

Information Technology Governance Design in DevOps-Based E-Marketplace Companies Using COBIT 2019 Framework

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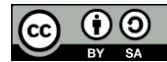
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Abstract—The E-Marketplace system is a digital place where sellers and buyers meet virtually, and transactions can be processed safely. E-Marketplace companies are oriented toward consumer-centric products and services and operate and have 24/7 non-stop transaction activities. E-Marketplace system development has become the digital transformation in Information Technology (IT) governance that meets the requirements of a system-based automated control with the application of DevOps principles. This study uses a mixed method approach through questionnaires, interviews, expert judgment, and relevant literature reviews related to the e-Marketplace system and IT governance concepts using the COBIT 2019 framework, which has 11 design factors with 40 IT processes to obtain the most appropriate governance model for e-Marketplace companies. The results were obtained in the form of 6 (six) methods in the IT governance model using the DevOps approach, namely the APO03 – Managed Enterprise Architecture, APO04 – Managed Innovation, BAI04 – Managed Availability and Capacity, BAI06 – Managed IT Changes, BAI11 – Managed Projects, and DSS03 – Managed Problems with a score ≥ 75 and the capability level target is at level 4.

Keywords—Information Technology Governance; E-Marketplace Companies; DevOps; COBIT 2019

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I. INTRODUCTION

The development of the e-Marketplace system in Indonesia is undergoing a swift transformation. E-Marketplace system users will be loyal if the system can provide the best value for benefits to its users, so they will continue to use the e-Marketplace system to buy the products they need, and they will eventually recommend it to others [1]. The e-Marketplace company is always operational and has non-stop transaction activity within 24 hours for seven days without stopping. Therefore, e-Marketplaces systems are generally built and operated with complex special automation techniques to provide fast and stable feedback. E-Marketplace companies need to be assessed to see how the control and governance side of a company is compared to the response of its users, how e-Marketplace system can be one of the digital transformations in Information Technology (IT) governance, and how e-Marketplace companies can qualify as a control system-based automation with the application of Development and Operations (DevOps) principles. By knowing the application of the principles in the DevOps process, it can be seen how the control has the potential to be tested based on a system-based testing approach [2].

The frameworks used as information technology governance guidelines include ITIL (Information Technology Infrastructure Library), which provides customer-oriented information technology services; ISO (International Standard Organization), which covers the quality of an organization or company and its performance measurement, while COBIT focuses on to information technology management [3]. COBIT 2019 differs from COBIT 5 and previous versions, whereas in COBIT 2019, there are 40 core models. The flexibility of COBIT 2019 lies in the scope of specific topics that are focused on certain areas in a coherent manner, such as security, risk, DevOps, and compliance with particular regulations [4].

This study uses a mixed method in which the process of collecting and processing data is carried out using a questionnaire based on the purposive random sampling method. Respondents are e-Marketplace system users in Indonesia based on aspects of system quality, information quality, and service quality to users, then continued with data collection in the form of interviews with technical support officers, product development specialists, back-end developers, and associate Vice President of Product from several top e-Marketplace companies in Indonesia such as Tokopedia, Shopee, and Rupa-Rupa and expert judgments based on the concept of IT governance in the COBIT 2019 as well as data collection from various literature studies.

Through this research, an IT governance design will be produced that can be implemented in the e-Marketplace companies to assist the company in carrying out its goals, vision, mission, and business processes in developing and operating the e-Marketplace system as its main product. Meanwhile, other benefits obtained through this research include that the company will get

feedback in the form of expectations from the needs of the e-Marketplace companies expected by users and the factors supporting its success through the development and operation process based on IT governance principles using the COBIT 2019.

Previous relevant research on IT governance design entitled "Perancangan Tata Kelola Teknologi Informasi Menggunakan Framework COBIT 2019 Pada Hotel XYZ" aims to assist the XYZ hotel organization know the processes that are important to the organization by using the COBIT 2019 framework. The research results are in the form of design IT governance at hotel XYZ. Essential processes include APO06 – Managed Budget and Costs, APO09 – Managed Service Agreements, APO12 – Managed Risk, BAI04 – Managed Availability and Capacity, and BAI11 – Managed Projects which have capability levels of levels 3 and 4 [5].

Another relevant research regarding the evaluation of IT governance with the title "Perancangan Tata Kelola Teknologi Informasi Menggunakan COBIT 2019 Pada PT Telekomunikasi Indonesia Regional VI Kalimantan" to improve the management of IT services, as an object of evaluation of the company in providing quality services to customers. PT. Telekomunikasi Indonesia, Tbk. Has utilized IT in almost all business areas based on the application side, network, information system (IS), data or information, infrastructure, and hardware. The research results are in the form of IT governance or management design with a total of 14 essential processes with a score above 50 or at the target level of capability level 3 [6].

Another research on information system security is entitled "Information security governance challenges and critical success factors: Systematic review." This study conducts a systematic review of various governance frameworks to carry out an analysis to identify the need to develop a holistic framework for information security governance that links organizational goals and protection, with discussions on aspects of strategy, control, and regulation, ensuring compliance with procedures and guidelines with policies and ensuring continuous evaluation and compliance, the review is used as the basis for developing a governance framework that is comprehensive, flexible, dynamic, and adaptable to business changes and meets organizational requirements which conclude the design of a new governance framework with 7 Information Security domains. Governance (ISG) identified 27 Critical Success Factors (CSF) [7].

Previous research related to this research entitled "DEVOPS IN E-COMMERCE SOFTWARE DEVELOPMENT: DEMAND FOR CONTAINERIZATION" reveals a set of capabilities and cultural patterns developed by developers as most beneficial for the future of software delivery for e-commerce solutions providers. These capabilities include automated deployment, Git VCS, and deployment to cloud environments using containers. In addition, professionals expressed a positive attitude towards taking on operational responsibilities and provided feedback on the shortcomings of the current CI/CD pipeline. The following conclusions from the survey are also confirmed by the

correlation between the abilities/solutions and the competencies measured through self-evaluation [8].

E-Commerce is a means for sellers and buyers to process trade transactions for various products electronically carried out by companies [9]. E-Commerce is a technology application used to automate business transaction processes [10]. There are other forms of e-commerce, namely e-Marketplace system is a digital platform that provides facilities for handling the process of buying and selling transactions, payments, and shipping from various online stores by sellers and buyers, with the concept that users, namely the general public, can act as sellers and buyers. An e-Commerce business in Indonesia can have the following characteristics as online shopping website for direct retail sales to consumers, participation in online marketplaces that focus on business-to-consumer (B2C) or consumer-to-consumer (C2C) processing, business-to-business (B2B) sales, collect and use demographic data through website contacts and social media, and business-to-business (B2B) electronic data exchange [11].

A new project life cycle has emerged along with an agile paradigm for project management, providing a flexible and customizable environment for projects where completion is complex and unclear, delivering a step-by-step product with feedback [12]. DevOps (development and operations) is developing the right approach to address the integration problem of development and operations capabilities to complement a swift process [13]. The strategic goal of DevOps is to examine the methods used to improve the quality of services and features in a way that meets user needs [14]. DevOps aims to deliver fast service to system users by bringing development and operations teams together and requires a delivery cycle consisting of planning, development, testing, deployment, deployment, and monitoring with active collaboration between the different members, as shown in Figure 1 [15].

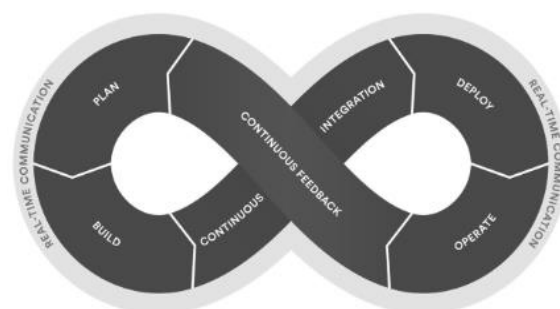


Figure 1. DEVOPS LIFE CYCLE [15]

Figure 1 shows a continuous delivery process for developing, testing, and deployment operations into an efficient method. The growing adoption of microservices architecture in many companies, especially in e-Marketplace companies, has resulted in changes in corporate culture, especially in

the software development process. The DevOps adoption culture encourages close collaboration within the e-Marketplace companies by carrying out the necessary organizational shifts to support a culture of shared responsibility to eliminate the boundaries between the roles of the development and operations teams. Automation is needed to assess the quality of development builds and feedback from e-Marketplace system users through rapid and stable changes [16].

Information Technology (IT) governance is a framework used to manage all information resources (human, cost, and infrastructure) in achieving the organization's business objectives effectively and efficiently. IT governance is essential for companies to decide how to use information technology resources, measure their performance, achieve business goals, and derive benefits [17]. The two main focuses on IT governance are how IT can generate sufficient benefits or value for the business and how the risks arising from IT implementation can be controlled and managed [18]. IT governance is an integrated, interconnected, and mutually directing process and structure that aims to regulate an organization or company to achieve its goals by aligning the benefits or values of implementing IT, risks IT, and IT processes [19]. IT governance includes organization, regulation, culture, and practices that result in a system of control and transparency of IT implementation. IT governance also explains who has the right to make a decision and how that decision is made in the application of IT [20].

COBIT (Control Objectives for Information and Related Technology) is one of the frameworks for IT governance and management. This framework helps organizations or companies provide governance direction according to the desired business processes by adjusting the benefits of an organization or company [21]. ISACA has released the latest version of COBIT, which replaces the previous COBIT 5 version, namely COBIT 2019; the publication of this framework is a guideline for every organization or company to move quickly, dynamically, innovate, and be closer to its customers. Both COBIT 2019 and COBIT 5 consist of 5 main domains, namely: 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) [22].

Based on relevant previous studies and several theories used in this research, there are gaps, such as the design of information technology governance in a company without paying attention to the technology explicitly used, so it is still too general. The second namely how to build DevOps-based e-commerce without paying attention to information technology governance. Therefore, the contribution or novelty of this research is designing information technology governance that can be applied to companies engaged in microservices using DevOps, especially e-Marketplace companies.

II. RESEARCH METHOD

The initial stage of this research is collecting data using a questionnaire based on the purposive random sampling method. The purposive random sampling method is a sampling technique with specific considerations [23]. Data collection is carried out on the response of e-Marketplace system users in Indonesia based on aspects of system quality, information quality, and service quality to users, then continued with data collection in the form of interviews with technical support officers, product development specialists, back-end developers and associate Vice President of Product from several top e-Marketplaces companies in Indonesia such as Tokopedia, Shopee, and Rupa-Rupa, as well as data collection from various literature studies from several relevant journal articles. After all the required data has been obtained, the researcher conducts a data analysis process and aligns business goals, IT goals, and IT processes using COBIT 2019. Then, a method of identifying findings is carried out through an expert judgment assessment of the e-Marketplace companies based on IT governance concepts using COBIT 2019. Based on the results, the relevant ideal recommendations are made to improve e-Marketplace system performance. The following process will obtain design factors that influence IT governance on the e-Marketplace companies so that a governance design will be accepted that is suitable to be applied to the e-Marketplace companies in Indonesia.

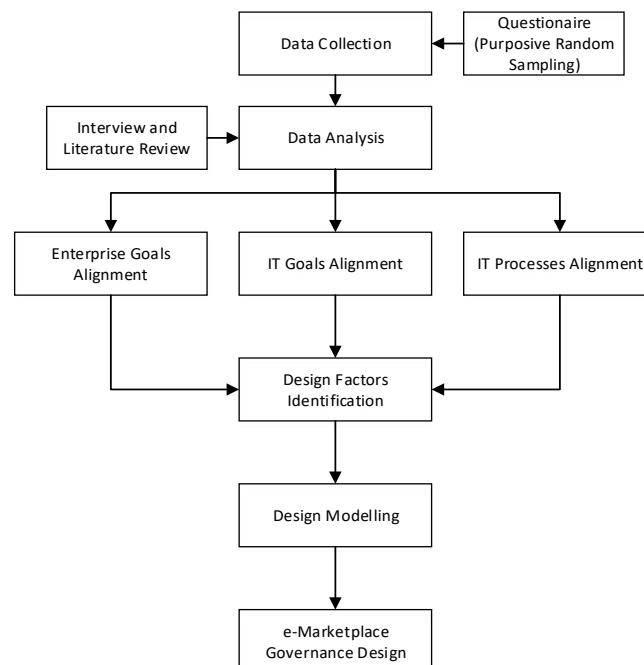


Figure 2. RESEARCH STAGES

Based on Figure 2, the IT governance design flow in the e-Marketplace companies can be divided into 3 (three) main stages, namely:

1. Alignment of Business Goals, IT Goals, and Enterprise IT Processes

This stage is based on the standard design factors provided by COBIT 2019 to understand the e-Marketplace company's strategy, company business goals, IT goals, IT processes, risk profiles, and current IT-related issues. Knowing the condition of the company's strategy is done by examining the plan's background and business environment to understand the design, the resulting objectives, and the current status of IT risks in e-Marketplace companies.

2. Identify IT Governance Design Factors

This stage is used to determine the scope of the IT governance system by considering design factors 1 to design factor 11, utilizing the help of the COBIT 2019 design toolkit. Design factors 1 to 11 consist of e-Marketplace enterprise strategy, enterprise goals, risk profile, IT-related issues, threat landscape, compliance requirements, IT role, IT sourcing model for IT, IT implementation methods, technology adoption strategy, and enterprise size. Next is to determine each relevant design factor. After that, the possible values of the design factors that apply to the e-Marketplace companies are determined. Finally, the assessment results of each design factor found the level of governance and management objectives.

3. IT Governance Design Results

It is the stage where all inputs from the previous steps are collected to complete the design of the IT governance system. The action taken is to combine all the information during the last stage to summarize the creation of the IT governance system. The final governance system needs to represent the relevant assessment of all inputs. This method can draw conclusions by planning an IT governance system for the e-Marketplace companies based on the IT governance system design stage.

COBIT 2019 has a core model, which is divided into 2 (two) parts, namely Governance and Management. COBIT 2019 explains the essential factors that need to be considered by companies in designing an IT governance system and positioning it for the successful use of information and technology. These critical factors are considered design factors that companies should consider in adjusting their IT governance system to realize the value of using IT. Design factors can influence the design of a company's governance system and position it for success in using information and technology. The domain reveals the main objectives and areas of activity within the processes [24]. COBIT 2019 defines several design factors, as shown in Figure 3.

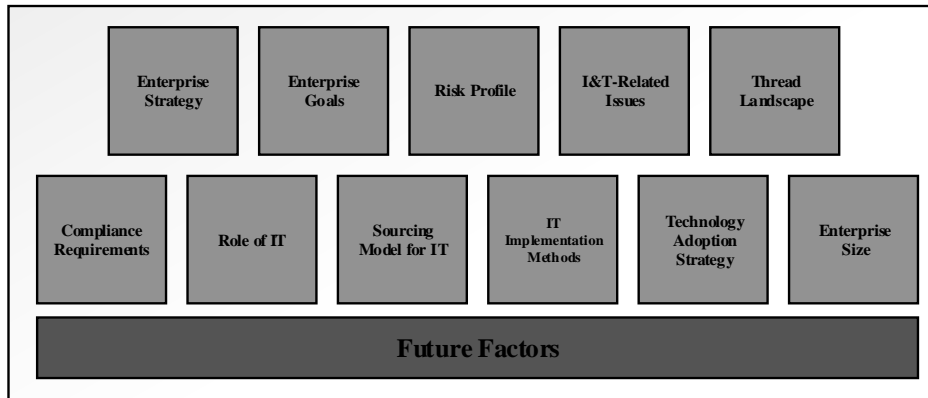


Figure 3. COBIT 2019 DESIGN FACTOR [24]

III. RESULT AND DISCUSSION

E-Marketplace companies in Indonesia can be divided into 2 (two) types, namely pure e-Marketplace and consignment e-Marketplace. The e-Marketplace companies discussed in this study is a pure e-Marketplace in the form of C2C (customer to customer), which provides buying and selling facilities for individuals and companies to sell their products directly to consumers through website and application platforms such as Tokopedia, Bukalapak, and Shopee [25]. The primary purpose of developing digital e-Marketplace system technology is to build a powerful automation platform to become a means of global digital trade. Proof of the success of the e-Marketplace companies in Indonesia is that one of the e-Marketplace systems in Indonesia succeeded in contributing 1.5% of Indonesia's total GDP [26].

E-Marketplace companies need clear guidance on the direction of technology development to update information technology which will be implemented regularly to meet customer needs through appropriate solutions and innovations [27]. Through the results of processing questionnaire data to 387 respondents in this study, the frequency of the use of the e-Marketplace system in Indonesia reached more than 80%, and the satisfaction level of e-Marketplace system users reached more than 99% with several criteria of advantages in the form of respondents considerations, namely the e-Marketplace system. Easier and faster to access, e-Marketplace companies have attractive promo offers, the use of e-Marketplace system can shorten shopping time, e-Marketplace system is a means of selling products that are varied and more complete than conventional stores with fair price competition transparency between merchants, e-Marketplace system has many types of payment methods that are guaranteed security, ease, and convenience in transacting using e-Marketplace system, and e-Marketplace system is one of the global marketing tools and as a promotional medium for Micro, Small and Medium Enterprises (MSMEs) products, especially in Indonesia. Through these considerations, it can be proven that e-

Marketplace companies in Indonesia are successful digital technology products from their companies and are accepted by the public. The company's strategy in each type of e-Marketplace has different characteristics. Table 1 shows the company's strategy differences for each e-Marketplace company.

Table 1. CHARACTERISTICS OF E-MARKETPLACE COMPANY BUSINESS STRATEGY BASED ON COMPANY TYPE

No.	Aspect	Business to Consumer (B2C)	Consumer to Consumer (C2C)
1.	Innovation	Expansion of the business market.	They are introducing the new e-Marketplace system.
2.	Services	Develop online stores such as SMEs or retail.	Provide service or platform availability.

The system, service, and information quality are essential turning points in the e-Marketplace system development process [28]. The quality can be assessed by how the user responds to the navigation of the system, whether the level of system response is good, how the story of user trust in the design, especially in the transaction process, and the level of system security. Based on the data collection results through questionnaires, it was found that more than 90% of users feel confident and satisfied with the quality of the e-Marketplace system, and 78% of users think that currently, e-Marketplace companies can adjust and provide the functional features that users need. The quality of service is obtained by more than 95% satisfaction in transacting on the e-Marketplace system due to guaranteed security in payment transactions and qualified search features. Meanwhile, through the quality of information, user trust is obtained by 75% because it is still not fully guaranteed consumer protection rights in the e-Marketplace system; for example, there are still many merchants who are not credible in marketing their merchandise.

The implementation of DevOps in the e-Marketplace system is one of the implementations of IT processes in IT governance in the e-Marketplace companies. Therefore, to realize the goals and obtain value for using IT, it is necessary to design a comprehensive e-Marketplace company's IT governance through the following processes:

1. Design Factor 1: Enterprise Strategy

Each company has a different strategy in design factor 1, namely Enterprise Strategy. The company's system consists of 4 types, namely growth/acquisition, where the company focuses on growing and developing; innovation/differentiation, where the company focuses on offering something new, including product and service innovation to clients; cost leadership, where the company focuses on minimizing the long-term budget, and client service/stability where the

company focuses on providing stable and user-oriented operational services. Based on the e-Marketplace companies strategy analysis, the Enterprise Strategy is obtained in Table 2.

Table 2. E-MARKETPLACE COMPANIES ENTERPRISE STRATEGY

Value	Importance (1-5)
Growth/Acquisition	3
Innovation/Differentiation	5
Cost Leadership	2
Client Service/Stability	4

Table 2 shows the priority business strategies based on the results of the e-Marketplace companies classification used in this study, namely the e-Marketplace companies with B2C and C2C types; the company strategy that becomes the priority is innovation/differentiation and client service stability compared to growth and cost leadership. This is because e-Marketplace companies must continue to innovate and provide services to the client to survive and have a competitive advantage with constantly growing competitors.

2. Design Factor 2: Alignment of Enterprise Goals to Alignment Goals

The next stage is design factor 2, namely the alignment of Enterprise Goals with Alignment Goals which aims to align enterprise and IT goals (alignment goals). The purpose of the e-Marketplace companies in Indonesia is to increase nationally and globally people's purchasing power and economic equity. The enterprise goals contained in the Balanced Scorecard were selected based on the results of interviews conducted with four respondents, namely technical support officers, product development specialists, back-end developers, and associate VP of Product from several top e-Marketplaces companies in Indonesia under the vision and mission of each e-Marketplace companies and based on the results of a literature review of several studies on e-Marketplace system. Table 3 shows the enterprise goals for e-Marketplace companies in Indonesia, namely EG01 and EG02. EG05, EG06, EG07, EG08, EG10, EG12, and EG13.

Table 3. SELECTED E-MARKETPLACE ENTERPRISE GOALS

The vision of the e-Marketplace companies in Indonesia is to expand the digital business market to support Micro, Small, and Medium Enterprises (MSMEs) by utilizing the Innovation of IT, nationally and globally, to distribute the economy in Indonesia digitally.	No.	Enterprise Goals	BSC Dimension	Relation
	EG01	Portfolio of competitive products and services	Financial	Primary
	EG02	Managed business risk	Financial	Primary
	EG05	Customer-oriented service culture	Customer	Primary
	EG06	Business-service continuity and availability	Customer	Primary
	EG07	Quality of management information	Internal	Primary
	EG08	Optimization of internal business process functionality	Internal	Primary
	EG10	Staff skills, motivation, and productivity	Internal	Primary
	EG12	Managed digital transformation programs	Growth	Primary
	EG13	Products and business innovation	Growth	Primary

The next stage is mapping business goals into appropriate IT goals, namely Mapping Enterprise and Alignment Goals. The purpose of IT e-Marketplace companies is to digitize transactions carried out by MSMEs to connect sellers and buyers in an integrated digital platform. The mapping of IT objectives is carried out using 13 perspectives of IT goals (alignment goals) on four dimensions in the IT Balanced Scorecard (IT BSC), namely the customer, financial, internal, learning and growth dimensions contained in the COBIT 2019. Based on the mapping results, enterprise goals related to IT (alignment goals) can be seen in Table 4.

Table 4. E-MARKETPLACE COMPANIES ALIGNMENT GOALS

No.	Alignment Goals	Relation
AG02	Managed I&T-related risk.	Primary
AG03	Realized benefits from I&T-enabled investments and services portfolio.	Primary
AG04	Quality of technology-related financial information.	Primary
AG05	Delivery of I&T services in line with business requirements.	Primary
AG06	Agility to turn business requirements into operational solutions.	Primary
AG07	Security of information, processing infrastructure and applications, and privacy.	Primary
AG08	We are enabling and supporting business processes by integrating applications and technology.	Primary
AG09	We deliver programs on time and budget, meeting requirements and quality standards.	Primary
AG10	Quality of I&T management information.	Primary
AG12	Competent and motivated staff with a mutual understanding of technology and business.	Primary
AG13	Knowledge, expertise, and initiatives for business innovation.	Primary

3. Design Factor 3: Risk Profile

Design factor 3 is the e-Marketplace company's Risk Profile and current issues regarding technology and information. The risk profile identifies the types of IT-related risks the e-Marketplace companies currently face and indicates the most at-risk areas. E-Marketplace companies must have chances that will be met; there are 11 risk categories to consider. The impact of risk on the company is very dependent on the risk of the e-Marketplace companies. Based on the results of interviews and data collection using questionnaires, the chances that may be faced by e-Marketplace companies such as program and project life cycle management, IT costs and omissions, IT infrastructure and operational incidents, software adoption/use problems, technology-based Innovation, and data and information management. These risks can occur when the e-Marketplace system is used and can potentially have a high impact if they appear and are not appropriately managed.

4. Design Factor 4: Information and Technology Related Issues (I&T-Related Issues)

Design factor 4, namely I&T-Related Issues, is a related method for assessing organizational IT by considering the latest IT-related issues or problems experienced. IT issues associated with IT risks can be evaluated as realized IT dangers. Some of the issues related to IT in the e-Marketplace companies are significant IT-related incidents which are substantial issues because

e-Marketplace companies hold and manage data. Critical personal data belonging to users and the level of user trust in the company is always a top priority; therefore, this issue must be prioritized so that it does not happen. Second, the assessment reports on IT performance or service quality issues are also important because e-Marketplace companies are engaged in digital technology, so the quality of IT services is also a priority. The better the cooperation of the IT team within the company, it will directly proportional to the resulting achievements. Third, issues related to implementation failures or innovations caused by the current IT architecture. The current e-Marketplace system development process uses the concept of DevOps adoption and collaboration to avoid innovation failures; However, this can be overcome; this issue is a significant issue that must always be considered because it can have very detrimental impact on the company.

Fourth a significant issue regarding the quality and integration of data from various sources. Due to the development of digital technology, partner companies related to e-Marketplace companies, for example, such as e-Wallet and e-Payment vendors who have different authorization, authentication, and security levels from each other, delivery service companies' e-Tracking systems must always be up to date; it must be ensured that the technology can be perfectly integrated without compromising the security and operation of the e-Marketplace companies. Fifth, related to issues of supervision, quality control, and company operations, the e-Marketplace system is a digital global trading system with many transactions that take place almost every second, supported by the operating system which always operates non-stop for 24 hours every day, this issue is a significant reason to prioritize through full-time and real-time system control. Sixth, in the case of non-compliance with privacy regulations, the e-Marketplace system platform can run because of the support from users' trust in the company, one of which is regarding the handling related to the management of user privacy data in transactions through the e-Marketplace system, based on this, it is necessary to guarantee the protection of consumer rights.

If the company is negligent about this issue, it will cause a tremendous loss impact; for example, the leakage of user data from one of the e-Marketplace systems by irresponsible parties will undoubtedly harm the company and users of the e-Marketplace system. The seventh is the issue of the inability to exploit new technologies or innovate using I&T. Adapting e-Marketplace system to meet user needs; e-Marketplace companies must consistently innovate and become a new trend following technological developments during competition in the global digital technology market. Therefore, the seven issues related to I&T have become an essential priority in e-Marketplace companies.

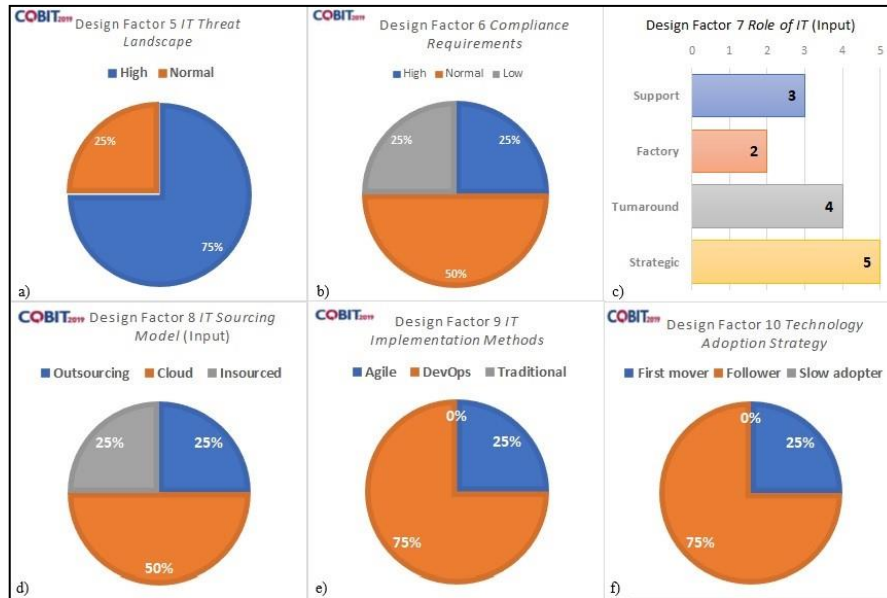


Figure 4. IT GOVERNANCE OF MARKETPLACE COMPANIES DESIGN FACTORS NO. 5-10

5. Design Factor 5: IT Threat Landscape

Design factor 5 is the IT Threat Landscape which means a threat view that can help the e-Marketplace companies identify threats that can threaten the e-Marketplace system while operating. Figure 4a shows the threats that can occur in the e-Marketplace system. The value of 75% is a threat categorized as usual because when the e-Marketplace system operates, these threats can be handled with the network security system (cyber security) they have. Threats that may occur are system operational failure.

6. Design Factor 6: Compliance Requirements

Design factor 6 is Compliance Requirements, which are compliance requirements that form the basis of the e-Marketplace companies. In Figure 4b, the resulting Low value is 25% because e-Marketplace companies have made efforts to improve company management by sound corporate governance principles. The standard value is 50% because e-Marketplace companies comply with the rules and conditions that the digital industry has determined. The high value of 25% is because e-Marketplace companies run their business based on the laws and regulations that the government has set regarding electronic information and transactions.

7. Design Factor 7: Role of IT

The results of the identification of design factor 7 are the Role of IT which is the role of IT for the e-Marketplace companies. Figure 4c shows the value of the part of IT used in e-Marketplace companies. The Support section has a value of 3, where the company has implemented IT to support the business processes and services offered. The Factory section has a value of 2 because when an IT failure occurs, the e-Marketplace companies will not feel the impact directly, even

though the business processes and services in the e-Marketplace companies are still running. The Turnaround section has a value of 4 because the IT seen in the e-Marketplace companies has a role in helping Innovation. The Strategic area has a value of 5 because the IT used significantly impacts the e-Marketplace companies, making it easier for companies to carry out business processes and provide services.

8. Design Factor 8: Sourcing Model for IT

The results of the identification of design factors eight on the e-Marketplace companies can be seen in Figure 4d. Design factor 8, namely the Sourcing Model for IT, is a procurement adopted by the e-Marketplace companies and consists of several parts, namely: 1) Outsourcing has a value of 25% because IT implementation in the e-Marketplace companies also uses and integrates features of third-party support services to improve e-Marketplace system performance, such as payment services on e-Payment by entrusting service providers to banks, monitoring services delivery by the delivery service through e-Tracking and internet services using third party services. 2) Cloud with a value of 50% because the e-Marketplace system uses cloud technology as an online-based storage place. 3) Insourced with a value of 25%, because the e-Marketplace companies have a department that focuses on the IT function.

9. Design Factor 9: IT Implementation Method

Design factor 9, namely IT Implementation Methods, is a method adopted by the company in implementing IT. The identification of design factors nine on the e-Marketplace companies can be seen in Figure 4e, which shows how DevOps has become the most dominant approach to IT implementation on e-Marketplace systems because it integrates development processes and operations capabilities to deliver fast and reliable services. The Agile approach is still the choice of IT implementation compared to the traditional method because it is more suitable to be applied to continuous e-Marketplace system development.

10. Design Factor 10: Technology Adoption Strategy

Design factor 10, namely Technology Adoption Strategy, is used by companies in adopting new technology. The results of the identification of design factors ten on the e-Marketplace companies can be seen in Figure 4f shows that the e-Marketplace system can be categorized as a first mover and follower because, at this time, it has developed a lot and has relatively the same essential functions.

11. Design Factor 11: Enterprise Size

Design factor 11 is Enterprise Size to determine the size of the company. Based on the data obtained, the number of employees owned by e-Marketplace companies is more than 1,000 employees on average; it can be concluded that e-Marketplace companies have a sourcing model of the Large Enterprise type because they have more than 250 employees.

12.IT Governance Design Result

The processes considered necessary are those with a capability level highest level 4 with a value of 75, as shown in Figure 5. Figure 5 shows 40 processes with different weights because these values are influenced by the values entered in design factor 1 to design factor 11. The values listed consist of values 100 to -10. The positive values in the governance design show that the process is significant for e-Marketplace companies. Then, a negative value means that the process is not the main one for e-Marketplace companies. Based on Figure 5, it can be seen that of the 40 core models or critical IT processes in the e-Marketplace companies with values that have values above 75% and become priorities, namely: 1) APO03 – Managed Enterprise Architecture; 2) APO04 – Managed Innovation; 3) BAI04 – Managed Availability and Capacity; 4) BAI06 – Managed IT Changes; 5) BAI11 – Managed Projects; 6) DSS03 – Managed Problems. Therefore, the 6 (six) IT processes must be a priority in developing and operating the e-Marketplace system. The BAI process domain dominates the critical processes in e-Marketplace companies because the field has a value of 75.

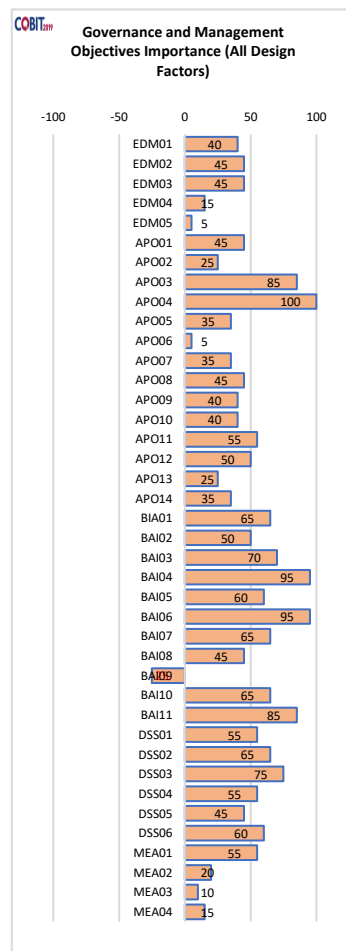


Figure 5. GOVERNANCE AND MANAGEMENT OBJECTIVES IMPORTANCE

APO03 – Managed Enterprise Architecture has a score of 85 which means that the target capability level is at level 4, relating to providing enterprise architecture services within the enterprise that include guidance to and monitoring of implementation projects, formalizing ways of working through architecture contracts, and measuring and communicating architecture's value and compliance monitoring. APO04 – Managed Innovation has a score of 100 which means that the target capability level is at level 4, relating to managing technology frameworks that have the potential to create innovative technologies and ideas and improve operational effectiveness and efficiency by utilizing IT innovatively. BAI 04 – Managed Availability and Capacity has a score of 95 which means the target capability level is at level 4, relating to balancing current and future needs for availability, performance, and capacity with cost-effective service provision.

BAI06 – Manage IT Changes has a score of 95 which means the target capability level is at level 4, relating to managing all controlled changes related to business processes, applications, and infrastructure, including routine changes and emergency maintenance. BAI11 – Managed Projects has a score of 85 which means the target capability level is at level 4, relating to the management of all projects initiated within the e-Marketplace companies under the company's strategy and in a coordinated manner based on standard project management approaches such as: creating, planning, controlling and implementing the project, and concludes with a post-implementation review. DSS03 – Managed Problems has a score of 75 which means the target capability level is at level 4, relating to increasing availability, improving service levels, reducing costs, improving customer convenience and satisfaction by reducing the number of operational problems, and identifying root causes as part of problem resolution.

Based on the 6 (six) processes produced by the design of information technology governance at e-Marketplace companies using the COBIT 2019 framework, the recommendations for government that must be prioritized by e-Marketplace companies include: architectural development for the system they own, Innovation according to the needs of system users, system availability 24/7, readiness in rapid IT change, have management good IT project, and ability in handling problems that occur in the system.

IV. CONCLUSION

Based on the results of data analysis obtained from questionnaires with users, interviews with stakeholders in the company, expert judgment, and literature review from various relevant studies to determine the design factors of e-Marketplace companies governance in Indonesia in this study, it is obtained the results of the appropriate governance model on e-Marketplaces companies in Indonesia using the COBIT 2019 and DevOps approach, namely the APO03 – Managed Enterprise Architecture, APO04 – Managed Innovation, BAI04 – Managed Availability and

Capacity, BAI06 – Managed IT Changes, BAI11 – Managed Projects, and DSS03 – Managed Problems processes. The 6 (six) IT processes all have a score of 75, with the target capability level being at level 4. Hence, it is a design factor that is a priority for implementing IT governance on e-Marketplace companies in Indonesia. The importance of information technology processes generated in this research is only done on methods with target level 4. The development of an e-Marketplace system with a DevOps approach can be an option to increase a company's ability to create systems and services at high speed compared to using a traditional method. In addition, DevOps is also responsible for designing, developing, and providing solutions for companies because they prioritize automation.

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