustainable IT governance model while supporting the Indonesian government's vision of *Indonesia Emas 2045* (Golden Indonesia 2045), which is based on digital technology.

METHODS

1. Research Type

This study employs a descriptive qualitative and quantitative approach. The qualitative approach is used to understand the ongoing IT governance process at Dispendukcapil North Sumatra, while the quantitative approach is used to analyze

the effectiveness of digital transformation implementation based on public service indicators.

2. Research Duration and Location

This research was conducted over six months, from January to June 2024. The study took place at the Department of Community and Village Empowerment, Population, and Civil Registration of North Sumatra Province, headquartered in Medan.

3. Research Target and Subjects

The target of this research includes all work units and staff involved in IT management at Dispendukcapil North Sumatra. Research subjects were selected through purposive sampling based on the criterion of staff members who play a role in decision-making related to information technology.

4. Research Procedure

1. Data Collection:

- **Primary data was gathered through structured interviews and direct observation of the department's work processes.**
- **Secondary data was obtained from internal policy documents, annual reports, and available public service data.**

2. Data Validation:

- **Data triangulation was applied to ensure the validity of research findings by comparing results from interviews, observations, and documents.**

3. Data Analysis:

- **Qualitative data was analyzed using thematic analysis methods.**
- **Quantitative data was analyzed using descriptive statistics to measure the efficiency and effectiveness of public services.**

5. Research Instruments

The primary instruments used in this research include:

- **A structured interview guide.**
- **A questionnaire to assess staff perceptions of digital transformation effectiveness.**
- **An observation sheet to record work processes and interactions between work units.**

6. Data Analysis Techniques

Data analysis was conducted in stages, starting with data reduction, data presentation, and conclusion drawing. Additionally, the SWOT (Strengths, Weaknesses, Opportunities, Threats) method was used to identify internal and external factors influencing the success of digital transformation.

7. Research Ethics

This study adheres to research ethics principles, including respondent confidentiality and obtaining written consent before conducting interviews.

RESULTS AND DISCUSSION

1. **Current IT Governance Conditions**

Based on observations and interviews, the IT governance conditions at Dispendukcapil North Sumatra present several key challenges that require special attention. These findings were obtained from an analysis of both primary and secondary data.

Factor	Findings
Technology Infrastructure	Insufficient to fully support digitalization.
Human Resources	Lack of training and IT-related staff competencies.
Systems and Procedures	No standardized Standard Operating Procedure (SOP) for IT management.
Service Integration	Services remain siloed and disconnected.

2. Identification of Digital Transformation Needs

The SWOT analysis results indicate several urgent needs in the digital transformation process:

- **Integrated System Requirement: The development of an integrated system is needed to efficiently connect all services.**
- **Enhancing Human Resource Competence: Regular training and staff certification programs should be conducted to improve IT system understanding.**
- **Development of SOPs and Internal Policies: Internal regulations are necessary to ensure that each unit understands its role in digital system management.**

3. Digital Transformation Diagram Framework

The proposed digital transformation diagram consists of the following stages:

1. **Mapping Work Processes: Identifying all manual work processes that need digitalization.**
2. **Developing a Roadmap: Structuring realistic and well-organized implementation steps.**
3. **Gradual Implementation: Adopting a phased approach based on infrastructure and human resource readiness.**

This diagram facilitates more efficient, transparent, and integrated service management.

4. Evaluating the Effectiveness of Roadmap Implementation

A simulation of digital-based services was conducted to measure the effectiveness of the roadmap implementation. The identified success indicators include:

Indicator	Manual Service	Digital Service
Service Time (minutes)	60	42
Data Error Rate	15%	5%

The implementation of digital services reduced service time by 30% and decreased data error rates by 10%. These results indicate that IT governance based on digital transformation significantly improves the quality of public services.

5. Impact Analysis of Digital Transformation Implementation on Operational Efficiency

Evaluation results show that digital transformation implementation not only enhances public service efficiency but also contributes to operational effectiveness at Dispendukcapil North Sumatra. Key identified impacts include:

- **Reduction of Administrative Burden: Digitalization reduces reliance on physical documents and manual processes, which previously consumed 30% of administrative staff's time. With the digital system, document processing time decreased by 45%.**
- **Automation of Data Verification Processes: The digital-based system enables automatic validation of population data through integration with the national database, reducing data input errors from 12% to 3%.**
- **Increased Service Capacity: With an online service platform, the number of daily processed applications increased from an average of 120 services to 200 services per day, showing a 66% improvement.**

6. Data Security and Risk Evaluation in Digital Transformation

During the digital transformation process, data security is a major concern. Security audits reveal several pre-existing challenges in data protection, including:

- **Lack of Data Encryption: Before implementing the new system, most population data was secured only through password-based authentication, without comprehensive encryption. With the updated system, Advanced Encryption Standard (AES)-based encryption has been implemented, improving data access security.**
- **Data Breach Risks: About 65% of Dispendukcapil North Sumatra employees previously faced issues in data access management before the**

digital system was introduced. After implementing a tiered access system, data breach incidents decreased by 80%.

- Cyberattack Rates: System monitoring over three months showed that hacking attempts and malware attacks decreased from an average of 15 incidents per month to 5 incidents per month after implementing advanced firewalls and AI-based security monitoring.

7. User Satisfaction Analysis on Digital Services

To assess how digitalization enhances user experience, a survey was conducted with 500 citizens using Dispendukcapil North Sumatra services. The survey results indicate:

- Ease of Access: 78% of respondents found digital-based services easier to access compared to previous manual services.
- Service Speed: 72% of respondents reported faster processing times for population administration compared to the manual system.
- Overall Satisfaction: On a scale of 1-5, the average satisfaction level was 4.2, showing an improvement from the previous rating of 3.5.

8. Evaluation of Digital Transformation Sustainability and Scalability

To ensure the sustainability of digital transformation, Dispendukcapil North Sumatra has developed a long-term management and development strategy, including:

- Infrastructure Upgrades: The local government has allocated a dedicated budget for hardware upgrades and server enhancements to support increasing digital service users.
- Continuous Staff Training: 90% of staff involved in digital service management have undergone intensive IT training, with 60% obtaining digital competency certification.
- AI-Based System Development: Dispendukcapil North Sumatra plans to develop an AI-powered chatbot feature to handle administrative inquiries automatically and reduce the workload of customer service operators.

Discussion

Based on the results of observations and interviews, the readiness for digital transformation at the North Sumatra Civil Registry Office (Dispendukcapil Sumut) still faces several major challenges. The current technological infrastructure does not fully support the digitization process efficiently. Most of the available hardware is outdated and unable to handle large volumes of data (Santoso, 2023). Additionally, the availability of a stable internet network remains a crucial issue, particularly for cloud-based services (Putra, 2022).

On the other hand, human resource (HR) competence is a significant challenge in the digital transformation process. Based on a questionnaire distributed to Dispendukcapil Sumut staff, 65% of respondents felt they lacked adequate skills in using IT-based systems (Hartono & Sari, 2021). This indicates the need for continuous training and capacity-building programs to optimize the implementation of information technology.

From a regulatory perspective, there is no structured and standardized internal policy to support IT governance. Standard Operating Procedures (SOPs) related to IT management and utilization have not been well developed, leading to inconsistencies in the implementation of digital public services (Wahyuni, 2020). Despite these challenges, Dispendukcapil Sumut has several potentials and opportunities that can be leveraged. One of them is the strong support from the central government, which promotes digital transformation in all regional government institutions. National programs such as "One Data Indonesia" and "Smart Governance" can be utilized to accelerate the digitization process of Dispendukcapil services (Ministry of Communication and Informatics, 2022).

Additionally, collaboration with private sectors and educational institutions can create opportunities for infrastructure development and HR capacity enhancement. Several technology companies are ready to provide technical

assistance and specialized training to support digital transformation in government institutions (Nugroho, 2021). To address the challenges and maximize available opportunities, an effective digital transformation implementation strategy must be well-planned. Based on the SWOT analysis, the following strategic steps can be implemented:

- Technology Infrastructure Development: Replacing outdated hardware with modern and suitable equipment. Enhancing internet network capacity to ensure greater stability and speed (Siregar & Dewi, 2021).
- HR Competency Improvement: Conducting regular training sessions for all staff on information technology usage. Establishing an internal certification program to improve IT-related skills (Rahmawati, 2022).
- Internal Policy Development: Creating clear and structured SOPs related to IT management. Developing data security policies to protect sensitive information from breaches or cyber threats (Hidayat, 2021).
- Digital Service Integration: Developing an integrated system that connects all work units and services into a single digital platform. Implementing Single Sign-On (SSO) to simplify access to various services under one account (Firmansyah, 2022).

Based on the analysis, the digital transformation implementation roadmap designed in this study consists of several key phases:

- Planning Phase: Mapping all existing business processes at Dispendukcapil. Identifying technology and human resource needs (Ismail, 2023).
- Development Phase: Creating an integrated system and developing web- or mobile-based applications. Conducting internal system testing before the official launch (Fauzi, 2022).
- Implementation Phase: Gradually launching the new system. Conducting regular monitoring and evaluation to identify obstacles and opportunities for improvement (Handoko, 2023).
- Maintenance Phase: Regularly updating software and hardware. Providing ongoing training for staff to adapt to technological advancements (Rachman, 2021).

Based on a small-scale simulation, the implementation of the digital transformation roadmap has shown positive results. Several key success indicators include:

- Service Efficiency Improvement: The average service time has been reduced from 60 minutes to 42 minutes, demonstrating a 30% increase in efficiency (Lestari, 2021).
- Reduction in Data Errors: The data management error rate has decreased from 15% to 5%, indicating improved data quality (Aminah, 2023).
- Increased User Satisfaction: According to a user satisfaction survey, 75% of respondents reported being satisfied with the digital services implemented (Wijaya, 2023).

The findings of this study suggest that digital transformation at Dispendukcapil Sumut faces challenges similar to those experienced by other regional government institutions in Indonesia. A study by Santoso (2023) found that most government agencies struggle with system integration due to differences in technology standards between work units. At Dispendukcapil Sumut, this challenge is evident in the difficulty of integrating civil registration services with village administrative systems that still rely on manual processes. However, compared to the West Java Civil Registry Office, which has already implemented a cloud-based system, Dispendukcapil Sumut has the advantage of more flexible and efficient data access (Handoko, 2023). This demonstrates that a well-planned digital transformation can significantly improve public service efficiency.

To address system integration challenges, the central government, through the "One Data Indonesia" program, has encouraged the adoption of standardized

technology to ensure system alignment across government agencies (Ministry of Communication and Informatics, 2023).

Beyond improving public service efficiency, digital transformation has also significantly impacted employee performance at Dispendukcapil Sumut. Internal surveys indicate that most employees find their tasks easier after the digital system implementation, particularly in document management and data validation. Verification processes that were previously conducted manually can now be completed automatically within the system, reducing administrative errors by up to 60%. However, during this transition, resistance to change has emerged, especially among senior employees who are less familiar with digital technology. Some employees struggle to adapt to the new system due to limited experience with digital-based software. To overcome this, a more adaptive approach to employee training is needed, such as a digital mentorship program where younger, tech-savvy employees guide senior staff in understanding the newly implemented system (Rahmawati, 2022).

Data security is also a critical factor in digital transformation. Before the digital system was implemented, Dispendukcapil Sumut faced vulnerabilities in population data protection, increasing the risk of sensitive information breaches. After implementing advanced firewalls and an Advanced Encryption Standard (AES)-based encryption system, system security significantly improved, with cyberattack incidents decreasing by 67%. Nonetheless, further measures are necessary to strengthen security, such as implementing two-factor authentication (2FA) for employees with access to sensitive data and increasing cybersecurity awareness through regular training sessions (Hidayat, 2021). The success of digital transformation not only depends on the technology used but also on the awareness and compliance of human resources in safeguarding information security in daily operations.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the research and analysis conducted, it can be concluded that digital transformation readiness at Dispendukcapil Sumut still faces various challenges, particularly in infrastructure, HR competence, and internal policies and regulations. However, significant potential and opportunities exist to accelerate digital transformation, especially through support from the central government and collaboration with private and educational institutions. The digital transformation implementation strategy outlined in this roadmap has shown improvements in service efficiency, data accuracy, and user satisfaction.

Recommendations

1. Strengthening Technological Infrastructure: Allocate sufficient budget for hardware upgrades and network capacity enhancement to ensure stable and efficient digital services.
2. Developing HR Competence: Conduct regular training and establish internal certification programs to enhance staff IT skills. Collaborate with educational institutions and tech companies for specialized training.
3. Formulating Policies and SOPs: Develop structured SOPs for IT management and implement strong data security policies to prevent breaches and cyberattacks.
4. Integrating Digital Services: Develop an integrated system that connects all work units and services into a unified digital platform. Implement Single Sign-On (SSO) for easier service access.
5. Continuous Monitoring and Evaluation: Establish a dedicated team for ongoing monitoring and evaluation to identify challenges and opportunities for improvement.

6. **Collaboration with External Partners: Form strategic partnerships with technology companies and educational institutions to enhance HR capacity and accelerate digital transformation.**

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