Unlocking Effective IT Governance: A Comprehensive Analysis of COBIT 2019 Implementation of a Hospital

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Abstract

This study aims to identify the level of capability of the information and technology governance process at a hospital. The identification of IT governance carried out in this study uses the COBIT 2019 framework in mapping the processes to be assessed. There were five domains tested in this study: Evaluate, Direct & Monitor (EDM); Align, Plan, and Organize (APO); Build, Acquire & Implement (BAI); Deliver, Service & Support (DSS); and Monitor, Evaluate & Assess (MEA) with 40 IT governance process objectives. Data were obtained through unstructured interviews, which were conducted to obtain information related to the 2019 COBIT IT governance design factors at the hospital. Data were analyzed through two stages: identification of IT Governance design factors and process capability level identification. The identification process is carried out by mapping the data related to organizations with IT governance design factors based on the COBIT 2019 toolkit. The result found that there are two highest score processes found in design factor analysis, namely APO08 (managed relationship) and BAI08 (managed knowledge). The results of identifying the capability level of the three processes are at level 4. It means that the activities carried out in implementing Hospital Management Information Systems in terms of APO08 and BAI08 at the hospital have achieved their objectives and are well-defined. However, EDM3 (Ensured Risk Optimization) and APO06 (Managed Budget and Cost) at the hospital still need improvement. The findings contribute to literature related to Management Information Systems and Accounting Information Systems.

Keywords: COBIT 2019, Hospital Management Information Systems, Information and Technology Governance and Capability Models

Introduction

The rapid development of science and technology, especially in the IT field, is very useful in supporting the progress of an organization and company. Williams et al. (see Sukamto et al., 2021) define Information Technology (IT) as any technology that assists human work in creating, changing, storing, communicating, and disseminating information.

One organization that requires information technology in practice is the Hospital. Hospital information Technology is integrated into a Hospital Management Information System (HMIS). This is based on Law of the Republic of Indonesia Number 44 of 2009 article 52 section (1) regarding hospitals, Every hospital is required to record and report all hospital operations in the form of a hospital management information system.

The Hospital is one example of a hospital that has used SIMRS in its work process. HMIS plays an important role in supporting the entire process of information technology governance in the Hospital. But in fact, there are still several obstacles in its implementation, such as network difficulties and uneven application in the entire operational process of the Hospital. Then the adoption of systems that come from third-party vendors so that there is still dependence in solving an obstacle.

Therefore, periodic evaluation of IT governance is needed so that improvements can be made if something goes wrong (Saleh *et al.*, 2021). Minister of health regulation No.82 of 2013 recommends the implementation of a technology governance framework that has a measurement model for IT services, namely COBIT. COBIT is an internationally recognized and applied best practice regarding information, information technology, and organizational risk (ISACA, 2019b).

Several previous studies have used COBIT in conducting evaluations ranging from COBIT 4.1, COBIT 5 to COBIT 2019 which is the latest version of COBIT published by ISACA in 2018. Research by Safitri et al., (2021) and Anugrah et al., (2022) utilizes the COBIT 2019 framework in risk management analysis of IT governance by measuring the level of capability achieved In the Education sector, especially at the higher education level, COBIT 2019 is also used to assist in evaluating IT services and providing improvement recommendations according to the selected process domain (Ishlahuddin et al., 2020; Atrinawati et al., 2021; Nugraha & Syaidah, 2022; Samsinar & Sinaga, 2022) The Information Technology Governance Planning Process Using the COBIT 2019 Framework is also used in the implementation of e-government in government agencies to help identify processes that are important to agencies (Solehuddin *et al.*, 2021) In several studies, COBIT 2019 is used to measure and improve IT services in order to meet business needs (Anastasia & Atrinawati, 2020; Bayasutra et al., 2021; Cristy et al., 2022; Ikhsan & Nugraheni, 2022; Widharto et al., 2022).

Based on the background that has been described, researchers are interested in analyzing the level of capability of the information technology governance process using the COBIT 2019 framework with a case study at a Hospital. This is because hospitals are one of the most important public services for the community, so good IT services are needed to support operational performance.

Control Objective for Information and Related Technology (COBIT) 2019

COBIT is an IT governance framework that helps organizations meet today's business challenges in the areas of regulatory compliance, risk management, and alignment of IT strategy with organizational goals. COBIT was developed by ISACA (Information Systems Audit and Control Association), an international professional membership association for IT professionals and IT auditors numbering more than 100,000 members worldwide. The main emphasis of the COBIT framework is to ensure that technology provides businesses with relevant, timely, and quality information for decision-making purposes (Otero, 2019).

COBIT was originally developed as a framework for carrying out IT audit tasks to guide the work of auditors. COBIT was first released by ICASA in 1996 as a framework for carrying out IT audit tasks, then a second edition in 1998. The third version of the COBIT framework was released in 2000. In 2005, ISACA released COBIT 4.0, and its direct successor, COBIT 4.1, was released in 2007. ISACA developed COBIT 5 as an integrated good practice framework

for IT governance and IT management in 2012. In November 2018, COBIT 5's successor, COBIT 2019, was officially released.

COBIT was chosen as a framework that assists in conducting information technology governance analysis at Hospital. The reason for choosing COBIT is because it is more flexible and comprehensive and can be applied in various types of organizations. This is in line with research by Bahari & Rifkanniza (2020) who also use COBIT in evaluating IT governance in hospitals where COBIT is used is COBIT version 4.1. Another study by Prabawa et al., (2022) used COBIT 5 in conducting HMIS evaluations with a primary focus on human resource management. Although the previous version of COBIT is still relevant and used in some recent studies, for this study, the COBIT used is COBIT 2019. This is because there are several updates from previous versions in response to the development of current IT needs. The biggest update is the COBIT 2019 design factor. COBIT 2019 design factors are factors that affect the design of IT governance systems.

COBIT 2019 plays a role in controlling and maximizing the value of information and technology with the aim of helping organizations achieve risk optimization, realize profits, and achieve resource optimization (Bayasutra, Shinta and Aris, 2021). COBIT 2019 has 6 principles of governance systems there are meeting stakeholder needs, holistic approach, dynamic governance system, differentiating governance and management, according to the needs of the organization, and end-to-end governance system and 3 principles of governance framework there are based on a conceptual model, open and flexible, and aligned with key standards (ISACA, 2019b).

From these principles, the COBIT 2019 Core Model framework was built with 5 domains containing 40 processes denoted by verbs that express the objectives to be achieved in each process where the objectives can be seen in figure 1:

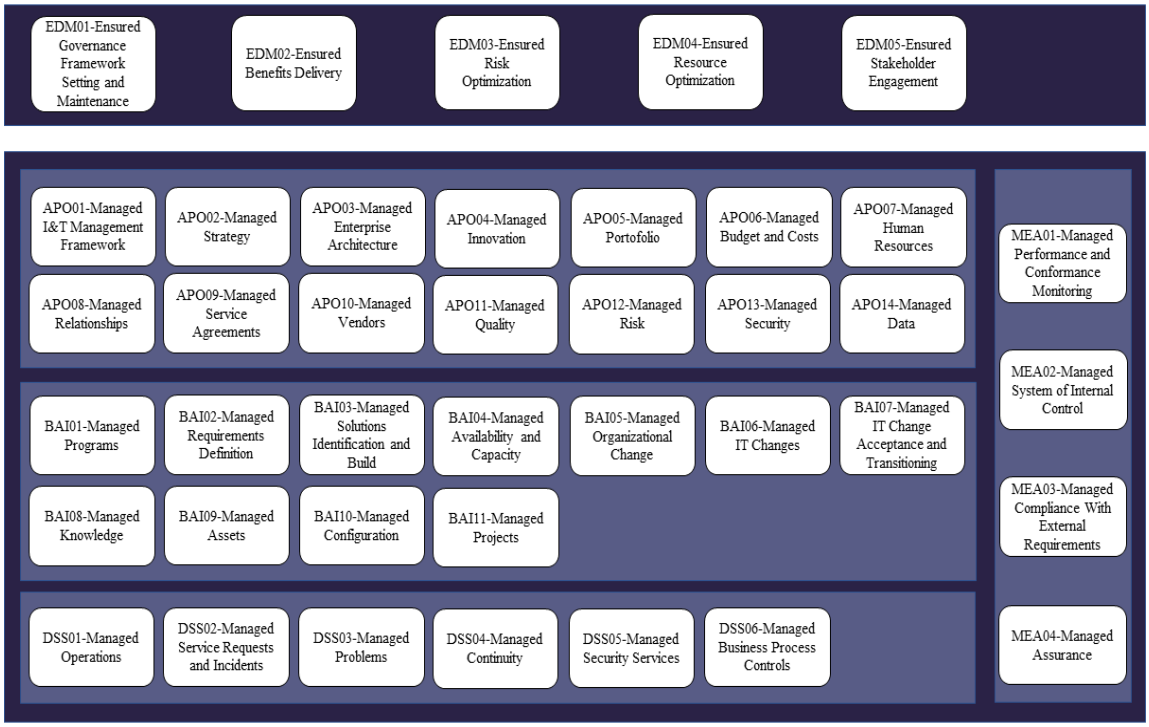

Figure 1: COBIT 2019 Core Model

Figure 1 lays out the 40 objective processes of the five existing domains, the five domains are (ISACA, 2019c):

- Evaluate, Direct and Monitor (EDM), with 5 objective process,
- Align, Plan, and Organize (APO), with 14 objective process,
- Build, Acquire and Implement (BAI), with 11 objective process,
- Deliver, Service and Support (DSS), with 6 objective process,
- Monitor, Evaluate and Assess (MEA), with 4 objective process.

Factors Influencing Organizational Information Technology Governance

COBIT 2019 defines several factors that can affect the design of organizational governance systems and positions them for the successful use of IT called design factors. Here are eleven design factors at COBIT 2019 (ISACA, 2019b):

- Enterprise Strategy
  There are four strategies in the design of COBIT 2019, namely growth/acquisition, innovation/differentiation, cost leadership, and client service/stability.
- Enterprise Goals
  Organizational goals are defined by COBIT 2019 in the form of a balanced scorecard (BSC) dimension. The Balance Scorecard groups organizational goals into four perspectives. First, the financial perspective (EG01-EG04) are portofolio of competitive products and services, managed business risk, compliance with external laws and regulations, and quality of financial information. Second, the customer perspective (EG05-EG07) are customer-oriented service culture, business-service continuity and availability, and quality of management information. Third, the internal perspective (EG08-EG11) are optimization of internal business process functionality, optimization of business process costs, staff skills, motivation and productivity, and compliance with internal policies. The last perspective is growth (EG12-EG13) related to managed digital transformation programs and product and business innovation.
- Risk Profile
  The third design factor of COBIT 2019 defines 19 IT-related risk profiles that are common to an organization, consisting of IT investment decision making, portfolio definition, and maintenance, program and project lifecycle management, IT costs and oversight, IT expertise, skills, and behavior, enterprise/IT architecture, IT operational infrastructure incidents, unauthorized actions, software adoption/usage problems, hardware incidents, software failures, logical attacks (hacking, malware, etc.), third-party/supplier incidents, noncompliance, geopolitical issues, industrial action, act of nature, technology-based innovation, environment, and data and information management.
- I&T-related Issues
  The fourth design factor addresses IT issues that an organization may face, these include frustration between different IT entities across the organization, frustration between business departments (i.e., the IT customer) and the IT department, significant IT-related incidents, service delivery problems by the IT outsourcer(s), failures to meet IT-related regulatory or contractual requirements, regular audit findings or other assessment reports about poor IT performance or reported IT quality or service problems, substantial hidden and rogue IT spending, duplications or overlaps between various initiatives, insufficient IT resources, IT-enabled changes or projects frequently failing to meet business needs and delivered late or over budget, reluctance by board members, executives or senior management to engage with IT, complex IT operating model, excessively high cost of IT, obstructed or failed implementation of new

initiatives or innovations caused by the current IT architecture and systems, gap between business and technical knowledge, , Regular issues with data quality and integration, high level of end-user computing, business departments implementing their own information solutions with little or no involvement of the enterprise IT department, ignorance of and/or noncompliance with privacy regulations, and inability to exploit new technologies or innovate using I&T.

- Threats Landscape
  There are two classifications in IT threats based on COBIT 2019's fifth design factor, normal and high threat levels.
- Compliance Requirements
  There are three classifications in compliance requirements on COBIT 2019's sixth design factor, low, normal, and high level of compliance.
- The Role of Information Technology
  There are four IT roles based on COBIT 2019's seventh design factor, support, factory, turnarounds, and strategic tool.
- Sourcing Model for Information Technology
  There are 3 source models used in IT adoption, that is coming from external parties (vendors), using the cloud, and coming from internal parties.
- Information Technology Implementation Methods
  The ninth design factor is related to the IT implementation methods of the organization. There are three methods that organizations can use, that is agile, devops, and traditional.
- Technology Adoption Strategy
  Technology adoption strategies can be classified into 3 types. An organization is categorized as a first mover, followers, and slow adapter.
- Organization Size
  The size of the organization is divided into two categories, that is large enterprise if employees exceed 250 people and small and medium enterprise with a range of 50 to 250 employees.

To help map the eleven COBIT 2019 design factors outlined earlier to organizational conditions, ISACA has published an excel spreadsheet tool, the COBIT 2019 toolkit. Each of the COBIT 2019 design factors was measured based on the scale of importance within the organization. The scale is in the form of numbers and percentages according to the level of importance (ISACA, 2019c)The results of the mapping design factor are in the form of scores for each objective of the current process along with the level of capability achieved.

Methodology

This research takes the organization as a place of research. Therefore, this research is classified into case studies, where the scope of research is limited to certain organizations or communities (Widharto, Suhatman and Aji, 2022). The data obtained can be in the form of qualitative and quantitative data for analysis and interpretation. This research was conducted at a Hospital in the Hospital Management Information System Installation section.

The data collection method in this study used two data sources, primary and secondary data. Primary data is data collected by researchers directly for specific research purposes (Sekaran, and and Bougie, 2016). The method carried out by researchers is interviews. Interview method was used to obtain data in analyzing design factors which would later be processed using the COBIT 2019 toolkit. Secondary data is data that has been collected by others for purposes other than the current research purpose (Sekaran, and and Bougie, 2016). In this study, the method

used in collecting secondary data is document study that was obtained through journals, ebooks, government regulations, related studies and also websites and official documents of organizations. The data includes information needed to support this research and general information such as vision and mission, history, strategy, goals, organizational structure, and other information related to information technology governance at a Hospital.

Data were analyzed through two stages: identification of IT Governance design factors and process capability level identification. The identification process is carried out by mapping the results of data obtained related to organizations with IT governance design factors based on COBIT 2019 by using a tool in the form of an excel spreadsheet called the COBIT 2019 toolkit. In this study, IT governance design factors used only ten out of eleven factors. This is because data analysis uses the help of the COBIT 2019 toolkit where the eleventh design factor, namely organizational size, is not included. These factors include:

- Enterprise Strategy
- Enterprise Goals
- Risk Profile
- I&T-related Issues
- Threats Landscape
- Compliance Requirements
- The Role of Information Technology
- Sourcing Model for Information Technology
- Information Technology Implementation Methods
- Technology Adoption Strategy

Process capability level identification refer to the results of the identification of design factors of 40 process objectives, with the following ability levels (ISACA, 2019a):

- Objective that scored 75 or higher would require a capability level 4.
- Objective that scored 50 or higher would require a capability level 3.
- Objective that scored 25 or higher would require a capability level 2.
- Objective that scored 0-25 should reach capability level 1.

Findings And Discussion

Identify 10 IT Governance Design Factors

The first stage in data analysis is to identify IT governance design factors. This study uses a toolkit available at COBIT 2019 to map IT governance design factors based on COBIT 2019 with organizational conditions.

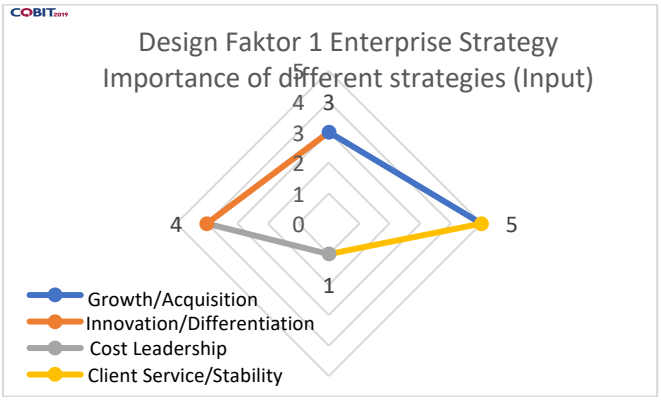

Figure 2: DF1 - Enterprise Strategy

The identification of organizational strategy is carried out by analyzing the vision and mission of the Hospital which is then mapped using the COBIT 2019 toolkit as shown in figure 2. Client service/stability aspect is the main strategy with the highest importance value of 5. This is because hospital is one of the public facilities that provide public services in the health sector. Then the application of HMIS at Hospital focuses on innovation / differentiation with an importance value of 4, followed by growth / acquisition with an importance value of 3, and finally cost leadership with an importance level of 1.

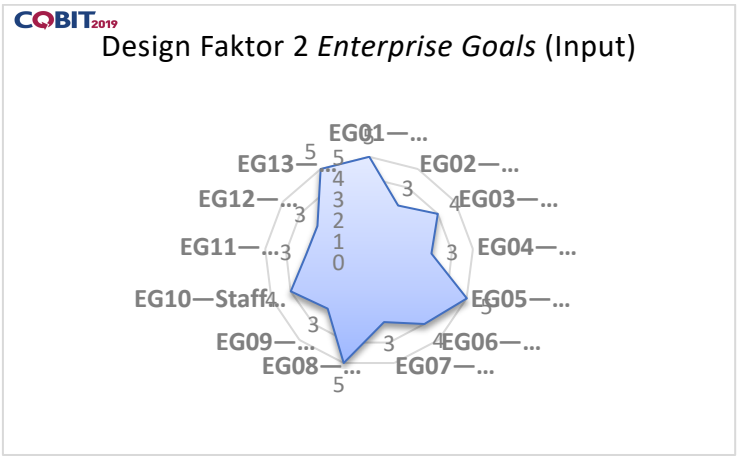

Figure 3: DF2 - Enterprise Goals

Figure 3 shows that organizational goals have three categories of importance values. Organizational goals with an importance value of 5 or arguably as the main goals for the organization are 4 goals, namely a competitive product and service portfolio, customer-oriented service culture, optimization of internal business process functionality, and product and business innovation. Organizational goals with an importance value of 4 are 3 goals, namely compliance with external laws and regulations, continuity and availability of business services, and employee skills, motivation, and productivity. Organizational objectives with an importance value of 3 total 6 objectives, namely managing business risk, quality of financial information, quality of management information, optimization of business process costs, compliance with internal policies, and managing digital transformation programs.

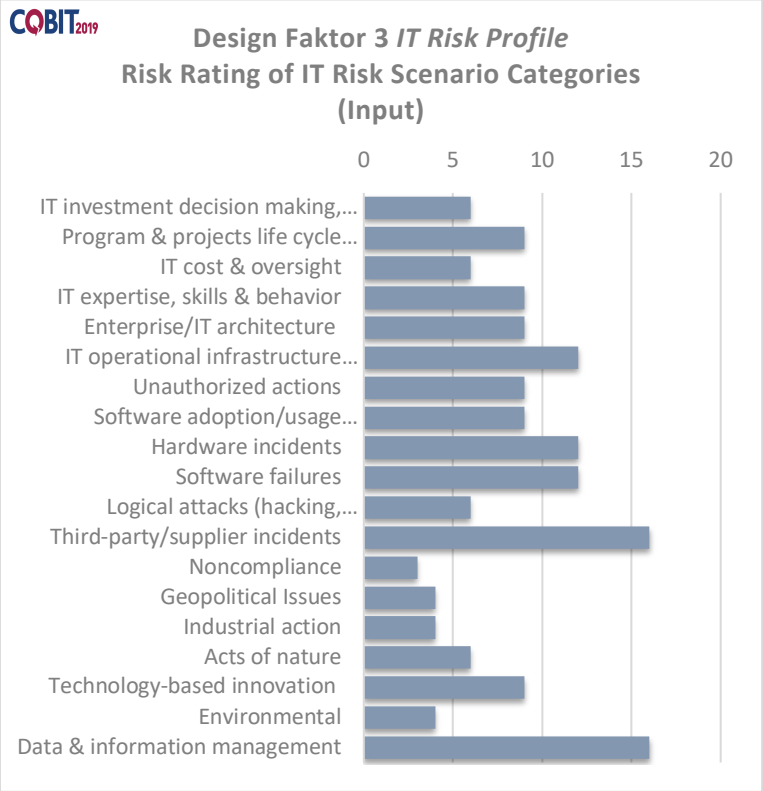

Figure 4: DF3 - IT Risk Profile

Figure 4 shows that the risk profiles at Hospital HMIS are distributed in 4 categories, namely very high risk 2, high risk 9 risk profiles, normal risk 7 risk profiles, and low risk 1 risk profile. The first IT risk profile that is categorized as very high risk is related to third-party/supplier incidents. In the implementation of HMIS, Hospital collaborates with third parties in providing applications that help hospital operations, so that if there is a disruption to vendors, it will certainly affect the overall performance of hospital services. The next highest IT risk profile is related to data and information management. There are various data and information related to existing hospitals, ranging from data related to health services, medical records, personnel, finance and management.

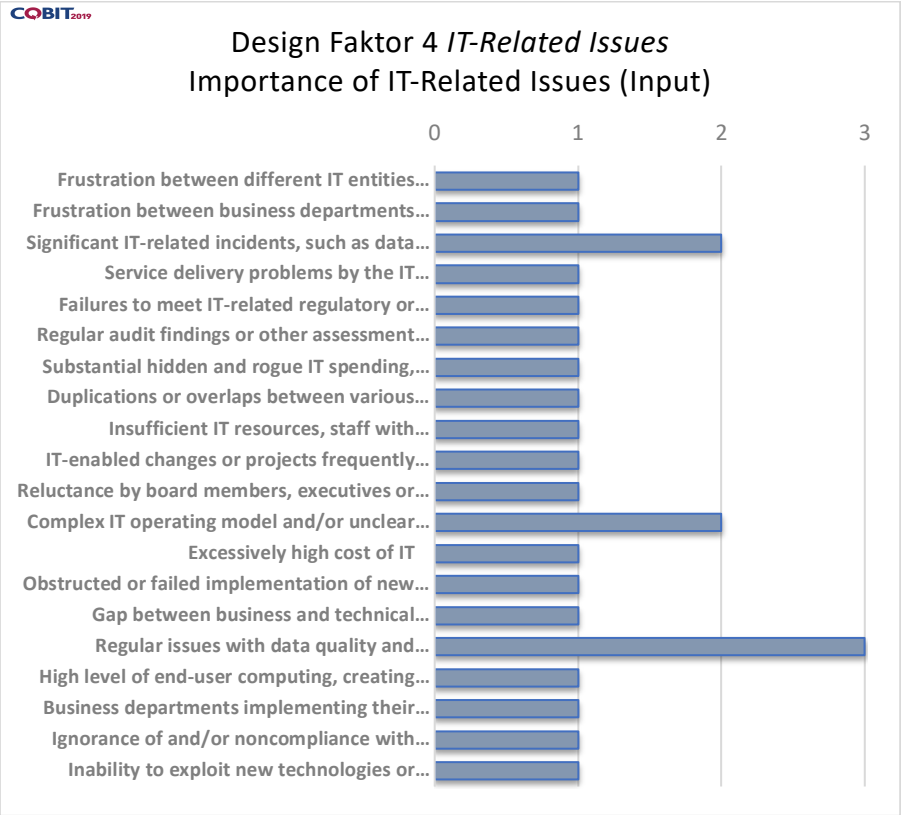

Figure 5: DF4 – IT Related Issue

Figure 5 shows that IT-related issue are distributed in 3 categories, classified as serious issue totalling 1 problem, issue category totalling 2 problems, and no issue category totalling 17 problems. Common problems related to data quality and data integration from various sources are the most serious problems in hospital.

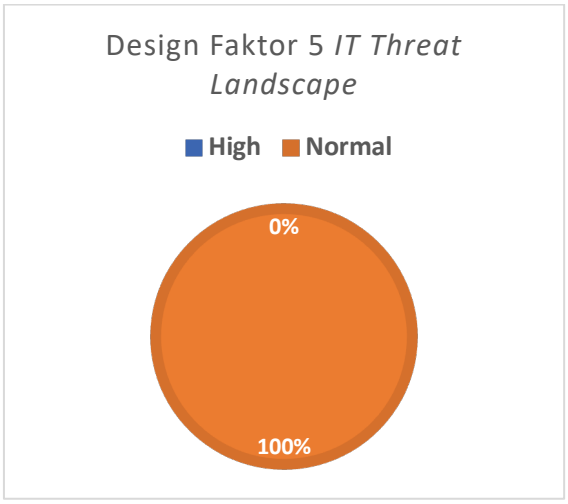

Figure 6: DF5 - IT threats Landscape

Figure 6 shows that the threat level is 100% normal, meaning that the Hospital is not in geopolitical or industrial problems. IT threats are categorized as high due to geopolitical situations, industry sectors or certain profiles, so organizations operate in high-threat environments.

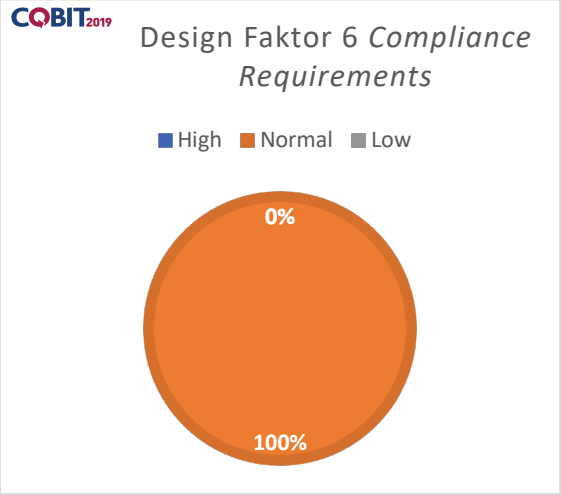

Figure 7: DF6 - Compliance Requirements

Figure 7 shows that 100% organizational compliance is at normal compliance levels. This means that the HMIS of hospital has complied with various generally accepted compliance requirements.

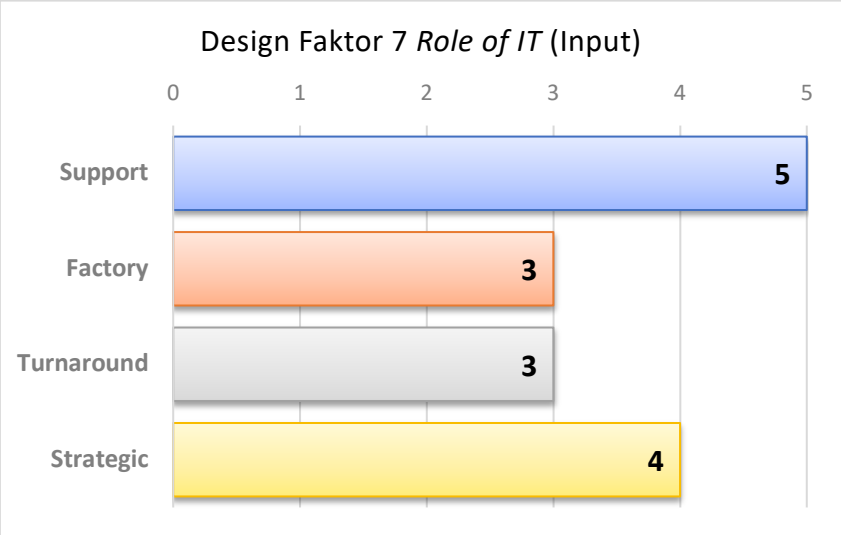

Figure 8: DF7 - The role of IT

Figure 8 shows that the role of IT in a distributed organization falls into three categories of importance. The IT role with the highest level of importance with a value of 5 is support, then strategic with a value of 4, and the IT role with a value of 3 is factory and turnaround. Based on these results, it can be seen that IT has a supporting role in carrying out the continuity of business processes and services in the implementation of HMIS at Hospital today.

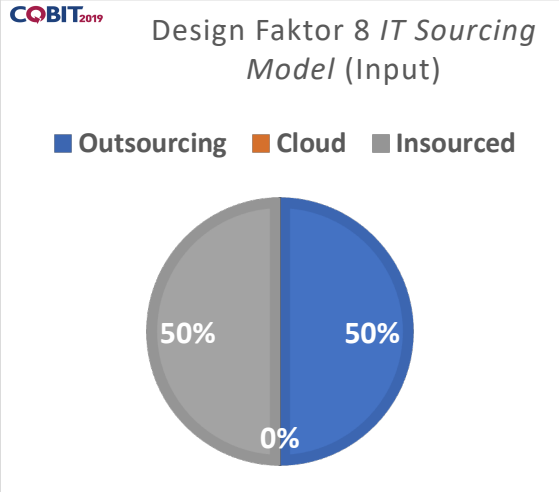

Figure 9: DF8 – Sourcing Model of IT

Figure 9 shows that the IT provisioning model in distributed organizations is in two models, namely outsourcing and insourced. Each model has a value of 50%.

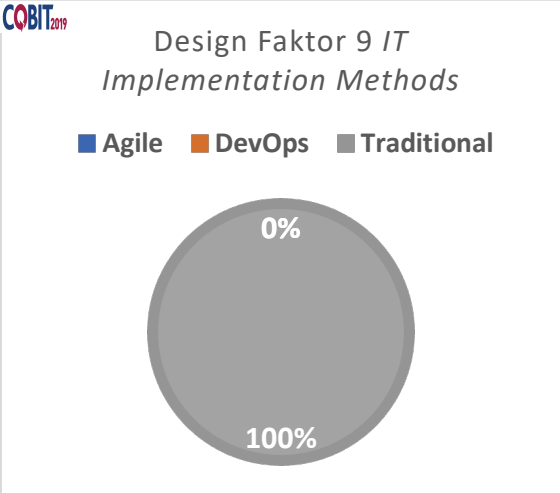

Figure 10: DF9 - IT Implementation Method

Figure 10 shows that, of the three implementation methods, HMIS of hospital uses 100% traditional/waterfall method. This is because the IT implementation process is carried out in a structured and orderly manner starting from planning, designing, implementing to maintenance. HMIS has also made Standard Operating Procedures (SOPs), especially for IT implementation in the HMIS Installation service guidelines.

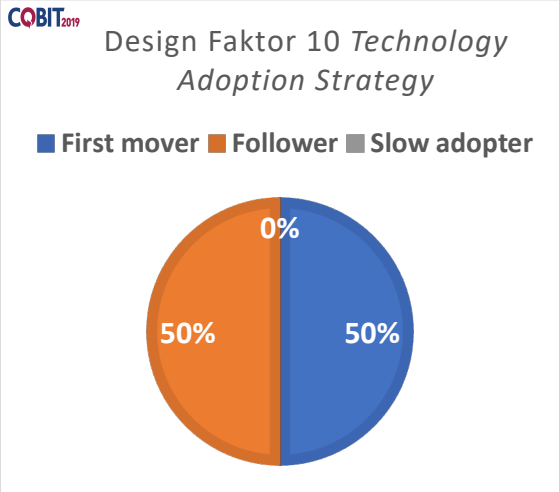

Figure 11: DF10 - IT Adoption Strategy

Figure 11 shows that IT adoption strategies fall into two categories: first movers and followers. Hospital has a 50% commitment to design its own IT by making servers as data storage and 50% as followers because the Hospital aligns HMIS with the development of systems regulated by the Ministry of Health.

Results of IT Governance Design Factor Analysis based on COBIT 2019

Based on the analysis of the results of interviews and document studies which were then mapped using the COBIT 2019 toolkit, the results of the IT governance design factor analysis can be seen in figure 11.

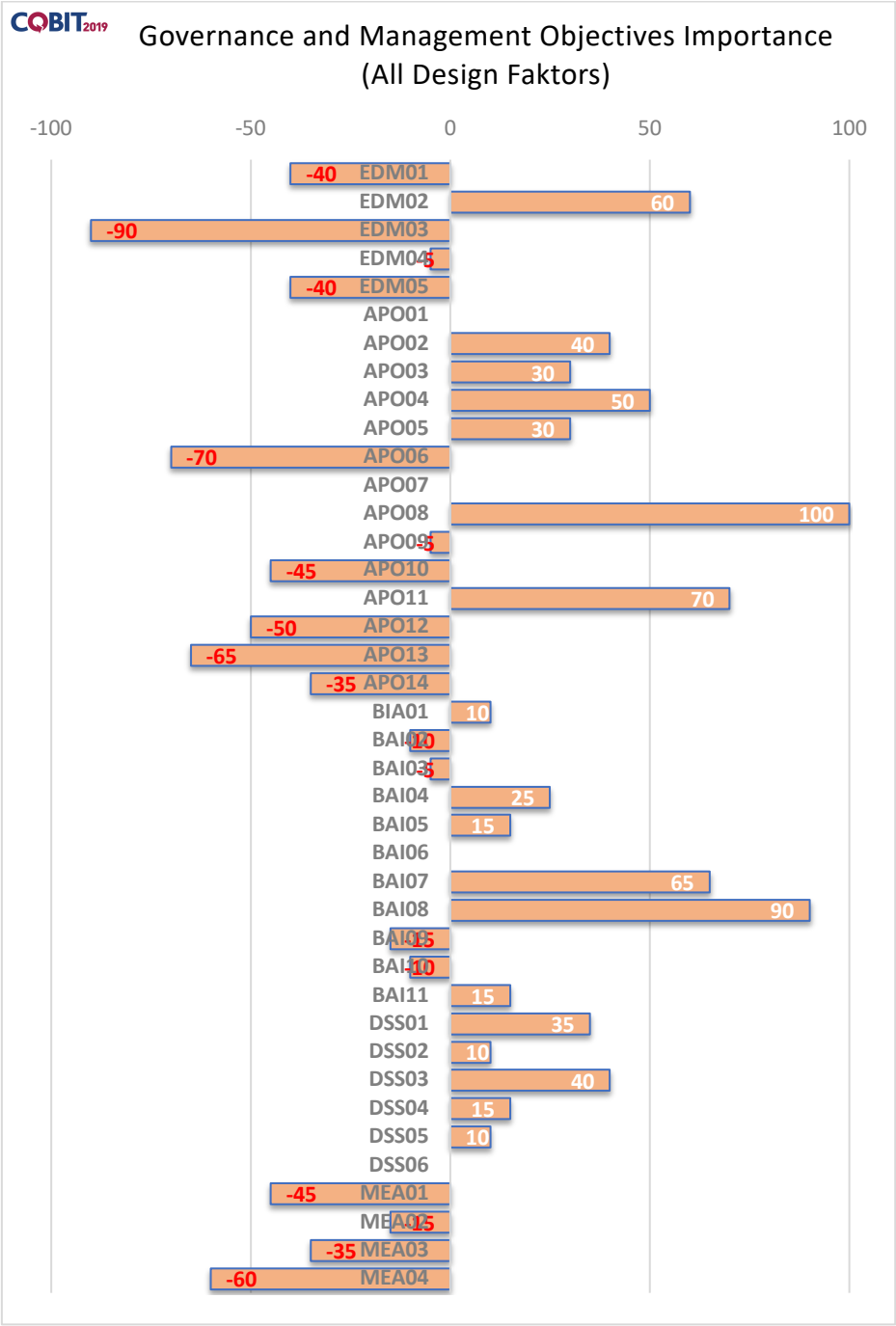

Figure 12: Results of Identification of IT Governance Design Factors

Based on figure 12, it can be seen that the objective with the highest score is APO08 - Managed Relationship with a score of 100, while the objective with the lowest score is EDM03 - ensured risk optimization.

Identify Process Capability Levels

The next step is to determine the level of capability using the results of mapping 10 design factors which can be seen in figure 11. Objective with a positive score means that have implemented in the hospital with the following ability levels (ISACA, 2019a):

- Objective that scored 75 or higher would require a capability level 4. These objectives are: APO08 (managed relationship) and BAI08 (managed knowledge)

- Objective that scored 50 or higher would require a capability level 3. These objectives are: EDM02 (ensured benefits delivery), APO04 (managed innovation), APO11 (managed quality), and BAI07 (managed IT change acceptance and transitioning)
- Objective that scored 25 or higher would require a capability level 2. These objectives are: APO02 (managed strategy), APO03 (managed enterprise architecture), APO05 (managed portofolio), BAI04 (managed availability and capacity), DSS01 (managed operations), and DSS03 (managed problems)
- Objective that scored 0-25 would require reach capability level 1. These objectives are: APO01 (managed I&T management framework), APO07 (managed human resources), BAI01 (managed programs), BAI05 (managed organizational change), BAI06 (managed IT changes), BAI11 (managed projects), DSS02 (managed service requests and incidents), DSS04 (managed continuity), DSS05 (managed security services), and DSS06 (managed business process controls).

To be objective with a negative result means to have an ability level of 0. For this reason, hospitals need to pay attention to negative score so that they can be improved for better operations in the future, at least they can be positive.

Conclusion

Based on the results of identifying design factors that affect information technology governance, there are 22 objectives with positive scores and 18 objectives with negative scores. Then the highest score of the identification results is APO08 about managed relationships with a score of 100 and the lowest score is the objective EDM03 about ensured risk optimization with a score of -90.

There are several recommendations given related to the objectives of the processes that have a negative score can at least be improved have positive score. The objectives that need to be improved include:

- In the EDM domain, namely: EDM01(ensured governance framework setting and maintenance), EDM03 (ensured risk optimization), EDM04 (ensured resource optimization), EDM05 (ensured stakeholder engagement).
- In the APO domain, namely: APO06 (managed budget and cost), APO09 (managed service agreements), APO10 (managed vendors), APO12 (managed risk), APO13 (managed security), APO14 (managed data).
- In the BAI domain, namely BAI 02 (managed requirements definition), BAI 03 (managed solutions identification and build), BAI09 (managed assets), BAI10 (managed configuration).
- In the MEA domain, namely: MEA01 (managed performance and confornance monitoring), MEA02 (managed system of internal control), MEA03 (managed compliance with external requirements), MEA04 (managed assurance).

The limitation of this study is that this study only analyze in general the entire objective of the 40 cores of the 2019 COBIT model, not yet detailed, So it is highly recommended for further researchers to be able to analyze details of all objectives to the process to be studied so that the research results are more comprehensive.

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