

CHAPTER 2 - LITERATURE REVIEW

2.1. Hospital (Healthcare Company)

A hospital is a healthcare facility that delivers a wide range of individual health services, including inpatient, outpatient, and emergency care. (UU No.44 of 2009). PT. EFG is a hospital under the management of a healthcare sub-holding, which is part of a major holding company that oversees businesses in healthcare, construction, property, managed services, IT solutions, and fiber optics.

PT. EFG has a sister company that also operates in the field of hospital medical services. Currently, there are 4 branch hospitals located in Jabodetabek plus Karawang Regency. Figure 2.1, which illustrates the company structure, holding, and its subsidiaries.

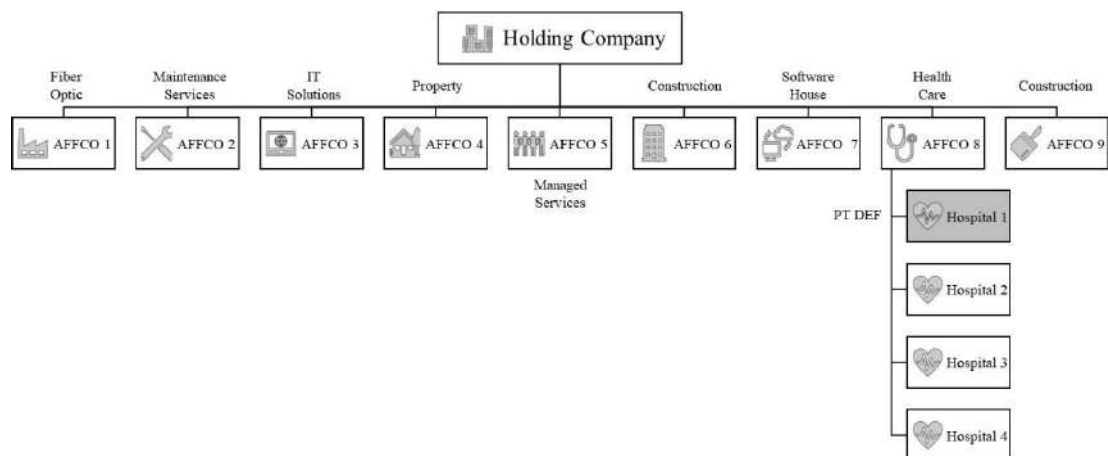


Figure 2.1 Enterprise Structure (Source: Company Profile)

In Figure 2.1, it can be seen that PT. EFG has a sister company that operates in the medical services sector (hospitals). Based on the interview results, PT. EFG generates the highest revenue compared to other hospitals. Therefore, the implementation of IT Governance is piloted at PT. EFG first, with the success story to be followed by other subsidiaries, to support the provision of excellent services.

To provide excellent service, it is essential to have infrastructure support in the form of information and communication systems. This requirement is outlined in UU No. 44 of 2009 on Hospitals, specifically in Section Four, Article 11, paragraph 1, letter (i), which states that hospitals must have a competent information and communication system to support medical services.

This aligns with the vision and mission established by PT. EFG, which is "To improve facilities, infrastructure, technology, and equipment to support the quality of medical services." This mission serves as a reference for PT. EFG in implementing Information Technology and, of course, influences the development of Enterprise Governance of IT within PT. EFG. Figure 2.2 explains the Vision and Mission of PT. EFG that have been established:

Vision : Become the referral hospital and the preferred hospital of the people of West Java	
Mission:	
1. Delivering and enhancing health care services through a proactive, preventative, therapeutic, and rehabilitative approach for all community levels.	
2. Providing top-notch, standardized, and professional health services while prioritizing patient safety.	
3. Upgrading facilities, infrastructure, technology, and equipment to ensure high-quality service.	
4. Transforming the hospital into a responsible, environmentally-friendly establishment that guarantees safety and comfort for patients and the broader community.	
5. Fostering the development of skills, competence, work ethic, and organizational culture among staff to stay adaptable to changes and boost overall well-being.	
6. Achieving sustainable growth and financial success by consistently upholding collaborative values with partners.	

Figure 2.2 Vision and Mission of PT EFG as a Healthcare Company (Source: Company Profile)

In Figure 2.2, Mission number 3 states that technology is an important aspect that needs to be upgraded and managed to ensure the creation of high-quality medical service. Therefore, this can certainly influence the development of Enterprise Governance of IT, particularly in the Governance & Management Objectives, which have a direct impact on the delivery of medical services through IT-enabled solutions.

In addition, PT. EFG, as a hospital that prioritizes quality, has established organizational Core Values as the foundation for providing medical services, which must be understood and implemented by all levels of the organization. Figure 2.3 explains the Core Values of PT. EFG.

Core Value			
Customer Oriented	Convenient & Easy	Warm & Friendly	Clean & Bright
Focus on customer service	PT DEF hospital network is committed to continuously strive for facilities that facilitate customers and make customers comfortable.	A warm and friendly environment must be always be built in the hospital	Well-maintained facilities will certainly increase the trust of customers

Figure 2.3 Core Value of PT EFG as a Healthcare Company (Source: Company Profile)

Figure 2.3 depicted that some core values can be supported by IT-enabled solutions. For example, the value "Convenient & Easy" can be supported by IT through the implementation of an integrated and accurate online registration mechanism. To ensure that IT-enabled solutions function effectively and achieve the intended outcomes, they need to be supported, enforced, and regulated by comprehensive Governance.

To ensure that business processes and medical services run as intended, PT. EFG has established an organizational structure as part of the Governance System to manage the operations of the organization and ensure that roles and responsibilities are well-defined. Figure 2.4 explains the organizational structure at PT. EFG.

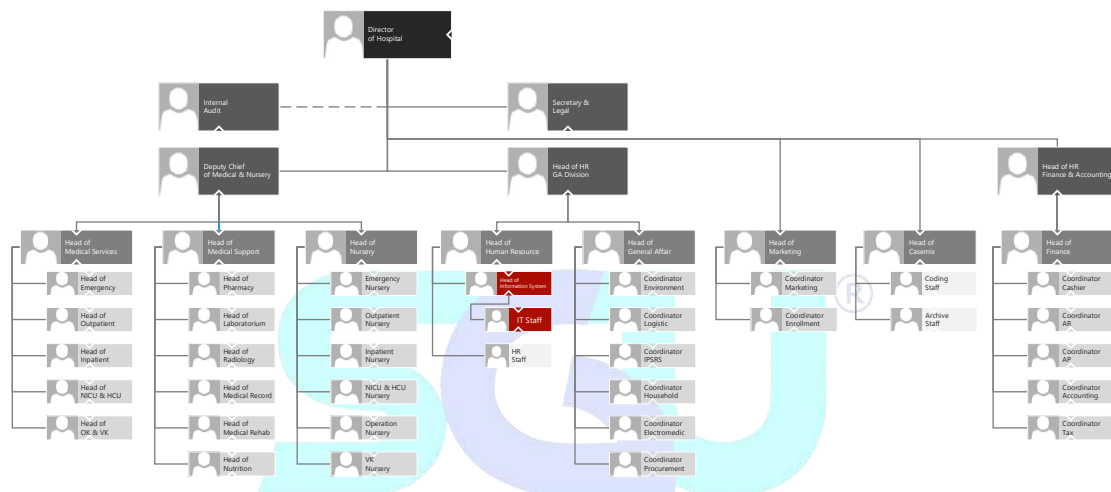


Figure 2.4 Organizational Structure of PT. EFG (Source: HR Documentation)

From Figure 2.4 regarding the organizational structure of PT. EFG, we can see that the Head of Information Systems is positioned under the Head of Human Resources. Additionally, it is apparent that there is currently IT staff managing the IT operations of the hospital.

2.2. Hospital Classification

Every hospital is required to meet classifications mandated by applicable regulations. These classifications determine the type of services provided, the human resources required, medical equipment, facilities and infrastructure, as well as administration and management (Article 5 of PERMENKES No. 340 of 2010) (Ministry of Health, 2010). General hospitals are classified into four categories: A, B, C, and D. However, according to this regulation, all four hospital categories are required to implement a Hospital Information System (SIRS), meaning that there are no exceptions based on the

class type. The Figure 2.5 shows the matrix of requirements for the Hospital Information System (SIRS) that must be met by all four hospital categories.

KRITERIA	KELAS A	KELAS B	KELAS C	KELAS D	KETERANGAN
23. Ruang PKMRS	+	+	+	+	
24. Ruang Perpustakaan	+	+/-	-	-	Khusus RS Pendidikan
25. Ruang Jaga Ko Ass	+	+/-	-	-	Khusus RS Pendidikan
26. Ruang Pertemuan	+	+	+	+	
27. Bangunan / Ruang Diklat	+	+/-	-	-	
28. Ruang Diskusi	+	+/-	-	-	
29. Skill Lab dan Audio Visual	+	-	-	-	Khusus RS Pendidikan
30. Sistem Informasi Rumah Sakit	+	+	+	+	
31. Sistem Dokumentasi Medis Pendidikan	+	-	-	-	

Figure 2.5 Hospital Management Information System is mandatory for all class (Source: PERMENKES No. 340 of 2010)

From the Figure 2.5, it is clear that the Hospital Information System (SIRS) has become a necessary facility and infrastructure required by all hospital classes, whether A, B, C, or D. Further guidance on Hospital Information System (SIRS) has been promulgated in Minister of Health Regulation No. 1171 of 2011 regarding Hospital Information System (Ministry of Health, 2011).

2.3. IT Governance according to Hospital Management Information System

Minister of Health Regulation No.82 of 2013 concerning Hospital Management Information Systems is a regulation that must be complied with and followed by hospitals to ensure the creation of quality Health services with the application of reliable, integrated and secure information technology. The main focus of this regulation is to ensure that hospitals implement information systems to support health service business processes. But not only talking about the application of technology, this regulation also specifically discusses hospital information technology governance in Chapter IV. The things discussed are related to the organizational structure, which requires hospitals to have an information and technology unit/installation, information and technology human resources and an information and technology governance framework. In particular, this regulation recommends that the framework that can be used for information technology governance in hospitals is COBIT.

2.4. Information Technology

Information technology is also known as IT. Various definitions of information technology are presented from several sources. From Table 2.1, several definitions of Information Technology are presented to provide a comprehensive definition.

Table 2.1 Various Definitions of Information Technology (Kadir, 2014)

Source	Number
Haag & Keen (1996)	Information technology is a set of tools that help work with information and perform tasks related to information processing.
Martin (1999)	Information technology is not only limited to computer technology (hardware and software) used to process and store information, but also includes communication technology to transmit information.
Williams & Sawyer (2003)	Information technology is a technology that combines computing (computers) with high-speed communication lines that carry data, voice and video.

According to the definition in Table 2.1, information technology encompasses both computer and telecommunications technologies, reflecting the convergence of these two fields (Kadir, 2014).

2.5. Enterprise Governance of IT

"Enterprise Governance of IT (EGIT)" is an emerging concept that is garnering increasing attention within both academic research and practical implementation. As a vital element of broader enterprise governance, EGIT encompasses the establishment and execution of processes, structures, and relational mechanisms within an organization. Its primary objective is to ensure the effective fulfillment of roles by both business and IT professionals, thereby fostering alignment between business and IT goals. Furthermore, EGIT is essential for generating, safeguarding, and enhancing the business value of IT-enabled investments. (De Haes et al., 2019).



Figure 2.6 EGIT Alignment Value Conceptual Model (ISACA., 2018)

According to the definition provided by ITGI (2003), "IT Governance" refers to the duty of executives and the board of directors. It encompasses the leadership, organizational structures, and processes that ensure the organization's IT effectively supports and enhances the enterprise's strategy and goals. Then based on (Grembergen

et al., 2000). IT governance encompasses the capacity of the board of directors, executive leadership, and IT management to oversee and guide the formulation and implementation of information technology strategies. This process ensures that business and IT objectives are effectively aligned and integrated.

Based on the two definitions provided, Enterprise Governance of IT (EGIT) represents an updated concept that highlights business responsibilities more prominently. It broadens the focus of EGIT beyond just aligning IT with business goals, as emphasized in IT Governance, to more critically include the generation of business value for the organization. EGIT is seen as a tool for achieving business/IT alignment, which is ultimately aimed at facilitating the creation of business value (De Haes et al., 2019). When discussing IT business value, it's important to note that no business value is generated simply by IT delivering a new solution or application on schedule, within budget, and according to specifications. Conversely, if the business fails to integrate the new IT system into its operations or does not utilize it, the potential value remains unfulfilled. Business value will only be felt and created if the business adopts and uses the IT system that has been built so as to enabling business performance to increase turnover and profit. So that business involvement is very crucial to ensure the achievement of IT Business Value.

2.6. COBIT

Control Objective for Information and Related Technology (COBIT) was developed by the IT Governance Institute (ITGI), which is part of the Information System Audit and Control Association (ISACA). COBIT provides business-oriented guidelines, thus business and IT stakeholders can use this guideline to build Enterprise Governance of IT in accordance with the organization's Enterprise Goals and Alignment Goals. COBIT is a best practice that helps optimize IT investments and provides a measure to assess when things go wrong (ISACA.,2018).

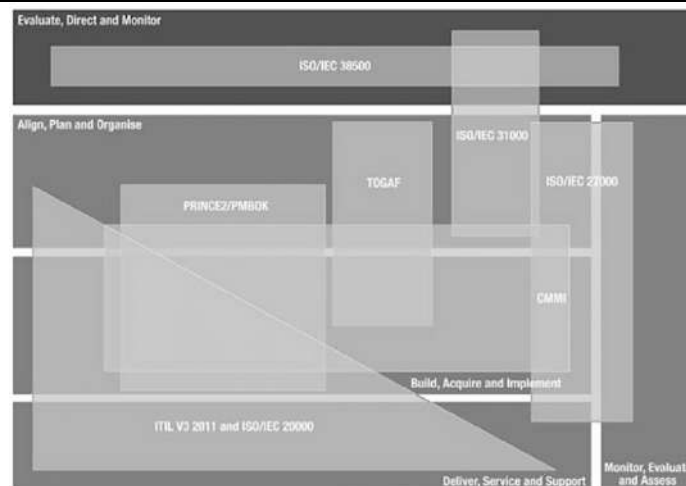


Figure 2.7 COBIT Coverage of other Standard and Framework (ISACA., 2018)

From the Figure 2.7 we can see that COBIT is a Single Integrated Framework, which covers other standards and frameworks for both management and operation areas. Although COBIT is broad, the discussion is shallow, to deepen each process we can refer to other frameworks or standards, for example for IT Service Management we can refer to ITIL or ISO / IEC 20000, as well as for Data Management we can refer to DAMA DMBOK.

The COBIT (Control Objectives for Information and Related Technologies) framework constitutes a comprehensive methodology designed to assist organizations in establishing an information technology system that aligns with their strategic objectives. As a set of best practices, COBIT offers a structured approach for the governance of enterprise IT, facilitating the integration of business objectives with IT management practices. By employing the COBIT framework, organizations can effectively bridge the gap between business risks, control mechanisms, and technical challenges. The implementation of this framework is intended to enable organizations to govern IT in a manner that supports the attainment of overarching enterprise goals, through the optimal management of IT processes related to planning, development, operation, and performance monitoring.

In 1996 COBIT version 1 was published where the emphasis was on a framework for auditing, then in 1998 COBIT version 2 was published and emphasized control. COBIT 3 was published in 2003 which is oriented towards management. COBIT 4 which focused on IT Governance in 2005. COBIT 5 which separates between governance and

management. And in 2018 the latest version was published, namely COBIT 2019, a significant difference is the addition of Design Factor and Focus Area in order to help the Governance design process in accordance with organizational goals.

2.7. COBIT 2019

COBIT 2019 represents the most recent iteration succeeding COBIT 5. This version introduces significant modifications aimed at streamlining the process of defining Governance System Design. It incorporates elements such as Design Factor and Focus Area to enhance clarity and efficacy. COBIT 2019 serves as a comprehensive framework offering guidance to enterprises in the realm of IT governance. Moreover, it facilitates the customization of governance strategies tailored to align with organizational objectives and goals. (Syuhada et al., 2021).

Table 2.2 describes the differences between COBIT 5 and COBIT 2019 based on several comparative points of view.

Table 2.2 Comparison of COBIT 5 and COBIT 2019 (Syuhada et al., 2021)

No	Point of View	COBIT 5	COBIT 2019
1	Overall	Does not have design factor	Have design factor
2	Principle	5 Principles	9 Principles
3	Detail Domain Proses	Called IT Governance Process	Called Governance and Management Objective
		In each domain it becomes a verb, for example: manage	Each domain becomes a more objective word, for example: managed
		37 Processes	40 Objective
4	Goal Cascade	5 Goal Cascade	4 Goal Cascade
5	Maturity level	Capability Level	Maturity Level and Capability Level
6	Governance System	Enabler	Governance System Components

2.7.1. Governance and Management Objective

COBIT 2019 divides the objectives of IT governance and management into two parts, which are:

1. Governance Objective is grouped into Evaluate, Direct and Monitor (EDM) domain. COBIT 2019 represents the evolution from COBIT 5, introducing

streamlined methodologies for Governance System Design through new concepts like Design Factor and Focus Area. It provides comprehensive guidance for organizations to manage IT governance effectively, allowing for customized governance solutions that align closely with organizational goals and objectives.

2. The Management Objectives are categorized into four domains. The Align, Plan, and Organize (APO) domain addresses organizational strategy and IT support activities. The Build, Acquire, and Implement (BAI) domain focuses on defining, acquiring, developing, and integrating IT solutions into business processes. The Deliver, Service, and Support (DSS) domain oversees operational IT service delivery, including security-related services. Lastly, the Monitor, Evaluate, and Assess (MEA) domain monitors performance, IT adherence to targets, and compliance with internal and external controls.

Figure 2.8 depict an overview of the domain distribution of the Governance and Management Objective in COBIT 2019.

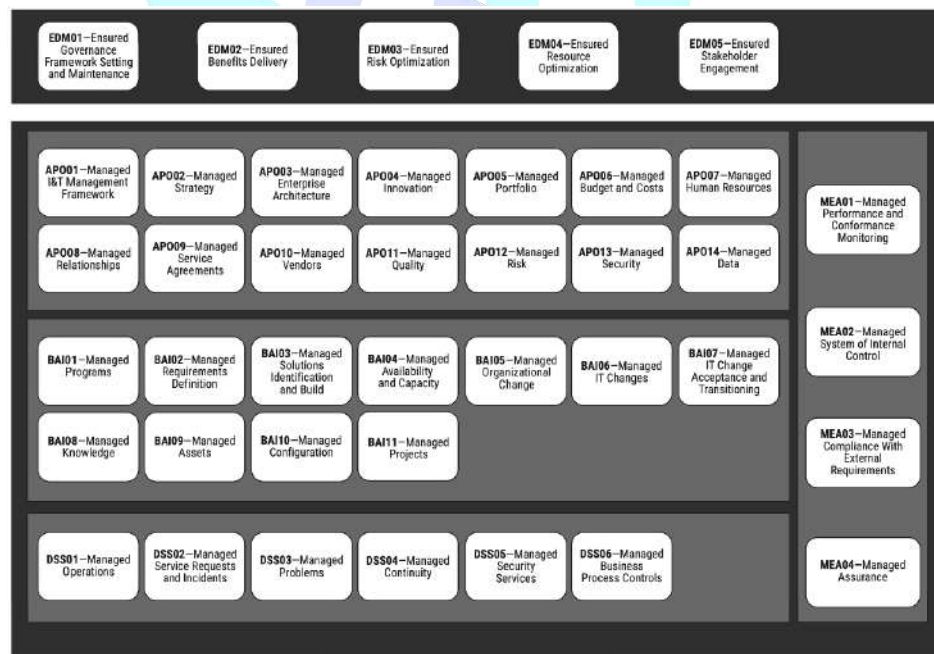


Figure 2.8 COBIT Core Model (ISACA., 2018)

Governance objectives align with governance processes, indicated in Figure 2.8 dark black background, while management objectives correspond to management processes, depicted on the gray background in the same figure.

Governance processes are chiefly overseen by boards and executive management, whereas management processes are typically managed by senior and middle management (ISACA., 2018).

2.7.2. Focus Area

A focus area represents a specific governance topic, domain, or issue addressed through structured governance and management objectives, including associated components. Examples include small and medium enterprises, cybersecurity, digital transformation, cloud computing, privacy, and DevOps. Each focus area typically encompasses a combination of broad governance principles and domain-specific adaptations. The potential focus areas within COBIT are virtually limitless, thereby underscoring its inherent flexibility. New areas of focus can be incorporated as required, or as emerging insights from subject matter experts and practitioners inform the continuous evolution of the COBIT framework. (ISACA., 2018).

2.7.3. Design Factors

Design factors are elements that shape the development of an enterprise governance system, ensuring that the governance of IT aligns with organizational objectives. Figure 2.9 explains the 11 COBIT Design Factors that can be used to design the Governance System.



Figure 2.9 COBIT Design Factor (ISACA., 2018)

2.7.3.1. Enterprise Strategy

Businesses often employ a range of strategies, typically represented by one or more archetypes outlined in Table 2.3. Organizations generally prioritize a primary strategy, with the possibility of a secondary strategy.

Table 2.3 Enterprise Strategy Design Factor (ISACA., 2018)

Strategy Archetype	Explanation
Growth/Acquisition	The enterprise has a focus on growing (revenues).
Innovation/Differentiation	The enterprise has a focus on offering different and/or innovative products and services to their clients.
Cost Leadership	The enterprise has a focus on short-term cost minimization.
Client Service/Stability	The enterprise has a focus on providing stable and client-oriented service.

2.7.3.2. Enterprise Goals

Enterprise goals, aligned with the overall strategy, are achieved through the attainment of specific objectives. These goals, as outlined in the COBIT framework, are structured according to the balanced scorecard (BSC) dimensions, incorporating the elements presented in Table 2.4.

Table 2.4 Enterprise Goals Design Factor (ISACA., 2018)

Reference	BSC	Enterprise Goal
EG01	Financial	Portfolio of competitive products and services
EG02	Financial	Managed business risk
EG03	Financial	Compliance with external laws and regulations
EG04	Financial	Quality of financial information
EG05	Customer	Customer-oriented service culture
EG06	Customer	Business-service continuity and availability
EG07	Customer	Quality of management information
EG08	Internal	Optimization of internal business process functionality
EG09	Internal	Optimization of business process costs
EG10	Internal	Staff skills, motivation and productivity
EG11	Internal	Compliance with internal policies
EG12	Growth	Managed digital transformation programs
EG13	Growth	Product and business innovation

2.7.3.3. Risk Profile

The risk profile outlines the types of information and technology-related risks currently facing the enterprise and highlights which areas exceed the acceptable level of risk. The risk categories detailed in Table 2.5 should be carefully reviewed.

Table 2.5 Risk Profile Design Factor (ISACA., 2018)

Reference	Risk Category
1	IT investment decision making, portfolio definition & maintenance
2	Program & projects life cycle management
3	IT cost & oversight
4	IT expertise, skills & behavior
5	Enterprise/IT architecture
6	IT operational infrastructure incidents
7	Unauthorized actions
8	Software adoption/usage problems
9	Hardware incidents
10	Software failures
11	Logical attacks (hacking, malware, etc.)
13	Third-party/supplier incidents
14	Noncompliance
15	Geopolitical Issues
16	Industrial action
17	Acts of nature
18	Technology-based innovation
19	Environmental

2.7.3.4. I&T-related Issues

An alternative method for conducting an enterprise-level I&T risk assessment is to assess existing I&T-related challenges or, in other words, to pinpoint emerging I&T-related risks. The primary issues are detailed in Table 2.6.

Table 2.6 I&T-Related Issues Design Factor (ISACA., 2018)

Reference	Description
A	Frustration between different IT entities across the organization because of a perception of low contribution to business value
B	Frustration between business departments (i.e., the IT customer) and the IT department because of failed initiatives or a perception of low contribution to business value
C	Significant IT-related incidents, such as data loss, security breaches, project failure and application errors, linked to IT
D	Service delivery problems by the IT outsourcer(s)
E	Failures to meet IT-related regulatory or contractual requirements
F	Regular audit findings or other assessment reports about poor IT performance or reported IT quality or service problems
G	Substantial hidden and rogue IT spending, that is, IT spending by user departments outside the control of the normal IT investment decision mechanisms and approved budgets
H	Duplications or overlaps between various initiatives, or other forms of
I	Insufficient IT resources, staff with inadequate skills or staff burnout/dissatisfaction
J	IT-enabled changes or projects frequently failing to meet business needs and delivered late or over budget
K	Reluctance by board members, executives or senior management to engage with IT, or a lack of committed business sponsorship for IT
L	Complex IT operating model and/or unclear decision mechanisms for IT-related decisions
M	Excessively high cost of IT
N	Obstructed or failed implementation of new initiatives or innovations caused by the current IT architecture and systems
O	Gap between business and technical knowledge, which leads to business users and information and/or technology specialists speaking different languages
P	Regular issues with data quality and integration of data across various sources
Q	High level of end-user computing, creating (among other problems) a lack of oversight and quality control over the applications that are being developed and put in operation
R	Business departments implementing their own information solutions with little or no involvement of the enterprise IT department (related to end-user computing, which often stems from dissatisfaction with IT solutions and services)
S	Ignorance of and/or noncompliance with privacy regulations
T	Inability to exploit new technologies or innovate using I&T

2.7.3.5. Threat Landscape

The operational environment within which the enterprise functions can be classified as depicted in Table 2.7.

Table 2.7 Threat Landscape Design Factor (ISACA., 2018)

Threat Landscape	Explanation
Normal	The enterprise is operating under what are considered normal threat levels.
High	Due to its geopolitical situation, industry sector or particular profile, the enterprise is operating in a high-threat environment.

2.7.3.6. Compliance Requirements

The enterprise's compliance obligations can be classified according to the categories specified in Table 2.8.

Table 2.8 Regulatory Environment Design Factor (ISACA., 2018)

Regulatory Environment	Explanation
Low compliance requirements	The enterprise is subject to a minimal set of regular compliance requirements that are lower than average.
Normal compliance requirements	The enterprise is subject to a set of regular compliance requirements that are common across different industries
High compliance requirements	The enterprise is subject to higher-than-average compliance requirements, most often related to industry sector or geopolitical conditions.

2.7.3.7. Role of IT

The role of IT within the enterprise is classified as outlined in Table 2.9.

Table 2.9 Role of IT Design Factor (ISACA., 2018)

Role of IT	Explanation
Support	IT is not crucial for the running and continuity of the business process and services, nor for their innovation
Factory	When IT fails, there is an immediate impact on the running and continuity of the business processes and services. However, IT is not seen as a driver for innovating business processes and services.
Turnaround	IT is seen as a driver for innovating business processes and services. At this moment, however, there is not a critical dependency on IT for the current running and continuity of the business processes and services.
Strategic	IT is critical for both running and innovating the organization's business processes and services

2.7.3.8. Sourcing Model for IT

The sourcing model adopted by the enterprise can be categorized as detailed in Table 2.10.

Table 2.10 Sourcing Model for IT Design Factor (ISACA., 2018)

Sourcing Model	Explanation
Outsourcing	The enterprise calls upon the services of a third party to provide IT services.
Cloud	The enterprise maximizes the use of the cloud for providing IT services to its users.
Insourced	The enterprise provides for its own IT staff and services
Hybrid	A mixed model is applied, combining the other three models in varying degrees.

2.7.3.9. IT Implementation Method

The implementation methods adopted by the enterprise can be classified in Table 2.11.

Table 2.11 IT Implementation Method Design Factor (ISACA., 2018)

IT Implementation Method	Explanation
Agile	The enterprise uses Agile development working methods for its software development.
DevOps	The enterprise uses DevOps working methods for software building, deployment, and operations.
Traditional	The enterprise uses a more classic approach to software development (waterfall) and separates software development from operations.
Hybrid	The enterprise uses a mix of traditional and modern IT implementation, often referred to as “bimodal IT.”

2.7.3.10. Technology Adoption Strategy

The strategy for adopting technology can be categorized as outlined in Table 2.12.

Table 2.12 Technology Adoption Strategy Design Factor (ISACA., 2018)

Adoption Strategy	Explanation
First Mover	The enterprise generally adopts new technologies as early as possible and tries to gain first-mover advantage.
Follower	The enterprise typically waits for new technologies to become mainstream and proven before adopting them.
Slow Adopter	The enterprise is very late with adoption of new technologies.

2.7.3.11. Enterprise Size

As indicated in Table 2.13, the design of an enterprise’s governance system is categorized into two distinct types, large and small medium enterprise.

Table 2.13 Enterprise Size Design Factor (ISACA., 2018)

Enterprise Size	Explanation
Large Enterprise	Enterprise with more than 250 full-time employees
Small & Medium Enterprise	Enterprise with 50 to 250

2.7.4. Designing a Tailored Governance System

The Governance System Design Workflow is a structured process aimed at developing a tailored governance system that precisely meets the Enterprise Governance of IT requirements of the organization. Figure 2.10 depicts the workflow for designing such a governance system.

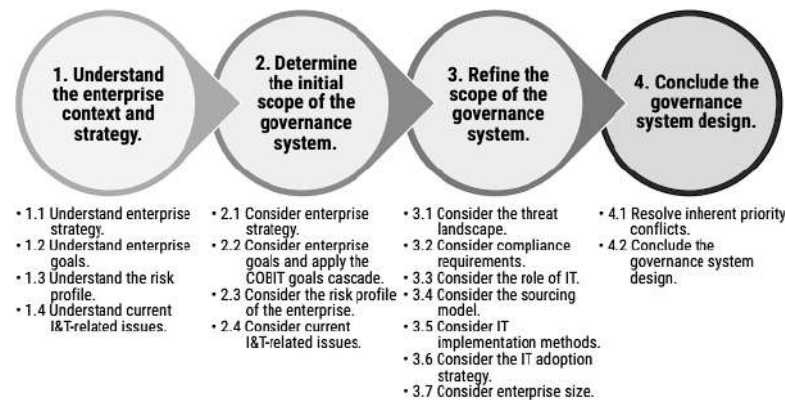


Figure 2.10 Governance System Design Workflow (ISACA., 2018)

The substeps outlined within each stage in Figure 2.9 are not obligatory. For instance, an organization may choose to develop a governance system specifically to address a particular strategic choice or to focus on specific IT risk areas, without necessarily following the entire detailed workflow sequence (ISACA.,2018). Decisions at each phase impact the prioritization of recommendations for governance and management objective.

a. Step 1: Understand the Enterprise Context and Strategy

At this stage, an analysis is undertaken to comprehend the context, strategy, and business environment, with particular emphasis on enterprise goals, strategy, I&T risk profile, and existing I&T challenges.

b. Step 2: Determine the Initial Scope of the Governance System

This step defines the initial scope. In Step 2, data from Step 1 is integrated, and assessments aligned with the enterprise strategy, goals, risk profile, and technology issues guide the creation of a tailored governance framework.

c. Step 3: Determine the Initial Scope of the Governance System

This phase aims to refine the initial scope by evaluating Design Factors DF5 through DF11. Not all Design Factors need to be universally applied; those deemed irrelevant can be omitted. The outcome of this stage is a prioritized list of governance and management objectives.

d. Step 4: Resolve Conflict and Conclude the Governance System Design

Stage 4 is the final stage where all the scores obtained from the previous steps are accumulated to conclude the Governance System Design as illustrated in Figure 2.10. At this step, the organization determines and modifies the prioritization of the Governance and Management Objectives included in the Tailored Governance System Design.

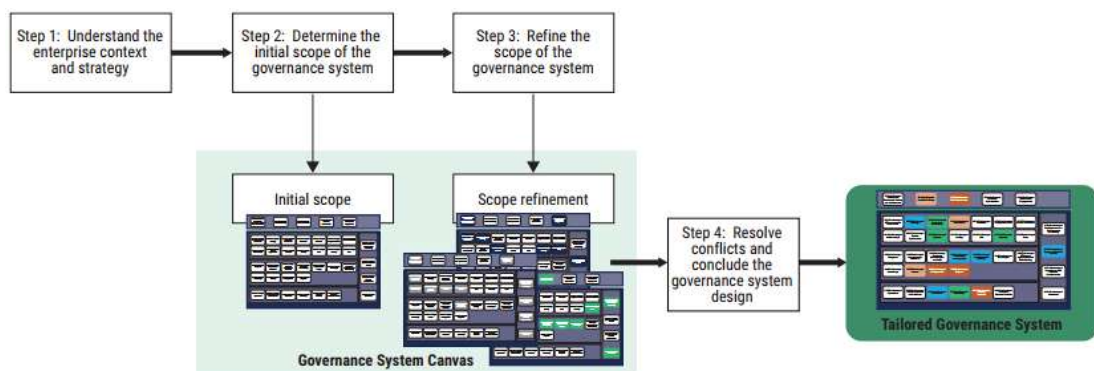


Figure 2.11 Governance System Design Workflow (ISACA., 2018)

2.7.5. COBIT Performance Management (CPM)

To illustrate the extent to which the applied IT has been managed and can support the organization's business, the implementation of IT requires development and improvement in order to achieve organizational goals (Nitrizal et al.,2007). Meanwhile, to assess the extent to which the performance of IT implementation, governance and management system requires an instrument to measure, and the measuring instrument is COBIT Performance Management. CPM broadly adopts the concept of CMMI v2 where Governance and Management Objectives are associated to capability levels.

2.7.5.1. Process Capability Levels

As outlined in Subsection 2.7.5, COBIT 2019 employs a process capability framework based on CMMI. Each process associated with governance and management objectives

may operate at varying capability levels, spanning from 0 to 5. These levels reflect the effectiveness and maturity of the process's implementation and performance. Figure 2.12 illustrates this model, showing the ascending capability levels and their general attributes. (ISACA., 2018).

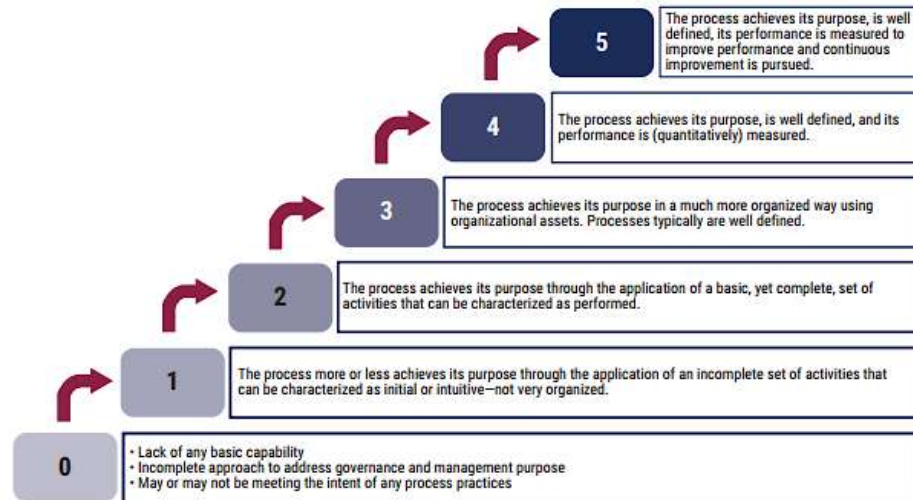


Figure 2.12 Capability Level for Processes (ISACA., 2018)

In figure 2.12 it can be seen that the Capability Level levels are tiered, and to be able to move up to the next Capability Level there is a Capability Levels Rating that must be met, the standard for being able to proceed to the next level of capability is when the Rating is "Fully Achieved". A more detailed explanation of the Capability Level Rating is contained in Table 2.14.

Table 2.14 Adopted from Enterprise Size Design Factor (ISACA., 2018)

Scale	% Achieved	Description	Achievement
N	15%	Not Achieved	Management practices not implemented, or that only a small portion of management practices are applied.
P	50%	Partially Achieved	At least half of the requirements management practices have been implemented.
L	85%	Largely Achieved	Most of the requirements from management practices have been implemented.
F	100%	Fully Achieved	All management practice requirements have been met.

The scale presented in Table 2.14 will be mapped to the "Management Practices" provided by the COBIT 2019 Framework in order to identify the capability level.

Subsequently, the results from the measurement of each Management Practice will be averaged to determine the capability score for each practice. The following presents the calculation process for deriving the average score for each Management Practice, based on the activity measurements within each practice.

$$\tilde{x} = \frac{\sum A1 + A2 + A..n}{n}$$

Where:

$\tilde{x}$ = Mean (Average) of Management Practice

$\sum A1 + A..n$ = Sum of all activities scoring result

n = Total number of activities

To assess the capability value for each Governance and Management Objective, the average of the results from the Management Practice calculations above is taken. The following formula outlines the computation method.

$$\tilde{y} = \frac{\sum \tilde{x}1 + \tilde{x}2 + \tilde{x}..n}{n}$$

Where:

$\tilde{y}$ = Mean (Average) of Governance and Management Objective

$\sum \tilde{x}1 + \tilde{x}..n$ = Sum of all average of management practice scoring result

n = Total number of management practice

Based on the calculations above, the capability level for the Governance and Management Objective has been determined.

2.8. Information Technology Library Infrastructure (ITIL)

Services are the primary means by which organizations generate value for both themselves and their customers. Today, nearly all services rely on IT, highlighting the significant advantages for organizations in developing, enhancing, and expanding their IT service management capabilities (Axelos, 2019). ITIL is a framework that is commonly used to ensure the realization of reliable and ideal information technology service management (ITSM). ITIL provides best practices on IT service delivery from establishing a service strategy (Service Strategy), designing services to meet user requirements and the capabilities of the organization (Service Design), ensuring that

the services developed are available in a live environment so that they can be used (Service Transition), ensuring services can be consumed by all users and dealing with incidents or problems that occur within the service (Service Operation) and ensuring continuous improvement in the services IT provided (Continual Service Improvement). This framework can be used as a reference for the preparation of recommendations in the Build, Acquire, and Implement (BAI) and Deliver, Service, Support (DSS) areas of COBIT 2019, which will be adopted by PT. EFG.

2.9. ISO/IEC 38500:2024

ISO/IEC 38500:2008 constitutes an internationally recognized standard in IT governance, co-published by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). This framework facilitates comprehensive comprehension and adherence to legal, regulatory, and ethical responsibilities concerning IT deployment at the upper echelons of organizational leadership. This standard governs the management processes associated with information and communication technology services within an organization (Calder, 2008).

2.9.1. Model for Governance of IT

IT governance involves setting objectives and parameters for the organization's use of IT, with the governing body ultimately responsible for the current and future use of IT within the organization. While the governing body retains this ultimate accountability, IT management activities occur throughout the organization.

Management is tasked with accomplishing objectives established by the governing body, maintaining a distinct separation between governance and managerial functions to enhance the attainment of favorable results. While management may delegate responsibility for particular IT aspects, ultimate accountability for ensuring IT's effective, efficient, and appropriate utilization rests with the governing body.

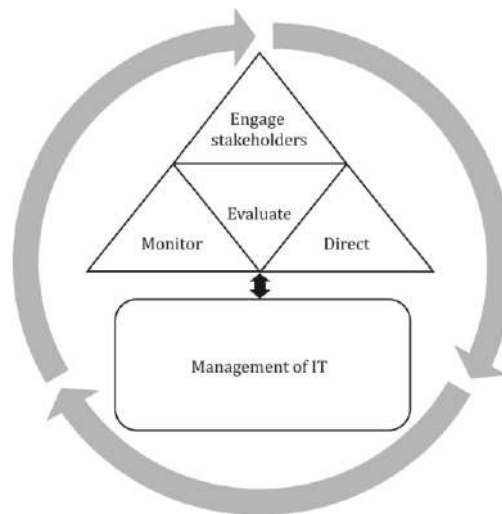


Figure 2.13 Model of Governance of IT

The model consists of three main elements:

1. Governance of IT practices, which includes core tasks such as engaging stakeholders, evaluating, directing, and monitoring.
2. Management of IT practices, focusing on day-to-day implementation.
3. Framework for IT governance, which applies across the entire organization.

2.9.1.1. Framework for the Governance of IT

Framework for the Governance of IT within the ISO/IEC 38500:2024 standard, which encompasses six main elements for IT governance within an organization. These six interconnected elements serve to regulate, manage, and ensure that IT usage within the organization operates effectively and aligns with stakeholder expectations.

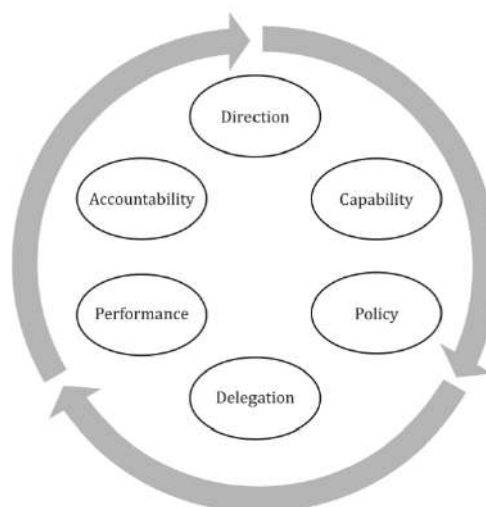


Figure 2.14 Framework of Governance of IT

The elements are as follows:

1. **Direction:** Sets the direction of IT policies and strategies to align with the organization's objectives. This element ensures that IT usage supports the organization's strategic goals.
2. **Capability:** Assesses the organization's capacity to establish and uphold proficient IT governance practices, encompassing the requisite skills, knowledge base, and resources essential for IT support.
3. **Policy:** Develops policies, procedures, and standards that govern IT usage across the organization. These policies serve as operational guidelines that must be followed.
4. **Delegation:** Assigns roles and responsibilities within the organization related to IT governance. Delegation allows the governing body to entrust certain tasks while retaining ultimate accountability.
5. **Performance:** Ensures that IT performance is regularly evaluated and monitored to confirm that IT delivers value and supports organizational operations. This also includes risk monitoring and control.
6. **Accountability:** Establishes clear accountability for IT usage, ensuring that each role involved has the appropriate responsibilities and can be held accountable.

The framework is represented as a cycle, indicating that these processes are iterative and interconnected. Each element does not operate in isolation but instead works together to create comprehensive and sustainable IT governance at all levels within the organization. Organizations must tailor this framework's details to fit their specific context, structure, and objectives.

With these six elements, the ISO/IEC 38500:2024 framework helps organizations create an effective and accountable IT governance structure that supports long-term success and compliance with regulatory and stakeholder needs.

2.10. Comparative Analysis between ISO/IEC 38500 and COBIT 2019

This analysis is grounded in a review of the ISO/IEC 38500:2024 standard on IT governance for organizations, alongside the COBIT 2019 Framework Introduction and Methodology publication. This comparative analysis is carried out based on several parameters, namely Purpose, Separation for Governance and Management, Principles, Processes, and Tailoring/Design an EGIT.

Table 2.15 Comparative Analysis ISO/IEC 38500:2024 and COBIT 2019 Framework

No	Point of View	ISO/IEC 38500:2024	COBIT 2019
1	Type	Standard	Framework
2	Purpose	Focuses on providing standard principles for IT governance, ensuring accountability and strategic alignment of IT within the organization.	Provides a comprehensive framework for governance and management of enterprise information and technology (EGIT) to optimize IT and business alignment.
3	Governance & Management	Distinctly separates governance (by the governing body) from management (operational execution), with governance retaining ultimate accountability.	Clearly separates governance and management into distinct domains but provides guidance across both to address all organizational levels.
4	Principle	11 Principles	9 Principles
5	Structure	Principles-based, organized around evaluating, directing, and monitoring IT to achieve alignment with business goals.	Domain-based, divided into five domains (EDM, APO, BAI, DSS, MEA) with specific governance and management objectives.
6	Detail Domain Proses	There is no explanation of the domain (Principle Based)	Called Governance and Management Objective 40 Objective
7	Maturity level	N/A	Maturity Level and Capability Level
8	Tailoring/Design	N/A	Design Factor
9	User	Designed for governing bodies, board members, and senior executives.	Used by boards, senior executives, IT management, and operational staff for a broad application across enterprise levels.
10	Implementation	Less prescriptive and relies on management's discretion for applying governance principles. Implementation depends on organizational adaptation.	Offers structured implementation guidance with a roadmap and performance management model, making it more prescriptive for detailed operational governance.

The table 2.15 compares ISO/IEC 38500:2024 and COBIT 2019, two widely used standard and frameworks for IT governance, highlighting ten key aspects. ISO 38500 is a high-level standard focused on setting principles for IT governance, particularly around ensuring accountability and strategic alignment of IT within organizations. It is designed for governing bodies, board members, and senior executives, and is less prescriptive, allowing organizations flexibility in applying its principles based on management discretion. Its structure revolves around 11 principles, organized into three main activities: evaluating, directing, and monitoring IT to support alignment with business objectives. ISO 38500, however, does not offer detailed domain processes, maturity levels, or customization elements, making it best suited for high-level strategic guidance.

COBIT 2019, on the other hand, is a comprehensive framework that provides extensive guidance across both IT governance and management. It offers nine core principles within a structured, domain-based model divided into five areas: Evaluate, Direct, and Monitor (EDM); Align, Plan, and Organize (APO); Build, Acquire, and Implement (BAI); Deliver, Service, and Support (DSS); and Monitor, Evaluate, and Assess (MEA). Each domain includes specific governance and management objectives, with maturity and capability levels for assessing progress. COBIT 2019 is highly customizable through its design factors, allowing organizations to tailor the framework to fit their unique context and goals. Additionally, COBIT 2019 includes structured implementation guidance with a roadmap and performance management model, making it more prescriptive and operationally detailed, supporting a broad audience that includes boards, senior executives, IT management, and operational staff.

In summary, ISO 38500 is ideal for organizations seeking a high-level, principle-based approach for top-level governance, while COBIT 2019 is better suited for organizations needing detailed, actionable guidance that spans strategic governance and operational IT management.

2.11. DAMA – Data Management Body of Knowledge (DMBOK)

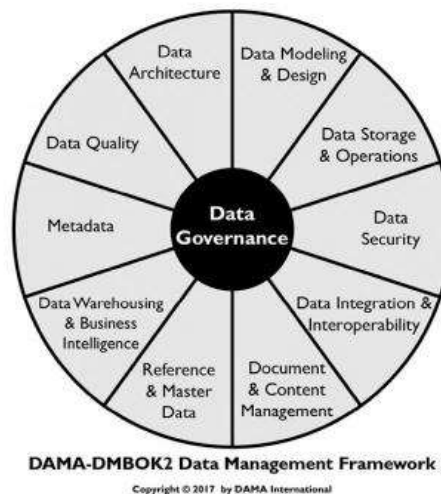


Figure 2.15 DMBOK DAMA Wheel (DAMA International, 2018)

DAMA - Data Management Body of Knowledge (DAMA-DMBOK) is a framework used for data management. As depicted at Figure 2.15 DAMA Wheel, The DMBOK consists of 11 Knowledge Areas which about Data Governance, Metadata, Data Quality, Data Architecture, Data Modeling, Data Storage & Operations, Data Security, Data Integration, Document & Content Management, Master Data & Reference and DWH & Business Intelligence. If we look at the APO14-Managed Data process in COBIT 2019, it states that they also refer to the DAMA DMBOK in compiling the process. DAMA-DMBOK can be used to sharpen recommendations related to APO-14 Managed Data in COBIT 2019, considering that the issue of data problems is an issue identified at PT. EFG.

2.12. SPICE Framework

SPICE is a conceptual framework employed in qualitative research, primarily aimed at assessing the outcomes of interventions or projects. SPICE is a framework employed to formulate questions aimed at evaluating and validating research. The acronym SPICE stands for Setting, Perspective, Intervention/Exposure/Interest, Comparison, and Evaluation. The "Setting" refers to the location in which the study is conducted, while the "Perspective" delineates the viewpoint from which the research is approached. The "Evaluation" component enables researchers to define success or emphasize a particular metric for assessing the intervention's effectiveness (Augustus C. Long, 2024).

2.13. Previous Studies

Several papers from related research provide backing for current research. Books, journals, conference papers and domestic or international publication are an excellent example. Table 2.16 details the strengths and weaknesses of previous research reviews including their objectives and contributions.

Table 2.16 Previous Studies

No	Author	Objective	Methods	Contribution	Weaknesses	Comparison
1	(Widharto <i>et al.</i> , 2022)	To assess IT priorities in alignment with the company's strategic objectives and to formulate recommendations based on best practices for enhancing IT services in support of these strategic goals.	• The research method used is qualitative and quantitative. • Scoping of Governance System using Design Factor. • Capability Level assessment using COBIT Performance Management (CPM).	• The Design Factor used is Initial Scope, i.e. DF1 until DF4. • Assessment findings along with recommendations are in place.	• Baseline priority number for the scope of the Tailored Governance System is not stipulated. • Design Workflow that is performed does not reach "Step 3: Determine the Initial Scope of the Governance System"	The author conduct an overall Design Factor assessment up to Step 4 using all 10 design factors. So that the resulting Governance Management & Objective is based on the overall design factor assessment.
2	(Utomo <i>et al.</i> , 2022)	Tailoring Governance System that suits the needs of Small and Medium Enterprise	• Both qualitative and quantitative methods	• Comprehensive recommendations regarding objectives that are part of the	• Calculation of the average capability value which ideally should not be done.	• In future research, the author suggests avoiding the averaging of capability score to

No	Author	Objective	Methods	Contribution	Weaknesses	Comparison
3	(Adhitya Nugraha and Syaidah, 2022.)	organizations, so that the implementation of IT Control and Objectives is not excessive, it is tailored to the needs of SME organizations. To develop IT governance, especially when considering the development of adaptive and responsive policies, as well as the establishment of structured governance frameworks with robust support from organized information systems.	• Scoping of Governance System using Design Factor • Capability Level assessment using COBIT Performance Management (CPM). • Both qualitative and quantitative. • Scoping of Governance System using Design Factor • Capability Level assessment using COBIT Performance Management (CPM)	Governance System Design • All stages Design Factor are performed • Resulting in 21 Objectives. • Capability level score of 1.05 and a target of 2.33. • Provide input to organizations regarding Governance System Design that can be adopted. • The result of Design Factor is 21 processes. • The baseline determined is priority above 34. • This findings, gap analysis and potential	• Calculation of the average capability value which ideally should not be done.	prevent potential result distortion. • In future research, the author suggests avoiding the averaging of capability score to prevent potential result distortion.

No	Author	Objective	Methods	Contribution	Weaknesses	Comparison
4	(Atrinawati <i>et al.</i> , 2021)	To design IT Governance in the University area, produce current capability level assessments and provide recommendations for future IT Governance improvements.	• Both qualitative and quantitative approaches • Scoping of Governance System using Design Factor • Capability Level assessment using COBIT Performance Management (CPM)	improvements are in place. • Presents a recommendation for the foundational process • Identifies 11 Governance and Management Objectives • Priority rating exceeding 50 points. • Recommendations for enhancing IT Governance are in place.	• This study does not explain the justification of priority value more than 50. • Very high priority value that can impact the number of objectives to be adopted are less.	• Author consider priority numbers that are not too high, because the higher the value determined, the less Governance & Management Objectives that are part of Enterprise Governance of IT.
5	(Ayu <i>et al.</i> , 2022)	Conduct an audit of the hospital's IT governance to obtain an evaluation of	• Both qualitative and quantitative.	• Provide an evaluation of each objective that has a critical point, like	• The Goal Cascade is not clearly explained. • The GaMO that are part of EGIT are only	• Author use Design Factor to Design the Governance of IT.

No	Author	Objective	Methods	Contribution	Weaknesses	Comparison
6	(Darmawan and Wijaya, 2022)	IT implementation and future improvements. Produce an IT Governance design, as a reference for evaluating IT performance in utilizing information technology in a targeted and more structured for an online shop.	• Process selection is done with 4 Step Goal Cascade. • Both qualitative and quantitative methodologies • Scoping of Governance System using Design Factor	APO14, DSS04, BAI09, and APO07. • Provide clear recommendations regarding GaMO. • Using entire Design Factor, and resulting 5 process which are APO08, APO12, APO13, DSS04 and DSS05.	4, which is not in accordance with the Goal Cascade Result which can prioritize more than 4. • Not explained how much baseline priority determines whether an objective is included in the governance system or not. • There is no assessment of the IT Governance capability level.	Author perform assessment of the IT Governance capability level in the organization of PT. EFG, so it is to know what improvements need to be made to make IT Governance in the organization run better.
7	(Ilham Akbar Sodik and Nugraheni, 2022)	Assess the effectiveness of the information system governance implemented within healthcare clinics.	• Combining qualitative and quantitative • Scoping of Governance System using Design Factor	• Provide an overview of what processes are part of the T Governance System, namely BAI02, BAI03 and BAI07	• For the clinic the recommended processes are processes related to system development. • The recommended targets are too high	Author ensure that in Phase 4: Resolve Conflict and Conclude the Governance System Design, processes that are not applicable in the near future or are not in

No	Author	Objective	Methods	Contribution	Weaknesses	Comparison
8	(Dharma and Sasmita, 2021)	Conduct an audit of IT governance capabilities that have been implemented in one government office.	- Both Qualitative and Quantitative. - Process scoping is done with 4 Step Goal Cascade.	- Each process targeted level 4 for capability level. - Provide an evaluation of each GaMO. - The objective are APO7, BAI10, EDM04, APO11, BAI03, APO08, BAI08, and APO04. - Recommendations for target capability levels are in place.	(level 4) which is very difficult to achieve. - The first drawback is that the calculation of capabilities is not standardized. - The Expected Capability Level targeted is too high when compared between the current capability.	accordance with Business Goals, adjusted so that they do not become part of the Enterprise Governance of IT. Author use COBIT Performance Management (CPM) in assessing the capability of EGIT and recommendations for increasing the level of capability are feasible and staged, not immediately jumping to a distant level, it can increase the load on the IT team, and make it possible that the target is not executed.

No	Author	Objective	Methods	Contribution	Weaknesses	Comparison
9	(Soetomo, M.A and Abdulatif, A, 2024)	Design IT governance framework that produced Governance and Management Objectives to enhance adherence to external regulations.	- Both Qualitative and Quantitative. - Scoping of Governance System using Design Factor	Establish governance and management objectives that support the organization's compliance with external regulations.	- The measurement of governance and management objectives, which are within the scope of IT Governance, has not been carried out. - There are no recommendations or implementation roadmap provided.	The author will measure the capability level of all selected Governance and Management Objectives, provide recommendations, and produce an implementation roadmap.

2.14. Summary of Previous Study and Comparison

Table 2.17 summarizes the overall objectives, methods, contributions and weaknesses for the eight previously conducted studies related to IT Governance.

Table 2.17 Summary of Previous Studies and Comparison

No	Author	Summary
1	(Widharto <i>et al.</i> , 2022)	This study evaluates IT priorities aligned with strategic goals and offers recommendations for IT service improvement. It uses qualitative and quantitative methods, focusing on the Governance System with the Design Factor approach. Contributions include actionable recommendations and the use of Initial Scope (DF1 to DF4). Limitations include missing baseline priorities for the Tailored Governance System's scope and an incomplete design workflow.

No	Author	Summary
2	(Utomo <i>et al.</i> , 2022)	This study tailors a Governance System for Small and Medium Enterprises (SMEs), using both qualitative and quantitative methods. It employs the Design Factor approach and COBIT Performance Management for capability measurement. Key contributions include 21 objectives, and a capability score of 1.05, targeting 2.33. A limitation is the calculation of the average capability value, which should be avoided.
3	(Adhitya Nugraha and Syaidah, 2022.)	This study aims to develop IT governance with a focus on adaptive policies and structured frameworks. It uses qualitative and quantitative methods, including the Design Factor approach and COBIT Performance Management. Key contributions include 21 processes and a baseline priority above 34. A limitation is the calculation of the average capability value, which should be avoided.
4	(Atrinawati <i>et al.</i> , 2021)	This study aim to designs IT governance for universities, assesses current capabilities, and offers improvement recommendations. It uses qualitative and quantitative methods, with the Design Factor approach and COBIT Performance Management. Key contributions include 11 governance objectives and a priority rating over 50 points. A limitation is that the high priority value reduces the number of objectives to be adopted.
5	(Ayu <i>et al.</i> , 2022)	This study aims to audits hospital IT governance to evaluate implementation and suggest improvements. It uses qualitative and quantitative methods with a 4-step Goal Cascade. Key contributions include evaluating objectives with critical points like APO14, DSS04, BAI09, and APO07. A limitation is the unclear explanation of the Goal Cascade and the use of only four EGIT-related goals, which doesn't align with its ability to prioritize more.
6	(Darmawan and Wijaya, 2022)	This study creates an IT governance design in online shops. It uses qualitative and quantitative methods, with the Design Factor. Key contributions include clear recommendations on governance and five key processes. A limitation is the lack of explanation on how much baseline priorities to be included in the governance system and the absence of an capability level measurement.
7	(Ilham Akbar Sodik and Nugraheni, 2022)	The study evaluates IT governance in healthcare clinics. It combines qualitative and quantitative methods, using the Design Factor approach. Key contributions include identifying processes like BA103 and BA102, with a target capability level of 4. A limitation is that these high targets (level 4) are difficult to achieve for company like a clinic.

No	Author	Summary
8	(Dharma and Sasmita, 2021)	This study conducts an audit of IT governance capabilities in a government office. It uses both qualitative and quantitative methods, with process scoping based on a 4-step Goal Cascade. Key contributions include an evaluation of objectives, with recommendations for target capability levels. A limitation is that the calculation of capabilities is not standardized, and the expected capability levels are too high compared to current capabilities.
9	(Soetomo, M.A and Abdulatif, A, 2024)	This study aims to designs an IT governance to improve compliance with external regulations. It uses qualitative and quantitative methods and focuses on defining governance and management objectives that related with the compliance management. However, it lacks measurement of these objectives and doesn't provide recommendations or an implementation roadmap.

Comparison with Current Study

Compared to previous studies, the EGIT developed is for a hospital. It is developed with both qualitative and quantitative methods. The governance framework was designed using a comprehensive design workflow incorporating 10 design factors with assigned priority values. Additionally, capability measurements of selected GaMO will be conducted without averaging the score, aiming for more feasible target levels. Subsequently, a gap analysis will be performed to derive actionable improvement recommendations aligned with stakeholders at PT. EFG. The author develop a Tailored Governance System which also can be used for other hospital's sister companies of PT. EFG. Also the author creates a Guideline Book for PT. EFG to improve their Governance containing Recommendation and Detailed Roadmap for 4 years.

Table 2.16 dan 2.17 illustrates some of the previous research that has been done related to Designing and Auditing IT Governance using COBIT. If we look in detail, table 2.16 has clearly defined the objectives, methods, contributions, weaknesses and comparisons with current research. In general, the key difference in this research that the author develop a Tailored Governance System as needed by PT. EFG that in hospital sector which have sister companies (another hospital), where the Governance System recommended can be used for other hospital sister companies.

Compared to the previous research that only used a few design factors, such as the study by Widharto et al. (2022), this research did not define the Initial Scope of the Governance System, resulting in only three design factors being used: Enterprise Strategy, Enterprise Goals, and Risk Profile. As well as the difference in contribution provided, in this study the authors create a Tailored Governance System that suits the needs of PT. EFG, which in the future can also be used by PT. EFG's sister company so as to create a standardization of IT capabilities between all hospital companies managed by the holding of PT. EFG, besides that if the holding of PT. EFG makes acquisitions and opens new branches, they can use the Tailored Governance System that has been implemented by PT. EFG to be implemented in new hospitals as a baseline standard.

Therefore, based on the explanation above, the researcher has developed a framework and method (Figure 3.1) to ensure that this study focus on designing enterprise IT governance using an overall design factor, which is divided into four stages of the Governance System Design Workflow, utilizing 10 factors that can influence the governance system design. By using all 10 design factors, this aims to deepen the process of scoping governance and management objectives so that the selected Governance and Management Objectives align with the needs and issues faced by the organization, with the hope of improving processes in the future. A more detailed explanation of this Research Framework is discussed in Chapter 3, accompanied by an illustration in Figure 3.1.