The Design of a New IT Governance Framework to Optimize the Utilization of Information Technology for MSME

Yusuf Wibisono[1] and Yanti Rosmunie Bujang[2]

[1] Mulia University, Balikpapan 76114, Kalimantan Timur, Indonesia
[2] Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

Abstract. The presence of industry 4.0 brings various conveniences in operational and marketing processes for companies, including micro, small and medium enterprises (MSMEs). All companies are required to be able to utilize information technology in order to win the competition. Based on 2019 data, the number of MSMEs in Indonesia is 99.99% of the total number of companies and contributes to a GDP of 61.1%. With a large number of MSMEs in Indonesia, their existence also opens up wider job opportunities with more equitable economic benefits for the community. To win the competition, MSMEs must optimize the use of information technology. To use information technology to align with business goals, MSMEs need IT Governance. Implementation of the IT Governance Framework generally runs in large companies. Constraints for small companies are usually related to the cost and complexity of the existing IT Governance Framework. This paper aims to develop an IT Governance Framework suitable for MSMEs and can be applied easily and efficiently. The initial stage is to develop a framework based on a literature review of the existing frameworks, namely COBIT, ITIL, CMMI, TOGAF, and relevant research. The proposed framework consists of six main components: Architectural Readiness, Technology Adoption, Service Management, Continuous Improvement, Leader Engagement, and Network Capability. Subsequently, improvements were made to the proposed framework by conducting quantitative and qualitative research on MSMEs to produce a better framework. As a validation stage, the enhanced framework will then be discussed with experts and the response from the MSMEs. Thus, it is hoped that the proposed framework can help MSMEs effectively utilize information technology that supports and is in line with MSME's business values.

Keywords: IT Governance, framework, MSME, Indonesia

1 Introduction

Micro, Small and Medium Enterprises (MSMEs) are businesses whose number of employees, sales, or loan size is below a certain threshold, and each country may have different criteria. The meaning of Micro in MSME, according to [1] and [2], is a

company with a maximum initial capital of up to IDR 1 billion (USD 67,252) or a maximum total annual sales of IDR 2 billion (USD 134,504), which usually has limited employees and technology.

Well-known IT governance, such as ITIL and COBIT, is very complex and requires significant financial outlay, especially in the form of consulting fees [3]. Hence, they are adopted mainly by large organizations with significant IT budgets. Due to the complexity of frameworks, such as ITIL and COBIT, small businesses have barely reached the conditions for adopting such frameworks. Some modules can help, but they are pretty complex to implement in small businesses. Meanwhile, the high cost and complexity of handling large amounts of digital information can be intimidating for small businesses [4].

In Indonesia, the government hopes that MSMEs will be present in the digital world and support businesses through effective use of IT and not just following competitors. According to [5], only about 13% or only about 8.3 million of the 64.2 million MSME entrepreneurs in Indonesia utilize digital technology, especially e-commerce platforms, even though the number of active smartphone users in Indonesia is estimated to be around 42% or more than 100 million people in 2018.

For MSMEs, it is not easy to apply IT Governance Framework standards such as COBIT, ITIL, CMMI, and TOGAF, because of the complexity and cost of consulting for implementation. Existing frameworks generally focus on specific areas, such as ITIL as service management, TOGAF as enterprise architecture, and COBIT, which focuses on corporate governance. With this difference in focus, ideally, companies need to apply several frameworks to be complete and inefficient for MSMEs.

This condition is why a new IT Governance framework is essential, specifically for MSMEs. The framework should avoid complexity and adopt an approach that fits the MSME pattern. Industry 4.0 makes MSMEs tend to use new technology as needed immediately and not implement overall IT management like large companies because of the complexity. This study aims to develop an IT Governance framework that can be used by MSME companies more efficiently.

2 Literature Review

In this study, it is necessary first to describe some of the underlying theoretical bases. It will presents the theory IT Governance, including the definition of the IT Governance Framework, the importance of IT Governance, the condition of IT Governance in Indonesia, and the impact of IT Governance. The following section will explain what MSME is, the condition of MSME in Indonesia, the types of MSME, and the importance. Furthermore, it will explain the adoption of IT Governance in the company by presenting four frameworks, namely COBIT, ITIL, CMMI, and TOGAF.

2.1 IT Governance Framework

The IT Governance Framework is a roadmap that defines the methods used to implement, manage, and report on IT governance within an organization [6]. The IT Governance Framework helps provide a roadmap and evaluate the performance and effec-

tiveness of IT governance. Several existing IT Governance Frameworks include COBIT, ITIL, CMMI, and TOGAF.

COBIT. COBIT is a framework for information technology governance for the entire enterprise model [7]. This information technology includes all information technology and processing to achieve company goals. The research was conducted to explore the implementation of the COBIT framework to measure IT risk control of internet financial companies in China [8] and the implementation of the COBIT framework to define and maintain information technology infrastructure in the West Nusa Tenggara Regional General Hospital [9].

ITIL. ITIL is the predominant IT service management framework in use in the world [10]. A research was conducted on implementing ITIL process management to mitigate operating risk on cloud architecture infrastructure for the banking and financial services industry [11]. Another study was also carried out to build a cognitive model by adopting ITIL to improve IT services for companies in India [12]. Meanwhile, a study was also conducted [13] to explore how ITIL 4 can provide a framework for managing security.

CMMI. CMMI is a process and behaviour model that assists organizations in process improvement. CMMI also supports productive behaviour to reduce risk in software, product, and service development [14]. A study in Sudan was conducted to provide a solution by encouraging SMEs to implement a software model in their software development process using CMMI [15]. Other research focuses on conducting a study to build an Intelligent Electric Meter Software Quality Evaluation Model based on the CMMI framework [16].

TOGAF. TOGAF is an enterprise architecture framework developed in 1995 by The Open Group [17]. A study was conducted to see the application of TOGAF's ADM (Architecture Development Method) methodology to develop Enterprise Architecture for healthcare services by identifying target architectures, looking for gaps, and using gaps as recommendations to solve problems [18]. Another study was also conducted to examine the application of TOGAF to build an IS/IT framework for forest fire disaster mitigation by utilizing the Architectural Vision, Business Architecture, Information System Architecture, and Technology Architecture [19].

The latest developments for each IT Governance Framework are as follows:

Table 1. IT Governance Framework Development

Framework	Development
COBIT	COBIT 2019 has six governance principles. There was a change in

Version: 2019 Release: 2018	terminology, and the number of governance support processes was 40 from the previous 37. Governance principles were added, and performance management was based on the CMMI performance management scheme instead of ISO/IEC 33000. [20]
ITIL Version: 4 Release: 2019	The updates focused on customers, value flows, and digital transformation, including artificial intelligence and cloud computing. In ITIL 4, service dimensions are not only about IT. Conducted value co-creation and service value chain development. Focus on practice, not just on the process. [21]
CMMI Version: 2.0 Release: 2018	Focus on improving the quality of developing products, solutions, and services that meet market and customer needs. Also, improve supply chain management and reduce risk. [22]
TOGAF Version: 10 Release: 2022	The focus is on strengthening agile environments and digital transformation. The new version is easier to customize and expand the documentation to assist organizations in implementing the framework and adapting it to business needs [23]

2.2 Micro, Small, Medium Enterprises (MSME)

Each country has its definition for MSMEs. In Indonesia, regulations regarding MSMEs are stated in [1], which is then regulated in more detail in [2], providing the definition based on business capital as follows: Micro Business if the business capital is a maximum of IDR 1 billion (USD 67,252), Small Business if the business capital is more than IDR 1 billion (USD 67,252) and a maximum of IDR 5 billion (USD 336,261), and Medium Business if the business capital is more than IDR 5 billion (USD 336,261) to IDR 10 billion (USD 672,522). If the company has carried out activities before this regulation is implemented, then the following criteria will be applied based on annual sales results: Micro Business if annual sales are a maximum of IDR 2 billion (USD 134,504), Small Business if the annual sales are more than IDR 2 billion (USD 134,504) to a maximum of IDR 15 billion (USD 1,008,783), and Medium Business if annual sales are more than IDR 15 billion (USD 1,008,783) up to a maximum of IDR 50 billion (USD 3,362,610).

Based on the size, MSME businesses are divided into Micro, Small, and Medium Enterprises. By type of business, the Indonesian Central Statistics Agency divides MSMEs simply into two types, namely agricultural and non-agricultural businesses. Meanwhile, MSME practitioners are trying to divide the types of MSMEs in Indonesia. MSME businesses divide into 7 business types, namely: Culinary, Fashion, Technology, Cosmetics, Automotive, Souvenir, and Agribusiness.

According to [24], the number of MSMEs in 2018-2019 was 64.2 million, consisting of 63,350,222 micro-companies, 783,132 small companies, and 60,702 medium companies. Meanwhile, the number of large companies is 5,500. So the percentage of MSME is 99.9914%, and large companies are 0.0086%. The absorption capacity of MSME workers is 117 million workers or 97% of the labour absorption capacity.

Meanwhile, the contribution of MSMEs to the national economy (GDP) is 61.1%, and large businesses contribute the remaining 38.9%.

2.3 Related Research

A study was conducted [25] to examine the alignment of digital strategies among 43 SMEs in the UK, Ireland, Italy, and Spain operating in five industrial sectors. The approach is divided into five levels: Passive Acceptance, Connection, Immersion, Fusion, and Transformation. Analysis was conducted based on interviews and questionnaires to classify each of the 43 companies into one of five levels of technology use. The result of this study indicate that Passive Acceptance is 9.3%, Connection is 30.23%, Immersion is 44.19%, Fusion is 9.30%, and Transformation is 6.98%.

A study on improving the performance of MSMEs through digital platforms was also carried out [26]. This study examines the effect of digital platform capabilities and network capabilities on the financial performance of SMEs. This study also examines how exploitation and exploration orientations moderate this relationship. Based on an analysis of 230 Swedish SMEs, the results show that SMEs can improve their performance through digital platform capabilities by aligning these capabilities with their orientation.

A study in Spain [27] shows that SMEs must recognize the importance of defining innovation strategies in applying embedded technologies, advanced robotics, cyber-physical systems, and IoT. It is necessary to do the right strategy before implementing the technology. The research also shows evidence of the positive influence of Industry 4.0 on SME innovation, which positively affects company growth and product quality.

Another study conducted in Italy [28] showed that many SMEs assume that any technology investment will automatically generate a positive impact on performance. In many cases, companies underestimate the costs and difficulties of introducing new technical solutions in an organized system and lack the resources to support organizational innovation. This study concludes that companies need to plan well in implementing each new technology.

From some of these studies, it can be summerized that it is essential for companies to prepare themselves well to face future challenges. The new technology brought by Industry 4.0 does provide many benefits. However, companies need to assess readiness and prepare the best strategy for adopting technology. In this position, proper IT governance is needed for MSME so that technology implementation can be in line with organizational goals.

3 Method

This research begins with a literature review by examining various relevant sources and continues with a combination of qualitative and quantitative research. The proposal for the framework at the initial stage will be carried out by combining studies of the existing framework with relevant research. Furthermore, the proposed framework will be refined in several stages (see Fig. 1).
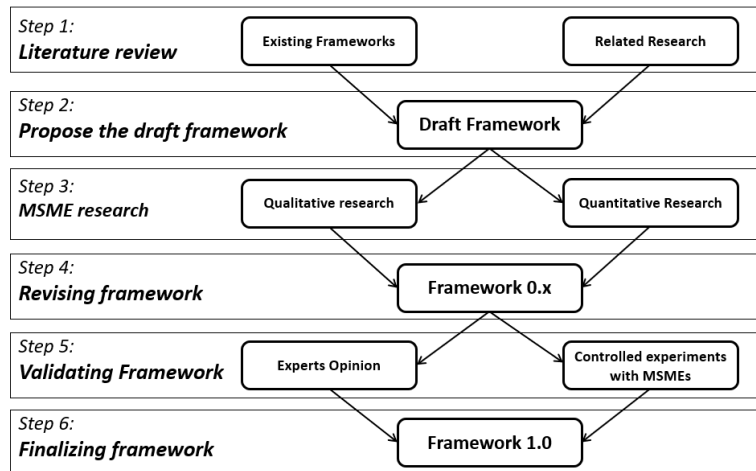
Fig. 1. The Research Process

This research model is designed in six stages: Literature Review, Proposes The Draft Framework, Quantitative and Qualitative Research, Revising Framework, Validating Framework, and Finalizing Framework.

- Literature Review: focus on studies on the existing framework and conduct studies on previous studies relevant to this research.
- Propose the draft framework: propose a framework based on studies of the existing framework and previous research.
- Quantitative and Qualitative Research: conduct a survey to support quantitative research on MSMEs to obtain valid data on the characteristics of MSMEs in Balikpapan. Meanwhile, the interview and observation will be conducted to support the qualitative research to obtain information on managing MSMEs in Balikpapan.
- Revising framework: based on the research results on MSME, further revisions are made as needed based on the data and information obtained. In this phase, gradual improvements are made to the proposed framework. The proposed framework is named 0.x, which means 0.1, 0.2, or 0.3, to anticipate versions of changes. This change was made to meet the needs based on the research results.
- Validating framework: the revised framework then consulted with the experts and conducted controlled experiments with MSMEs.
- Finalizing framework: The framework is finalized based on expert opinion and the result of the controlled experiment and will be named 1.0.

4 Research Framework

The research is in the early stages of designing a framework based on a literature review and combined with a study of related research. The framework proposed in the

initial stage consists of six main components: Architecture Readiness, Technology Adoption, Service Management, Continual Improvement, Leader Involvement, and Network Capability. (see Fig. 2).

4.1 Architecture Readiness

This part identifies the architectural readiness of MSMEs. Although the information technology architecture is generally simple or very simple, in principle, MSMEs must still have a good perception of the architecture used. This element of architecture readiness is based on [29], who researched the implementation of TOGAF for MSME, which divided the architecture into four groups, namely technology architecture, application architecture, data architecture, and business architecture. The following Table 2 gives an explanation of architetcure readiness.

Table 2. The Components of Architecure Readiness

Components	Descriptions
Technology Architecture	Focus on how to design the technology model within the company
Application Architecture	Describes how applications are designed within the company and the relationship between them
Data Architecture	Describes the design of data and the relationship between databases
Business Architecture	Describes the business model, business strategy, and business functionality

4.2 Technology Adoption

In looking at how MSME implements information technology, it is essential to know how the company's level of adoption of technology is. With the rapid development of technology, the winners are those who can choose the best technology to support their business activities. The principle in Technology Adoption is based CMMI concept in maturity level and also referred to [25], who researched digital strategy alignment in SME, and divided the company's adoption readiness into five levels: passive acceptance, connection, immersion, fusion, and transformation. The following Table 3 gives the explanation of Technology Adoption.

Table 3. The Components of Technology Adoption

Components	Descriptions
Adoption Response	Describes how the company's level of acceptance or response to the presence of new technology
Degree of Technology	Indicates the level of sophistication of the technology used

4.3 Service Management

Service Management is developed from the ITIL Framework. There are five components in ITIL, namely service strategy, service design, service transition, service operation, and continual service improvement [10]. This research tries to simplify and only takes two components: service design and service operation. The following Table 4 gives the explanation of Service Management.

Table 4. The Components of Service Management

Components	Descriptions
Service Design	See how companies design their IT services
Service Operation	See how the company provides IT services to support the company's operational activities

4.4 Continual Improvement

One of the critical things in the company is maintaining business continuity [30]. Concerning this in the implementation of information technology and the provision of services to support its business operations, it is essential to see how the company makes improvement efforts to improve the quality and aspects of technology security. This continual improvement was developed from the principles in COBIT and ITIL. The following Table 5 gives the explanation of Continual Improvement.

Table 5. The Components of Continual Improvement

Components	Descriptions
Configuration	See how the company configures technology to achieve the best performance and improve it over time
Security	See how the company has made security for configurations and services in order to ensure continuity and business improvement

4.5 Leader Involvement

The success of implementing information technology also depends on how the leadership is involved with it. The level of leadership involvement will affect the speed of IT improvement because, in general, it will be related to IT investment. The following Table 6 gives the explanation of Continual Improvement.

Table 6. The Components of Leader Involvement

Components	Descriptions
Formal Involvement	Leadership involvement is shown formally in the IT organizational structure
Informal Involvement	Leadership is involved but not clearly stated in the formal

organizational structure

4.6 Network Capability

The success of organizational performance is undoubtedly influenced by how communication and relationships run. Obstacles in relationships within the organization or relationships with external parties will be a barrier for the company to be able to develop better. Network Capability is developed from [26], focusing on how MSMEs compete in digital platform capabilities, network capabilities, and ambidexterity. The following Table 7 gives the explanation of Continual Improvement.

Table 7. The Components of Network Capability

Components	Descriptions
Internal Communication	Focus on how communication within the organization goes well
External Partnership	Focus on how the organization builds partnerships with external parties in order to support operations and business development

5 Discussion

Based on the variables that have been studied previously, the complete outline of the proposed framework can be seen in Fig. 2.
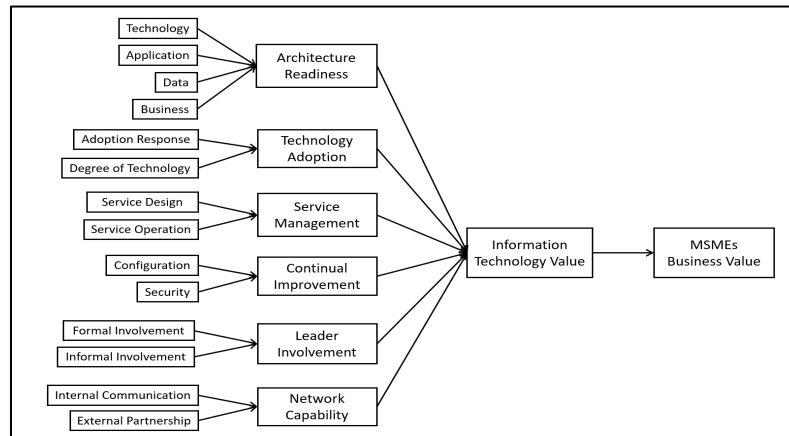

Fig. 2. The Proposed Framework

Based on Figure 2, all proposed framework components can be seen. First, the MSME must have an idea of the desired architecture. This architecture can describe the tech-

nology, applications, data, and business. This architectural description may be simple but straightforward enough.

After having a picture of the desired architecture, the next step is determining the Technology Adoption to support the applied architecture. At this point, the ability to adapt can be measured from two factors: the level of depth of the technology used and how the company responds to the technology.

The combination of the chosen architecture and technology will become an IT service in the company. Service Management is formed from two factors, namely the service model that is designed and how the service is carried out to support the company's activities. At this point, the company must also prepare efforts for business continuity by conducting Continual Improvement. This improvement strategy is implemented through the proper configuration and how the company makes security efforts for its overall information technology.

The next aspect is how the leadership is involved in IT decision-making. This Leader's Involvement can be formal because there is an IT organization and the top leadership has the highest role in decision making. The involvement of leaders can also be informal; that is, they do not have an IT organization specifically, but decisions in IT always involve top management. The last aspect is related to Network Capability, namely the company's ability to optimize communication within the team and external parties. IT implementation is closely related to communication patterns between users and the IT team and how to use outside partners to support the services provided.

6   Conclusions

MSME has obstacles, challenges, and opportunities to implement information technology to support its business activities. The number of MSMEs in a country is vast compared to the number of large companies. However, the economic impact of MSMEs in the country is still not optimal financially and is still relatively small when viewed from the comparison of the number of MSMEs with large companies. One way to increase the economic role of MSMEs is to optimize the use of information technology to support their business activities. One way to optimize the use of information technology is to apply the appropriate IT Governance Framework. Therefore, it is essential to conduct and support research to develop an ideal framework for MSMEs.

Acknowledgements

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