International Journal of Industrial Innovation and Mechanical Engineering

E-ISSN: 3047-4515
P-ISSN: 3047-4507

Research Article

Digital Transformation of 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], Muhammad Syahputra Novelan [3]

[1] Magister Teknologi Informasi, Universitas Pembangunan Panca Budi, Indonesia
Email : juliyandri.saragih@gmail.com
[2] Magister Teknologi Informasi, Universitas Pembangunan Panca Budi, Indonesia
Email : andiesiahaan@gmail.com
[3] Magister Teknologi Informasi, Universitas Pembangunan Panca Budi, Indonesia
Email : putranovelan@dosen.pancabudi.ac.id

Alamat : Jl. Jend. Gatot Subroto Km. 4.5 Sei Sikambing, 20122, Medan, North Sumatra, Indonesia
* Corresponding Author : Juliyandri Saragih

Abstract: Digital transformation in Information Technology (IT) governance has become a crucial aspect in improving the efficiency of public services, particularly within the Department of Community and Village Empowerment, Population, and Civil Registration of North Sumatra Province. This study aims to analyze the implementation of digital transformation in IT governance using the COBIT 2019 framework. The research method includes the analysis of regulations, the role of IT, procurement models, implementation methods, and technology adoption strategies applied by the department. The findings show that IT implementation is predominantly strategic in nature, supporting the digitization of population services and enhancing data transparency. The IT procurement model comprises a combination of outsourcing (30%), cloud computing (30%), and insourcing (40%) to balance efficiency and system control. Agile methodology is the most dominant implementation method (50%), followed by DevOps (35%) for maintenance and traditional approaches (15%) for more structured projects. The department primarily adopts a "follower" technology adoption strategy (75%), reflecting a selective approach to digital innovation. Based on COBIT 2019 evaluation, the BAI (Build, Acquire, and Implement) domain is the main focus, with high scores in solution identification and improvement management (90) and change management (100), indicating the department's readiness to adopt digital systems. However, challenges remain in information security, inter-agency data integration, and human resource readiness. The digital transformation of IT governance at the department has been systematically implemented, supporting the improvement of population service efficiency. Enhancements in security, infrastructure, and the strengthening of IT governance policies are necessary to optimize and sustain digital transformation implementation.

Keywords: COBIT 2019, Digital Transformation, IT Governance, Information Technology, Public Service

Received: April, 07 2025
Revised: April, 21 2025
Accepted: May, 21 2025
Published: May, 24 2025
Curr. Ver.: May, 24 2025

1. INTRODUCTION

Digital transformation in the government sector has become an urgent need to improve the efficiency of public services, particularly in administrative processes. Manual procedures still used for civil servant retirement proposals, periodic salary submissions, and academic title updates often lead to delays, inefficiencies, and the risk of administrative errors (Huiqian Li, 2024; Idrus et al., 2024). As the demand for transparency and accountability grows, well-governed digital systems can help optimize personnel data management and improve public service quality (Dhandar, 2024).

In Indonesia, bureaucracy digitization has been driven by several policies, including the Electronic-Based Government System (SPBE), which mandates government institutions to digitize all aspects of administrative services (Vovk & Markovets, 2024; Wibawa, 2024). However, implementation challenges remain, such as the lack of system integration, unclear IT governance standards, and suboptimal data security (Sanina et al., 2023; Mkrtchyan & Melkumyan, 2023). Therefore, a systematic approach using the COBIT 2019-based IT governance framework is necessary to ensure more efficient, secure, and transparent personnel administration processes (Aryatama et al., 2024).

IT governance is a crucial element in the success of digital transformation, especially in managing complex administrative processes (Intan et al., 2023). In a government context, IT governance ensures that information technology supports organizational strategies, improves efficiency, and safeguards data integrity and security.

According to research by Intan et al. (2023), effective IT governance in the public sector can reduce bureaucracy and increase service effectiveness. Other studies suggest that the COBIT 2019-based IT governance model helps organizations align technology roles with specific needs, including employee data management, administrative automation, and improved compliance with regulations (Gouwnalan & Tanaamah, 2023).

Various IT governance models have been implemented in digital government systems, including ITIL (Information Technology Infrastructure Library) and TOGAF (The Open Group Architecture Framework). COBIT 2019 stands out by offering a structured, risk-based, and adaptable approach to organizational needs. Therefore, this study focuses on applying the COBIT 2019 framework to design IT governance for digitalizing civil servant retirement proposals, periodic salary submissions, and academic title updates, replacing the currently manual systems.

COBIT 2019 is an IT governance framework that provides comprehensive guidance for managing and controlling information systems within organizations, including in the public sector. It features Design Factors (DF) allowing organizations to tailor IT governance based on specific needs, such as organizational strategy (DF1), risk profile (DF2), IT operating model (DF3), and compliance requirements (DF4) (Afdhani & Soewito, 2024).

Previous studies have shown that COBIT 2019 implementation enhances administrative efficiency, particularly in population and personnel data management. Research by Dharmaa et al. (2021) demonstrated that applying COBIT 2019 in personnel management improves data accuracy, accelerates administrative processes, and reduces input errors and data manipulation. Integrating COBIT 2019 with e-Government systems improves public service quality and strengthens transparency in personnel management.

COBIT 2019 will be used as the framework for developing digital workflows for civil servant retirement proposals, periodic salary submissions, and academic title updates. With this approach, the system is expected to offer more efficient and secure solutions, minimizing common administrative issues in manual processes.

Digital transformation in personnel administration is a vital step toward improving the efficiency and transparency of government services. By adopting the COBIT 2019 approach, this study aims to design IT governance that supports the digital submission of retirement proposals, salary adjustments, and title certifications. This research contributes not only to e-Government system development but also provides practical recommendations for public institutions to implement better IT governance, thereby optimizing public service delivery.

2. LITERATURE REVIEW

IT Governance

IT governance is a set of policies, processes, and mechanisms that ensure the use of information technology within an organization supports its business strategy, enhances efficiency, and manages risks effectively. In the public sector, IT governance plays a crucial role in improving transparency, accountability, and the effectiveness of services provided to the public (Mathase et al., 2019).

IT governance encompasses various aspects such as organizational structure, policies, standards, and supervision of IT systems to ensure optimal value for stakeholders. The implementation of effective IT governance enables organizations to align IT strategies with business goals, strengthen data security, and reduce operational risks (Correia & Água, 2021).

In the context of government, the application of IT governance often uses frameworks such as COBIT, ITIL, or ISO/IEC 38500 to ensure IT policies are aligned with national regulations and public service needs. Studies have shown that organizations with well-implemented IT governance tend to achieve higher operational effectiveness and deliver higher-quality services to the public (Luna-Reyes et al., 2020).

COBIT 2019

COBIT 2019 is an IT governance and management framework designed to help organizations ensure that their use of information technology aligns with business goals, enhances efficiency, and improves risk management. COBIT 2019 is the latest version of

COBIT 5, featuring several enhancements, including greater flexibility in implementation and adjustments based on design factors relevant to each organization (Steuperaert, 2019).

One of the key features of COBIT 2019 is its design factor-based approach, which allows organizations to tailor their IT governance systems according to their specific needs. This framework includes a set of processes grouped into governance and management domains, covering areas such as IT strategic planning, risk management, performance monitoring, and improved regulatory compliance. With this approach, organizations can more easily adopt and implement COBIT 2019 according to their size, complexity, and priorities.

COBIT 2019 has also been adopted across various industries, including the public sector and education, to improve IT governance and support digital transformation. Recent studies indicate that the implementation of COBIT 2019 can enhance the effectiveness of IT resource management, strengthen system security, and optimize organizational workflows. Therefore, COBIT 2019 has become the preferred choice for organizations aiming to systematically and sustainably improve their IT governance (Wattimury & Faza, 2023).

3. METHODOLOGY

This study employs a qualitative descriptive approach using a case study at the Office of Community and Village Empowerment, Population, and Civil Registration of North Sumatra Province. The methodology aims to design and implement IT governance based on COBIT 2019 to support digital transformation in personnel administrative processes, particularly for civil servant (PNS) retirement proposals, periodic salary submissions, and degree registration. The research process is divided into four main stages according to the COBIT 2019 framework: analysis of organizational conditions, determination of IT governance scope, refinement of IT governance design, and system implementation and evaluation.

The first stage involves identifying the organization's condition and strategy through a needs analysis and evaluation of the existing state. This phase includes interviews and observations of the manual systems still used in the retirement proposal process, periodic salary submission, and degree registration. These processes, which rely on physical documents, lead to several issues such as slow procedures, vulnerability to errors, and difficulties in monitoring and archiving employee data. Therefore, this study seeks to understand the organization's strategy, institutional goals, and IT risk profile before developing a digital system. It also involves identifying IT risks, including potential threats to data security, infrastructure readiness, and system integration with existing databases.

The second stage is defining the initial scope of IT governance. This scope is developed based on COBIT 2019's design factors, particularly Enterprise Strategy, Enterprise Goals, Risk Profile, and IT-Related Issues. To assist in formulating this scope, the study utilizes the COBIT 2019 Design Toolkit to identify key issues and determine IT governance priorities relevant to the organization's needs. Through this approach, the main scope is established to include the digitalization of personnel administration processes, integration of systems with the employee database, and improvements in data security and process transparency.

The third stage involves refining the scope of IT governance, in which the governance design is further developed by considering COBIT 2019 design factors 5 through 10. These include analysis of the cyber threat landscape, compliance requirements, the role of IT in the organization, the sourcing model of IT, IT implementation methods, and technology adoption strategies. During this stage, adjustments are made to policies and procedures related to employee data management, information security standards, and governance of user roles (admin, employee, and the National Civil Service Agency). Additionally, the developed digital system is designed to be integrated with the population database to ensure consistency and accuracy of employee data.

4. Results and Discussion

This chapter presents the research findings derived from an analysis of the organizational condition, digitalization strategies, transformation goals, as well as various challenges and risks encountered in implementing the digital system at the Department of Community and Village Empowerment, Population and Civil Registration of North Sumatra Province. These findings are based on interviews, observations, and literature studies that support the understanding of the effectiveness of digital transformation in personnel administration, particularly in the workflows of civil servant retirement proposals, periodic salary submissions, and academic title registrations.

The discussion in this chapter includes an analysis of organizational strategies applied to improve administrative service efficiency, the main goals of digitalization, and the risk profiles that may arise during system implementation. It also outlines various information technology (IT) issues as challenges, along with mitigation measures planned to ensure the success of digital transformation.

Through this discussion, it is expected that a clearer understanding can be obtained regarding the impacts, benefits, and challenges of applying digital systems in personnel administration, which may serve as a reference for developing digitalization strategies and policies in related institutions.

Analysis of Organizational Conditions and Strategies in Digital Transformation

This section analyzes the organizational condition before and during the implementation of digital transformation, as well as the strategies adopted in developing the digital system for the workflows of civil servant retirement proposals, periodic salary submissions, and academic title registrations. The analysis covers aspects of organizational strategy, targeted objectives, risk profiles, and challenges related to information technology (IT).

Digitalization Strategy for Personnel Administration

The Department of Community and Village Empowerment, Population and Civil Registration of North Sumatra Province implements a digitalization strategy as part of its efforts to improve the effectiveness and efficiency of personnel administration. The main goals of this strategy are:

1. To accelerate the processing of personnel documents through a digital system.
2. To reduce the risk of manual errors in employee data recording and management.

3. To provide more flexible access for employees to propose retirement, request periodic salary increases, and register academic titles without having to come to the office in person.
4. To enhance data security and accuracy through a well-documented and integrated system.

This digital transformation is expected to overcome the limitations of manual systems based on physical documents, thus making personnel administration services more transparent, faster, and accurate.

Goals of Digital Transformation in Personnel Administration

As the provider of civil registration and population administration services, the Department has several main goals in implementing the digital system, including:

1. To improve the quality of personnel administration services through a faster and more accurate digital system.
2. To reduce the manual workload for employees and administrative staff, allowing them to focus more on other strategic tasks.
3. To ensure transparency and openness in the processes of retirement proposals, periodic salary increases, and academic title registration.
4. To enhance accountability in managing employee data with a documented system that enables more systematic tracking and auditing.

Through this digital system, employees are no longer required to submit physical documents directly but can simply upload them into the system for automatic processing.

Risk Analysis in the Implementation of the Digital System

1. System usage errors by employees unfamiliar with digital technologies.
2. The need to safeguard data security to prevent information leaks or misuse.
3. Potential system failures, which could disrupt administrative processes if the system is inaccessible at certain times.
4. Risk of data input errors, which could cause inconsistencies between digital and prior physical documents.
5. Lack of employee readiness in adopting digital systems, particularly among those unfamiliar with web-based technologies.

To mitigate these risks, employee training and outreach are necessary, along with adequate technical support to ensure proper system operation. Additionally, system development must include data recovery mechanisms and cybersecurity measures to ensure system stability.

Challenges and IT Issues in Digital Transformation

Key challenges in implementing the digital system include:

1. System stability, as there are still potential disruptions in applications that may affect service continuity.
2. Limitations in IT infrastructure, including server capacity that is not yet optimal for handling a large number of users.
3. Shortage of IT experts, requiring technical training for staff responsible for system management.
4. Integration with other systems, especially with employee databases and the national civil service system managed by the National Civil Service Agency (BKN).

As a mitigation measure, the Department plans to:

1. Conduct phased trials before full system implementation.
2. Improve IT infrastructure capacity to ensure system stability and responsiveness.
3. Provide technical training to enhance employee skills in system management.
4. Implement data backup mechanisms to prevent information loss due to system failure.

With a comprehensive understanding of the organizational condition, digitalization strategies, and the associated challenges and risks, the implementation of digital transformation in retirement proposal workflows, periodic salary submissions, and academic title registration is expected to run optimally and deliver significant benefits to both employees and the institution.

Analysis of COBIT 2019 Framework Implementation in Digital Transformation

This section discusses the analysis of the COBIT 2019 framework implementation in supporting digital transformation. The main focus is on how the principles, domains, and practices within COBIT 2019 can be applied to enhance effectiveness, efficiency, and regulatory compliance in an increasingly digital environment. This analysis also evaluates how far COBIT 2019 can assist the organization in addressing major challenges in digital transformation, such as data security, risk management, and IT-business alignment.

By understanding the implementation of this governance framework, it is expected that the organization can adopt a more structured and risk-based approach to governance, enabling digital transformation to be more targeted and deliver maximum benefits.

Identification of Organizational Strategy in Digital Transformation

Each organization has a unique strategy to achieve its digital transformation goals. Based on the identification at the Department of Community and Village Empowerment, Population and Civil Registration of North Sumatra Province (DPMD Dukcapil Sumut), the primary strategy adopted is Client Service/Stability, with the highest score of 5. This strategy focuses on enhancing transparency and efficiency in personnel administration, aligning with the agency's goal of providing better services for civil servants.

In addition, Growth and Innovation strategies were also considered, though not yet the main priority, each scoring 3. The digitalization of the personnel system is expected to optimize services and improve administrative efficiency. Meanwhile, the Cost Leadership strategy received a score of 1, as the agency operates based on established regulatory standards, without emphasizing cost efficiency as the main focus. The approach adopted by DPMD Dukcapil Sumut reflects a balance between maintaining service stability and exploring future innovation opportunities.

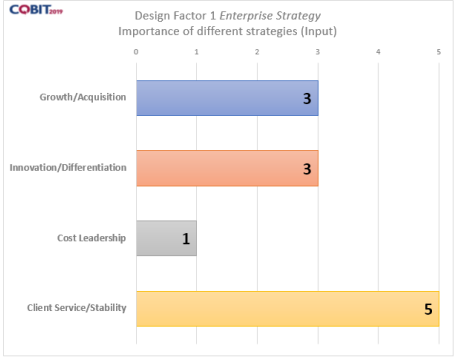

Figure 1. Design Factor 1 – Enterprise Strategy

Figure 1 illustrates how the organization directs its digital transformation to improve service quality without overlooking opportunities for further development.

Linkage Between Organizational Goals and COBIT 2019 Enterprise Goals

The analysis of Enterprise Goals within the COBIT 2019 framework shows that the organization's primary focus is on improving services (Customer-Oriented Service, EG05) and managing digital transformation programs (Managed Digital Transformation Programs, EG12). These two aspects are the main priorities in the digitalization of personnel administration at DPMD Dukcapil Sumut, in line with the organization's vision to enhance transparency and service efficiency.

Based on the analysis results, Customer-Oriented Service (EG05) received a score of 5, as the agency emphasizes optimizing personnel administration services through digital systems. This includes digitalizing the processes for pension proposals, periodic salary submissions, and employee title listings, all aimed at improving service effectiveness.

Additionally, Managed Digital Transformation Programs (EG12) also scored 5, considering the importance of managing digital systems to ensure administrative processes run more efficiently and are well-integrated. The aspect of Risk Optimization (EG01) is also taken into account in this digital transformation, with particular attention to employee data security to ensure the protection of information within the developed system.

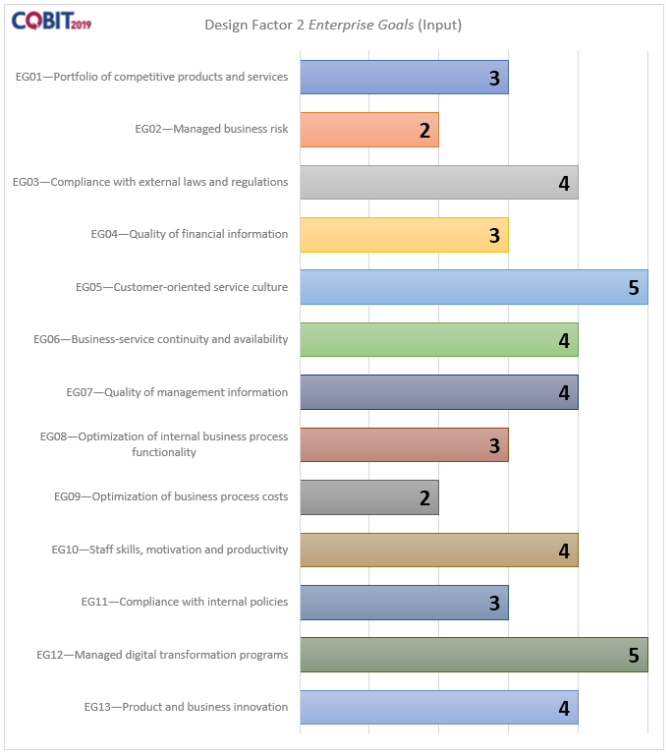

Figure 2 illustrates that the organization's strategy must align with the goals outlined in the COBIT 2019 Enterprise Goals, which are categorized based on the balanced scorecard. This approach ensures that digital transformation not only enhances service quality but also addresses security aspects and the sustainability of technology implementation within the organizational work environment.

Risk Profile Analysis in the Digitalization of Personnel Services

Digital transformation brings benefits in terms of efficiency and transparency of services but also introduces several risks that need to be identified and mitigated. In the

implementation of the digital system at DPMD Dukcapil Sumut, three main risks stand out: unauthorized system access (Unauthorized Actions), cyberattacks (Logical Attacks), and suboptimal data management (Data & Information Management).

Based on the risk analysis within the COBIT 2019 framework, the primary risk categories faced by the organization are as follows:

1. Unauthorized Actions (Score: 16): This risk relates to illegal access or misuse of the system by unauthorized parties. In the context of digitalizing personnel administration, securing employee data access is a top priority to prevent leakage or manipulation of sensitive information.
2. Logical Attacks (Score: 20): Risks from cyberattacks, such as hacking and data theft, have the potential to disrupt the digital administration system. Without strong protection mechanisms, the integrity and availability of personnel services could be significantly compromised.
3. Data & Information Management (Score: 16): This risk includes recording errors, loss of digital documents, or discrepancies between digital data and previous physical documents. Poor data management can hinder personnel administrative processes and cause inconsistencies in the information system.

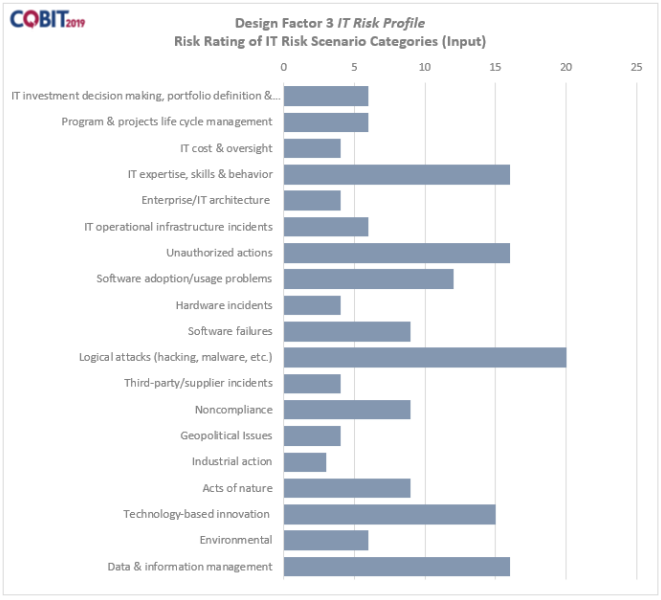

Figure 3 explains the mitigation steps that need to be implemented, including data encryption, role-based authentication, and a structured data backup system. With this approach, security and efficiency in the digitalization of personnel services can be better ensured, so that risks can be effectively controlled in accordance with good IT governance principles.

Information Technology Challenges in Implementing Digital Systems

In the process of implementing digital systems for personnel administration at DPMD Dukcapil Sumut, several main challenges must be overcome to ensure the digital transformation runs optimally. These challenges include system failures, IT infrastructure limitations, and lack of employee skills in operating new technology. Based on the conducted analysis, the main challenges in implementing the digital system are as follows:

1. Data Loss and System Failure: Suboptimal IT infrastructure can cause system disruptions, risking loss of employee data or failure in processing administrative

requests. To address this, periodic data backup mechanisms and stricter system monitoring are necessary to prevent prolonged downtime.

2. Data Security and Privacy: Employee data is sensitive information that must be protected from external threats such as leaks or unauthorized access. Therefore, implementing data encryption, two-factor authentication, and information security policies are essential steps to maintain the confidentiality and integrity of employee data.
3. IT Infrastructure Limitations: Limited server capacity and network bandwidth can cause the system to become slow or unresponsive, especially as the number of users increases. The needed solution is upgrading server capacity and bandwidth so that the system can operate smoothly and meet the growing user demand.
4. Lack of Employee Skills in Using Digital Systems: One of the main obstacles in digital transformation is the lack of technological literacy among employees. Not all administrative staff are familiar with the new system, so regular training and socialization are very necessary. By improving employee competence, the use of digital systems can run more effectively and efficiently.

Figure 4. Design Factor 4 – I&T Related Issues

Figure 4 explains the efforts needed to address these challenges, including improving IT infrastructure capacity, employee training, and implementing information security policies. With this strategy, it is expected that the implementation of the digital system can run optimally and provide maximum benefits in personnel administration.

Relationship Between Organizational Goals and COBIT 2019 Enterprise Goals

In the implementation of the digital system at DPMD Dukcapil Sumut, several threats can hinder the sustainability of personnel administration services. The primary threat identified is network and connectivity disruptions, where the IT infrastructure, which is not yet fully optimal, causes instability in system access. In addition, cybersecurity is also a major concern, especially in preventing data breaches of population data, requiring layered protection systems to maintain data integrity and confidentiality.

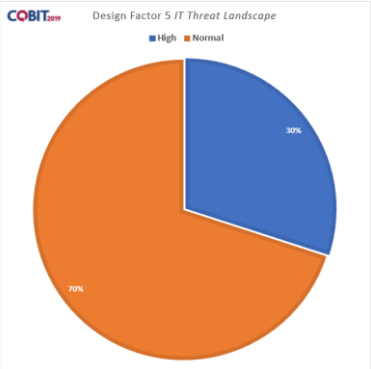

Figure 5. Design Factor 5 – Threat Landscape

Figure 5 identifies various threats that may affect the sustainability of digital services and the security of population data in this institution. Based on the analysis results, the main threats faced include:

1. Network and Connectivity Disruptions (80%): Unstable network infrastructure is the greatest risk factor in digital services. Inconsistent internet connectivity can hinder employee access to population and village administration systems, thereby reducing service efficiency.
2. Dependence on Electrical Infrastructure (10%): The absence of backup power systems such as generators or UPS during power outages can cause the system to become inaccessible, disrupting the continuity of digital service operations.
3. Cybersecurity Threats (10%): Risks such as population data hacking, ransomware, and phishing attacks can jeopardize the integrity and confidentiality of citizen information. Therefore, additional security layers are needed, such as Intrusion Detection Systems (IDS), data encryption, and cybersecurity training for employees.

To ensure the sustainability of digital services, mitigation steps that can be applied include improving network infrastructure, providing backup power supplies, and strengthening cybersecurity systems. With this strategy, digital services at DPMD Dukcapil Sumut can run more stably, securely, and sustainably.

Compliance with Regulations in IT Governance

Compliance with regulations is a crucial aspect in the implementation of IT governance at DPMD Dukcapil Sumut. As an agency managing population data and personnel administration, this office has fulfilled most government requirements, especially related to data security standards and the One Data Indonesia policy. However, some aspects require strengthening, particularly in managing population information and integrating data across agencies to improve efficiency and security of digital services.

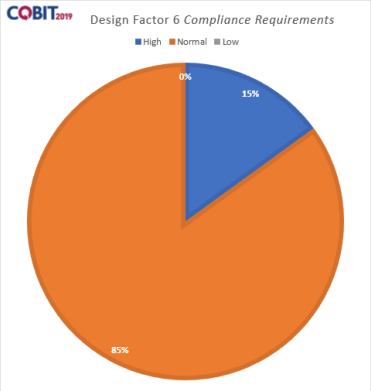

Figure 6. Design Factor 6 – Compliance Requirements

Figure 6 explains the compliance requirements that form the operational basis of IT governance at DPMD Dukcapil Sumut. Based on the conducted analysis, the agency's compliance levels are categorized as follows:

1. **Normal Compliance (90%)**: DPMD Dukcapil Sumut has fulfilled most of the government regulatory requirements related to IT governance, including:
   a. Population data security standards, ensuring the protection of citizen information.
   b. Compliance with the One Data Indonesia policy, promoting interoperability and accuracy of data across agencies.
   c. Implementation of digital-based administration systems, accelerating personnel and population service processes.
2. **High Compliance (10%)**: In more sensitive aspects, especially information security and access to population data, the agency must comply with specific guidelines, such as:
   a. Ministry of Home Affairs Regulation (Permendagri) regarding the Population Administration Information System (SIAK), which regulates the mechanism for recording and managing population data.
   b. Personal Data Protection regulations, requiring the implementation of strict security systems to prevent data leakage or misuse.

To enhance the compliance level, DPMD Dukcapil Sumut needs to continuously update its internal policies in line with the latest regulatory developments. Additionally, increasing compliance audits, providing IT policy training for employees, and strengthening data security systems are strategic steps that can be implemented to ensure the digitalization of services remains in accordance with legal standards and government administration.

Role of Information Technology in Digital Transformation

The role of Information Technology (IT) in DPMD Dukcapil Sumut can be categorized into four main aspects: Support, Factory, Turnaround, and Strategic. Based on the analysis, the most dominant role of IT is Strategic, as IT is used to support the digitalization of population services, improve data accuracy, and accelerate service delivery to the public.

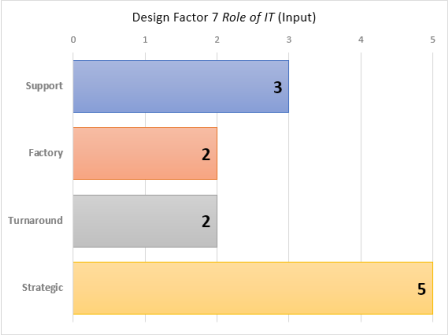

Figure 7. Design Factor 7 – Role of IT

Figure 7 illustrates how Information Technology (IT) contributes to digital transformation in IT governance at DPMD Dukcapil Sumut. The use of IT in this agency plays a vital role in enhancing service efficiency, data transparency, and supporting the government's digitalization policies.

Based on the analysis, the role of IT in the organization is categorized as follows:

1. **Support (Score: 3)**: IT serves as operational support for the agency, particularly in:
   a Population administration and village data recording.
   b. Web-based digital services that facilitate public access to information.
   c. Use of digital systems to assist daily administrative tasks.
2. **Factory (Score: 2)**: a. Disruptions in IT systems do not entirely halt operations but can affect service effectiveness; b. Access to population and village administration data may be hindered during system downtime or network failure.
3. **Turnaround (Score: 2)**: IT supports service innovation, such as: a. Implementation of the Population Administration Information System (SIAK) to simplify population data management; b. Digital village data management systems to enhance efficiency in recording and community services; c. E-government service integration to accelerate administrative processes.
4. **Strategic (Score: 5) – Most Dominant IT Role**: a. Automation of population services, which accelerates administrative processes and reduces data entry errors; b. Improved data accuracy through integrated digital systems; c. Inter-agency integration, enabling faster, more transparent, and accountable services; d. Support for government digital transformation policies, including the One Data Indonesia initiative.

With Strategic as the dominant role, IT is not merely a support tool but a key element in digital transformation. Therefore, strengthening infrastructure, enhancing data security, and developing competent human resources in digital technology are strategic actions that must be continuously pursued by DPMD Dukcapil Sumut to optimize digitalization implementation.

Identification of Organizational Strategy in Digital Transformation

To ensure the effective implementation of the digital system, DPMD Dukcapil Sumut adopts a combination of IT procurement models: Outsourcing, Cloud Computing, and Insourced. This approach allows for more flexible IT system management while maintaining control over data security through internal IT personnel.

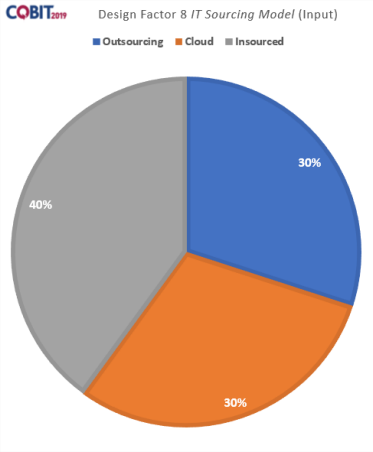

Figure 8. IT Procurement Model

Figure 8 illustrates that the selection of the Information Technology (IT) procurement model is a crucial aspect in ensuring the effective implementation of systems that support the digitalization of population and village administration services. The procurement model can be categorized as follows:

1. **Outsourcing (30%) – Use of External Vendors**: DPMD Dukcapil Sumut employs third-party services to support IT infrastructure, including: a.Internet services to ensure digital system connectivity. b.Development and maintenance of web-based population service applications. c. Procurement of specific software required for administration.
2. **Cloud Computing (30%) – Digital Storage and Collaboration** Cloud-based services are utilized in various aspects, including: a. Storage of village administrative documents and population data using Google Drive or other cloud platforms; b. Inter-agency collaboration, such as population data integration with other institutions to improve public service efficiency; Automatic data backups to prevent data loss due to system failures or cyberattacks.
3. **Insourced (40%) – Internal Management by the Agency's IT Staff**: To maintain data security and system control, the agency retains internal IT personnel responsible for: a. Direct management of the population information system; b. Oversight of data security, including management of population and village administration databases; c. Development of web-based digital service applications tailored to the agency's specific needs.

With a combination of Outsourcing (30%), Cloud Computing (30%), and Insourced (40%), DPMD Dukcapil Sumut can:

1. Leverage the latest technology through external vendors without building everything from scratch.
2. Use cloud computing for flexibility and efficiency in population data management.
3. Maintain data security control with an internal team, thereby minimizing the risk of data breaches.

This approach ensures that digital transformation is carried out optimally, maintaining operational efficiency and safeguarding data security.

IT Implementation Methods

In the digital transformation of IT governance at the Office of Community and Village Empowerment, Population and Civil Registry of North Sumatra Province, the method of IT implementation plays a key role in the success of service digitalization. The Agile approach is the most dominant method used in system development, while DevOps and Traditional methods are applied in system maintenance and projects subject to strict regulations.

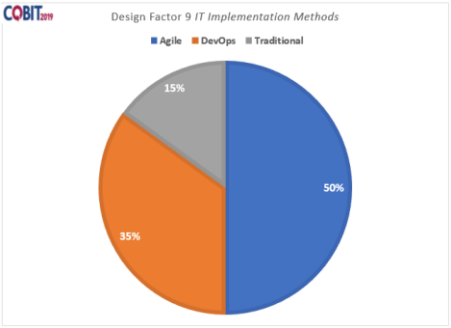

Figure 9. Design Factor 1 – IT Implementation Methods

Figure 9 illustrates three main approaches used in the implementation of IT systems within the agency:

1. **Agile Method (50%) – Flexible and Iterative**: a. The majority of IT systems are developed using Agile Development methodology, which allows for gradual and flexible system development; b. Agile enables quick and efficient feature adjustments based on user feedback; c. This method is used in the development of digital population administration service systems, which are continuously updated in line with community needs and government policies.
2. **DevOps Method (35%) – System Maintenance and Optimization**: a. DevOps is applied in managing digital infrastructure, particularly in the maintenance and optimization of IT systems; b. Automated deployment and system monitoring help maintain the stability and responsiveness of digital services; c. This method is used in system updates, bug fixes, server performance improvements, and data security enhancements.
3. **Traditional Method (15%) – Stable and Regulation-Compliant**: a. A small number of IT projects still use the Traditional (Waterfall) method, especially for systems with fixed requirements and minimal feature changes; b. This method is applied in the procurement and development of systems bound by strict regulations, such as digital archive management systems that must adhere to government storage standards, and long-established population data systems that require minimal updates.

Technology Adoption Strategy in Digital Transformation

In the Digital Transformation of IT Governance at the Office of Community and Village Empowerment, Population and Civil Registry of North Sumatra Province (DPMD Dukcapil Sumut), the technology adoption strategy is implemented in stages to ensure optimal integration with existing systems. The agency selectively adopts the latest technologies, taking into account infrastructure readiness and human resources.

Based on the analysis of technology adoption strategies, it can be concluded that the implementation of COBIT 2019 in DPMD Dukcapil Sumut's digital transformation has been

carried out systematically. However, several challenges still need to be addressed, such as **budget limitations**, **human resource readiness**, and the **need for regulatory harmonization** to ensure more effective IT governance.

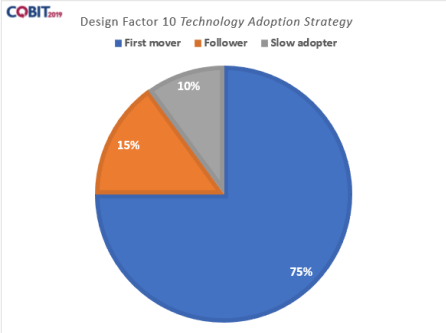

Figure 10. Design Factor 10 – Technology Adoption Strategy

Figure 10 illustrates that the technology adoption strategy within the agency can be categorized into three main approaches:

1. Follower (75%) – Adoption After Proven Success: a. The majority of technology adoption in the agency is of the follower type, where new technologies are implemented only after they have been proven effective and widely adopted by other government institutions; b. This strategy is employed to minimize the risk of failure and to ensure that the adopted technologies align with operational needs and applicable regulations; c. Example implementations: Implementation of the Population Administration Information System (SIAK) in accordance with Ministry of Home Affairs policies and Adoption of cloud computing after other agencies demonstrated its success in storage efficiency and data security.
2. **First Mover (10%) – Early Innovation for Service Efficiency**: a. Some innovations are adopted early as part of efforts to enhance service efficiency and create more effective solutions for population administration needs; b. The agency aims to pioneer the use of certain technologies that can accelerate digital transformation and improve the accuracy and security of population data; c. Example implementations: Development of web-based applications for population administration services before being nationally mandated and Use of encryption technology for data protection before stricter regulations were introduced.
3. **Slow Adopter (15%) – Delayed Adoption Due to Regulatory and HR Constraints**: a. Some technologies are adopted more slowly, primarily due to regulatory factors, budget constraints, or human resource readiness; b. Technology adoption is often delayed due to complex administrative procedures or the need to wait for a clear legal framework before implementing certain technologies; c. Example implementations: Use of Artificial Intelligence (AI) in population data analysis remains limited due to the lack of supporting regulations and Implementation of blockchain for data security is still in the exploratory stage, as it requires significant investment and specialized expertise.

Implementation of the Digital Transformation Design

As part of the Digital Transformation of IT Governance at the Office of Community and Village Empowerment, Population and Civil Registry of North Sumatra Province (DPMD Dukcapil Sumut), the IT governance system design is developed based on the COBIT 2019

framework. The core model in COBIT 2019 consists of five main domains and forty IT governance processes, grouped according to the evaluation of strategy, planning, implementation, service, and monitoring of IT within the organization.

This implementation design aims to improve service efficiency, ensure data security, and optimize the use of technology in supporting the digitalization of population administration. Figure 11 provides a detailed overview of the COBIT 2019 design results

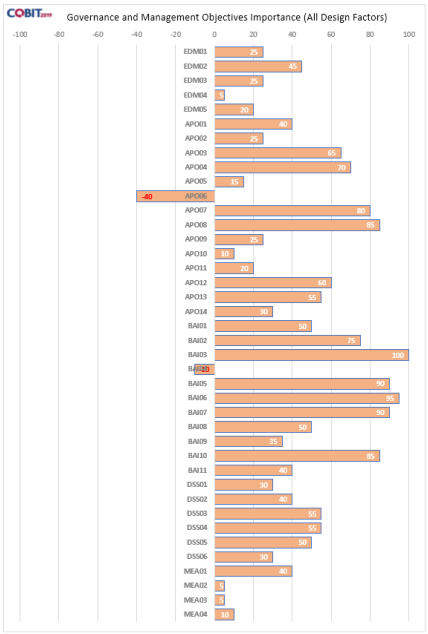

Figure 11. Results of COBIT 2019 Design

Evaluate, Direct, and Monitor (EDM)

The EDM domain focuses on setting IT strategy within the organization, including strategic decision-making and monitoring of technology implementation. Processes in this domain ensure that digital transformation is aligned with the organization's vision and applicable regulations.

Align, Plan, and Organize (APO)

The APO domain addresses IT strategic planning and its supporting activities. One key aspect in this domain is Information Security Management (APO13), which received a score of 50 with a target capability level of 3. This indicates that while information security is acknowledged as important, further development is required to align the implemented strategies with the agency's digital transformation needs.

Build, Acquire, and Implement (BAI)

The BAI domain is the primary focus of the agency's digital transformation, as it involves the development and integration of digital systems to improve public service efficiency. Key processes in this domain include:

1. BAI02 – Requirements Definition Management (score: 75, capability level: 4): Identifying digital solutions that align with the organization's strategic needs, including the development of digital-based population services.
2. BAI03 – Solution Identification and Improvement Management (score: 90, capability level: 4): Developing relevant digital systems and ensuring the continuous maintenance and enhancement of services.

3. BAI05 – Organizational Change Enablement Management (score: 50, capability level: 3): Supporting the sustainability of digital transformation through structural and operational changes within the agency.
4. BAI06 – Change Management (score: 100, capability level: 4): Managing significant technological changes to ensure smooth implementation.
5. BAI07 – Change Acceptance and Transition Management (score: 80, capability level: 4): Ensuring new technologies are well-received by users through training and system transition support.
6. BAI10 – Configuration Management (score: 50, capability level: 3): Ensuring optimal IT system configurations to support public administration services.

Deliver, Service, and Support (DSS)

The DSS domain plays a role in managing IT operations, including technical support, system maintenance, and the delivery of digital services to the public. Implementation in this domain aims to improve efficiency and ensure the sustainability of digital public services.

Monitor, Evaluate, and Assess (MEA)

The MEA domain is responsible for ensuring that IT implementation aligns with regulations, organizational policies, and strategic goals. Regular monitoring is conducted to evaluate the effectiveness of digital transformation and identify areas for improvement.

Through the application of the COBIT 2019 framework, the DPMD Dukcapil of North Sumatra can manage its digital transformation systematically and in accordance with standards. This implementation enables stronger and more effective IT governance, supports public service innovation, and improves operational efficiency in managing population data and village administration.

Table 1. Evaluation of IT Governance Domains Based on COBIT 2019

Domain	Process	Score	Capability Level	Description
EDM	IT Strategy Evaluation and Direction	-	-	Ensures alignment with the organization's vision
APO	Information Security Management (APO13)	50	3	Information security needs to be improved
BAI	Requirements Definition Management (BAI02)	75	4	Identifies strategic digital solutions
BAI	Solution Identification and Improvement Management (BAI03)	90	4	Develops systems and ensures continuous maintenance
BAI	Organizational Change Enablement Management (BAI05)	50	3	Supports structural and operational change
BAI	Change Management (BAI06)	100	4	Manages significant technological changes
BAI	Change Acceptance and Transition Management (BAI07)	80	4	Ensures smooth integration of new technologies
BAI	Configuration Management (BAI10)	50	3	Optimizes IT system configurations
DSS	Digital Service Management	-	-	Ensures sustainability of IT-based services
MEA	Technology Implementation Evaluation	-	-	Ensures compliance with regulations and strategic targets

The table presents the evaluation of IT governance domains based on the COBIT 2019 framework implemented in the digital transformation of DPMD Dukcapil North Sumatra. In the Evaluate, Direct, and Monitor (EDM) domain, IT strategies are assessed to ensure alignment with the organization's vision. In the Align, Plan, and Organize (APO) domain, the information security aspect (APO13) received a score of 50 with a capability level of 3, indicating the need for improvements in data security strategy.

Meanwhile, the Build, Acquire, and Implement (BAI) domain is the primary focus, with BAI06 (Change Management) achieving the highest score of 100 at capability level 4, reflecting the effectiveness in managing significant technological changes. Other processes within the BAI domain, such as BAI02, BAI03, and BAI07, also received high scores, indicating success in developing and implementing digital solutions. BAI05 and BAI10 each scored 50 with capability level 3, suggesting that organizational change and system configuration still require reinforcement.

The Deliver, Service, and Support (DSS) domain emphasizes the sustainability of digital services, while the Monitor, Evaluate, and Assess (MEA) domain ensures that technology implementation complies with regulations and strategic objectives. Overall, this evaluation shows that the digital transformation at DPMD Dukcapil North Sumatra has progressed well, although several areas still need improvement to achieve more optimal IT governance.

5. Conclusions

The digital transformation of IT governance in this agency has been carried out systematically and has had a positive impact on population services. The use of IT plays a strategic role in service digitalization, improving data accuracy, and accelerating administrative processes. IT procurement combines Outsourcing, Cloud Computing, and Insourced models, while its implementation is mostly based on the Agile method, supported by DevOps for maintenance, along with traditional methods used in certain projects.

The technology adoption strategy tends to follow a Follower approach, although some innovations have been adopted early. However, there are still obstacles related to regulations, budget constraints, and human resource readiness. The evaluation using COBIT 2019 shows that aspects such as change management and solution identification are already well-developed. Nevertheless, challenges remain in information security, inter-agency data integration, and human resource management.

To achieve optimal effectiveness, improvements in IT governance, infrastructure, and human resource development are necessary to ensure the sustainability of digital transformation.

References

[1]. Afdhani, R., & Soewito, B. (2024). Perancangan Tata Kelola TI Menggunakan Framework COBIT 2019 pada Pusat Data dan Informasi Kementerian. Jurnal Tata Kelola Dan Kerangka Kerja Teknologi Informasi, 10(1), 22–33.

[2]. Aryatama, S., Miswan, M., Fahriyah, F., Pribadi, T., & Suacana, I. W. G. (2024). Enhancing Governance Efficiency through Digital Transformation in Public Services: Lessons from Global Practices. Global International Journal of Innovative Research, 2(5), 1019–1027. https://doi.org/10.59613/global.v2i5.171

[3]. Correia, A., & Água, P. B. (2021). A Corporate Governance Perspective on IT Governance. Corporate Governance: A Search for Emerging Trends in the Pandemic Times, 107–114. https://doi.org/10.22495/cgsetpt19
[4]. Dhandar, K. A. (2024). E-Government and Digital Transformation: Investigate the implementation and impact of e-government initiatives on public service delivery, citizen engagement, and administrative efficiency. Gurukul International Multidisciplinary Research Journal. https://doi.org/10.69758/GIMRJ/2408II05V12P0001
[5]. Dharmaa, I. G. M. S., Sasmitaa, I. G. M. A., & Putra, I. M. S. (2021). Evaluasi dan Implementasi Tata Kelola TI Menggunakan COBIT 2019 (Studi Kasus pada Dinas Kependudukan dan Pencatatan Sipil Kabupaten Tabanan). Jurnal Ilmiah Teknologi Dan Komputer, 2(2).
[6]. Gouwnalan, S. K., & Tanaamah, A. R. (2023). Penggunaan Framework Cobit 2019 dalam Evaluasi Tata Kelola Teknologi Informasi. Jurnal Teknik Informatika Dan Sistem Informasi, 9(2). https://doi.org/10.28932/jutisi.v9i2.6373
[7]. Huiqian Li. (2024). Smart Practice of Integrating Administrative Management and Human Resources of Chinese Local Governments under the Background of Digital Transformation. Lex Localis - Journal of Local Self-Government, 22(3), 209–227. https://doi.org/10.52152/22.3.209-227(2024)
[8]. Idrus, S. H., Sumartono, E., Wartono, W., Suharto, S., & Syahriar, I. (2024). Harnessing Digital Transformation for Improved Public Service Delivery: Lessons from Global Administrative Practices. Join: Journal of Social Science, 1(3), 257–269. https://doi.org/10.59613/k8s6s859
[9]. Intan, A., Setiawan, A., & Maengkom, M. R. (2023). Studi Literatur terhadap Peran dan Manfaat COBIT 2019 dalam Tata Kelola Teknologi Informasi di Indonesia. INNOVATIVE: Journal Of Social Science Research, 3(5), 1681–1692.
[10]. Luna-Reyes, L., Juiz, C., Gutierrez-Martinez, I., & Duhamel, F. B. (2020). Exploring the Relationships between Dynamic Capabilities and IT Governance. Transforming Government: People, Process and Policy, 14(2), 149–169. https://doi.org/10.1108/TG-09-2019-0092
[11]. Mathase, E., Phahlane, D. M., & Ochara, P. N. M. (2019). Review of IT Governance Frameworks Implementation in the Context of the South African Public Sector. 2019 Open Innovations (OI), 351–355. https://doi.org/10.1109/OI.2019.8908178
[12]. Mkrtchyan, T., & Melkumyan, N. (2023). The Foundations of Digital Transformation of the Public Administration System. ALTERNATIVE, 118–127. https://doi.org/10.55528/18292828-2023.2-118
[13]. Sanina, A., Balashov, A., & Rubtcova, M. (2023). The Socio-Economic Efficiency of Digital Government Transformation. International Journal of Public Administration, 46(1), 85–96. https://doi.org/10.1080/01900692.2021.1988637
[14]. Steuperaert, D. (2019). COBIT 2019: A Significant Update. EDPACS, 59(1), 14–18. https://doi.org/10.1080/07366981.2019.1578474
[15]. Vovk, N., & Markovets, O. (2024). EU experience in the digital transformation of administrative services. Scientific Journal "Library Science Record Studies Informology," 20(2), 20–30. https://doi.org/10.63009/lsrsi/2.2024.20
[16]. Wattimury, G., & Faza, A. (2023). COBIT 2019 Implementation for Enhancing IT Governance in Educational Institutions. JISKA (Jurnal Informatika Sunan Kalijaga), 8(3), 210–221. https://doi.org/10.14421/jiska.2023.8.3.210-221
[17]. Wibawa, R. P. (2024). Digital Transformation and Administrative Efficiency Study. American Journal of Science and Learning for Development, 3(1), 169–175. https://doi.org/10.51699/ajsld.v3i1.3444