

CHAPTER I INTRODUCTION

I.1 Background

In contemporary organizational practice, the use of information systems has become central to the operation and coordination of complex business activities. Information systems are not merely tools for automation, but enablers of decision-making, integration, and control across organizational functions. The requirement for an integrated information system arises not only from the need to support business operations but also from the obligation of some companies to implement effective information systems in order to meet regulatory compliance (Darudiato, 2022).

The enterprise being analyzed on this research is PT Perusahaan Gas Negara (PGN), a leading natural gas transmission and distribution company in Indonesia. As part of its strategic transformation, PT PGN now serves as the gas sub-holding entity within PT Pertamina (Persero), Indonesia's national oil and gas holding company. As a leading energy's company in Indonesia, PT PGN is at the forefront of driving digital innovation, aiming to significantly enhance the efficiency of its legacy operations. Based on the Strategi, Portofolio, dan Pengembangan Usaha (SPPU) 2023 of PT Pertamina, PT PGN is directed to strengthen its legacy business through optimization and expansion as part of its long-term strategy. This aligns with Pertamina's Long-Term Plan, which promotes a Dual Growth strategy, positioning the Gas Subholding to focus on integrated and systematic business development. PT Pertamina Gas Negara has an Information, Communication, and Technology (ICT) Division that serves as a key enabler of the company's business strategy. The IT Planning Unit is one of Unit under IT Planning Unit that will be further analyzed in this research. IT Planning plays a vital role in ensuring every digital and technological initiative aligns with the company's business direction, both at the Subholding (PT PGN) and Holding (Pertamina) levels. Beyond its strategic alignment function, the division is also responsible for overseeing risk management in the technology domain, as well as planning, evaluating, and reporting on work programs related to ICT initiatives. This includes ensuring that

each program contributes to operational efficiency, business continuity, and the broader goals of system integration and transformation.

Despite its prominent position within Indonesia's energy sector, PT Perusahaan Gas Negara (PGN) faces several challenges that constrain its operational agility and efficiency. Chief among these are the fragmentation of its information systems where the reliance of manual data processing and collecting still continued using Microsoft Office specifically Microsoft Excel, the lack of integration between the essential applications such as Enterprise Risk Management System (ERMS), Perform, and SAP, as well as the absence of a structured mechanism for risk-based evaluation of work programs. The widespread reliance on Microsoft Office applications within PT PGN has resulted in significant gaps in data sharing and document version control, thereby increasing the risk of inconsistencies and human error. In the absence of an integrated system, inter-divisional data exchange continues to be conducted manually, often through direct requests between units. This not only adds to the administrative workload but also increases the time required to collect, validate, and consolidate data. Consequently, the timely fulfillment of information needs is frequently compromised due to delayed access and processing. Moreover, the lack of a structured mechanism for evaluating and monitoring work programs, particularly in terms of risk alignment, further limits organizational responsiveness. In addition, work program data still has to be input manually from the Perform system into SAP, reinforcing inefficiencies in reporting, reducing data accuracy, and weakening the overall quality of performance governance.

Based on the Regulation of the Minister of Badan Usaha Milik Negara (BUMN) of the Republic of Indonesia Number PER-2/MBU/03/2023 concerning Guidelines for Corporate Governance and Significant Corporate Activities of State-Owned Enterprises, every BUMN is required to establish a standardized and well-governed information technology governance framework. This regulation emphasizes the critical importance of structured, accountable, and integrated IT management as a foundation for supporting core business functions and ensuring strategic alignment across all organizational activities. As a Badan Usaha Milik Negara (BUMN), PT Perusahaan Gas Negara is obliged to comply with this

mandate by optimizing the utilization of its technological resources. To achieve this, the organization must adopt a precise and well-planned strategic approach in managing and developing its information systems.

The design and implementation of Enterprise Architecture (EA) serves as a suitable and effective strategy to fulfill this need. EA is a strategic tool that provides a method for identifying and addressing gaps between the existing and targeting, it enables PT Perusahaan Gas Negara to align its technology assets with business objectives, integrate fragmented systems, enhance governance, and ensure that its digital initiatives support long-term corporate performance and regulatory requirements (The Open Group, 2009). The Enterprise Architecture design or changes are frequently implemented without fully understanding how they affect the organization's efficiency and effectiveness. Therefore, it is necessary to have driving indicators that support the quality of EA. The design of EA within an organization or company provides several benefits (Tamm et al., 2011), including organizational alignment, information availability, resource portfolio optimization, and resource complementary. From four benefits aforementioned, the related EA design benefits of IT Planning Unit at PT Perusahaan Gas Negara will provide the as following:

1. Organizational Alignment, provides substantial advantages by aligning business processes with the organization's objectives through Enterprise Architecture (EA), ensuring that every resources under the IT Planning Unit comprehends and backs PT PGN's strategic goals, working efficiently to fulfill the company's targets.
2. Information Availability, offers precise and reliable information to assist IT Planning Unit in making informed decisions regarding strategy and operations.

In developing the enterprise architecture for the IT Planning unit, the researcher will utilize the TOGAF Standard 10th Edition framework along with the ADM approach, which is renowned for its comprehensive and detailed methods. The results of this design focus on ensuring improved effectiveness and efficiency in

information dissemination by leveraging information technology systems within the IT Planning Unit.

I.2 Problem Statement

Based on the background research above, several key issues can be identified:

1. How is the existing condition of the IT Planning Unit at PT Perusahaan Gas Negara?
2. How is the targeted Enterprise Architecture design for the IT Planning Unit at PT Perusahaan Gas Negara formulated?
3. How is the gap analysis between the existing and target conditions carried out in the Enterprise Architecture design for the IT Planning Unit at PT Perusahaan Gas Negara?
4. How is the implementation plan for the targeted Enterprise Architecture of the IT Planning Unit at PT Perusahaan Gas Negara designed?

I.3 Research Objectives

Based on the problem statement above, the research objectives are:

1. To describe and provide an overview of the existing Enterprise Architecture of the IT Planning Unit at PT Perusahaan Gas Negara.
2. Develop the targeted Enterprise Architecture design for the IT Planning Unit at PT Perusahaan Gas Negara.
3. Present the gap analysis results between the existing and target conditions in the Enterprise Architecture design of the IT Planning Unit at PT Perusahaan Gas Negara.
4. Design the implementation plan for the targeted Enterprise Architecture of the IT Planning Unit at PT Perusahaan Gas Negara.

I.4 Research Scopes

The limitation of this research will be as follows:

1. The development of the Enterprise Architecture will only focus on IT Planning Unit.
2. Framework used is TOGAF Standard 10th Edition within each of phases such as preliminary phase, architecture vision, business architecture,

information system architecture, technology architecture, opportunities and solution, and migration planning.

3. The cost data utilized in the Investment Valuation for this research are assumptions derived from budget realizations only, not from PGN's actual calculations.

I.5 Research Benefits

This research aims to give benefits to:

1. As for PGN, this research benefits them in alignment with their business process efficiency, optimizing their resource, and ultimately serving as a strategic tool for achieving business goals and driving operational efficiency.
2. As for Telkom University, this research benefits them in providing practical insights and fostering industry partnerships where it opens opportunities for further research.
3. As for the author, this research provides an opportunity to enhance knowledge and develop skills in designing Enterprise Architecture using TOGAF Standard 10th Edition.

I.6 Root Cause Analysis

Root cause analysis (RCA) is a systematic approach used to uncover the underlying reasons behind a problem, rather than focusing solely on its visible effects. The process typically involves identifying the problem, analyzing related events and contributing factors over time, distinguishing between core and peripheral causes, and mapping out how each factor leads to the issue. One of the most commonly used tools in RCA is the fishbone diagram, which visually organizes possible causes into categories. This helps teams examine complex issues from multiple angles and encourages collaboration in diagnosing problems accurately (Majka, 2024). In the context of Enterprise Architecture (EA), when the RCA applied through fishbone diagrams enables organizations to identify root issues across the architectural layers, including business processes, data handling, application functions, and technological infrastructure. By revealing the

connections between problems like manual operations, disjointed systems, or lack of integration, RCA supports more informed and strategic architectural decisions aimed at addressing the real causes, not just the symptoms.

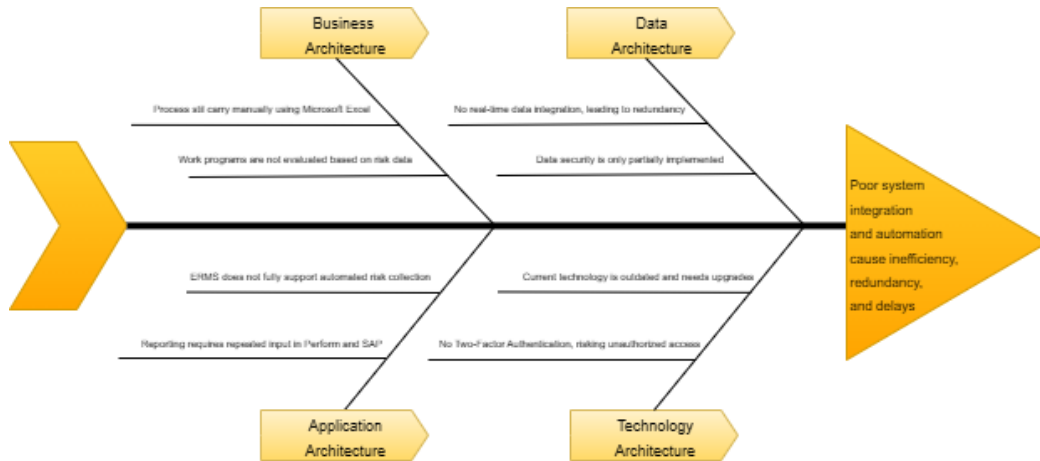


Figure I-1 Fishbone Diagram

This visual diagnostic tool was structured according to four principal layers of Enterprise Architecture (EA) such as Business, Data, Application, and Technology. At the business layer, operational processes such as risk data and work program collection are still conducted manually using Microsoft Excel, leading to fragmented workflows and inefficiencies. Additionally, work program evaluations are not fully aligned with risk data, resulting in suboptimal decision-making. In the data layer, the absence of real-time integration across systems contributes to data duplication and inconsistent information, while security mechanisms are only partially enforced, exposing the organization to unauthorized access risks. From the application perspective, key systems like ERMS have not yet fully automated risk data processing, and the reporting process within Perform and SAP remains redundant, requiring users to re-enter the same data in multiple systems. At the technology level, the current infrastructure is outdated and lacks the scalability to support modernized systems. Moreover, critical security features such as Two-Factor Authentication (2FA) have not been implemented, increasing vulnerability to unauthorized access. These layered issues converge into the overarching problem of poor system integration and automation, which significantly hinders the organization's agility, decision accuracy, and overall operational performance.