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ANALYSIS AND DESIGN OF RISK MANAGEMENT SYSTEM OF ELECTRONIC GOVERNMENT (E-GOVERNMENT) (STUDY CASE: XYZ INSTITUTIONS)

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Abstract
Electronic-Based Government System or SPBE is a government administration that utilizes information and communication technology to provide services to users. XYZ Institutions is one of the cities implementing SPBE. The implementation of SPBE management by the XYZ Institutions Government received the lowest score and Risk Management was an indicator of SPBE management with a low level of maturity. Risk management is an effort or attempt to control, manage and control risk within an organization. This study conducted an analysis and design of risk management documents at the XYZ Institutions, using the PANRB Regulation Number 5 of 2020 concerning SPBE Risk Management Guidelines as standardization. This research also uses the 2018 ISO 31000 principle approach regarding risk management standards and uses the PDCA method.

I. INTRODUCTION

Advances in science and technology have made many contributions to human civilization [1]. The application of technology has provided many benefits in progress in various aspects, including aspects of education, cultural aspects, political aspects and aspects of government [2]. The application of technology in aspects of government is commonly known as e-government.

E-government is the administration of information technology-based government [3]. Electronic Based Government System (SPBE) is one of the e-government applications. SPBE is a government administration that utilizes information and communication technology to provide services to users [4]. Almost all government agencies in Indonesia have developed SPBE which has been implemented in several regions to serve the public. As for one of the important indicators in the implementation of SPBE that need attention is risk management[5]. This aims to find out the possible risks that occur and their prevention. To minimize the possibility of risk occurring, it is necessary to implement risk management [6].

According to Misra, et al. (2020) risk management is understanding, identifying and evaluating the risks of a project [7]. Meanwhile, according to Arifudin, et al. (2020), Risk management is important in doing business because the more the business develops, the more risks it faces [8]. So that risk management is an effort or effort to control, manage and control risk in an organization.

XYZ Institutions is one of the cities implementing SPBE. Responding to developments in the use of technology in the government sector in Indonesia, the President of Indonesia issued Presidential Regulation No. 95 of 2018 concerning SPBE which aims to increase the effectiveness of the electronic-based government system nationally[9]. Based on PerMen PANRB No 59 of 2020, in order for the SPBE to run properly, a monitoring and evaluation process for SPBE is needed. The 5 predicates in the SPBE assessment include Satisfactory (4.2 – 5.0), Very Good (3.3 – 4.2), Good (2.6 – 3.3), Fair (1.8 – 2.6), Poor (<1.8). In 2021 an

evaluation has been carried out, in this case the maturity level of the Institutions Government of XYZ gets a score of 3.19 in the good category. From the results of the XYZ Institutions Government's SPBE index assessment, the implementation of SPBE management received the lowest score of the other indexes/domains with a value of 2.13 (enough).

Risk management is an indicator of SPBE management with a low level of maturity. While the application of risk management is mandatory in regional government, this is also regulated in the PANRB Regulation No. 5 of 2020 concerning SPBE Risk Management Guidelines [2]. Based on the results of interviews and data obtained in the field, in 2022 an evaluation of SPBE management will be carried out using the KAMI Index tools. The results of the final evaluation of the implementation of SPBE management are said to be inappropriate with risk management maturity level I. According to PerMen PANRB No 59 of 2020 Maturity level I (Stub) means the process of implementing SPBE is carried out without planning, what should be the level to be achieved is maturity level III (Defined) which means the implementation of SPBE according to guidelines/standards and applied to an organization[10].

It was also found that the risk management document was still in draft form, and was not in accordance with PerMen PANRB No 5 of 2020 in the section on the SPBE risk management process, structure, risk management awareness culture. The risk management process refers to the establishment of categories, determination of impact areas and risk assessment which initially uses level 3 to level 5. SPBE's risk awareness management and culture refers to shared responsibility so that the process and implementation of risk management runs well. So that currently the Risk Management document owned by XYZ Institutions is not in accordance with the scope of SPBE implementation. This study provides recommendations in the form of risk management documents and is expected to increase the value of SPBE implementation at XYZ Institutions. This study focuses on the risk management process which is carried out through several processes of observation, interviews, data processing and preparation of risk management recommendations. This research also uses the 2018 ISO 31000 principle approach regarding risk management standards and uses the PDCA method.

II. LITERATURE

2.1. E-Government

E-government is the use of information technology by the general public provided by the government [6][11] . E-government can help manage electronic-based government more efficiently, and can improve communication between the government and the business and industrial sectors. E-government has a goal to achieve good public services[12].

2.2. Electronic Based Government System (SPBE)

SPBE is a service to SPBE users facilitated by the government in the form of utilizing information and communication technology [2]. One of the ways to realize effective and efficient governance is by implementing an electronic-based government system (SPBE). SPBE is a government governance system that utilizes information technology to assist the implementation of government administration and the delivery of public services for a government agency.

2.3. Risk management

Risk management is a risk management by the organization to increase the value of the organization or agency [6]. Risk management plays an important role in avoiding risks that may occur in an institution. Even though it has a long and continuous stage, the risk management process is one of the most important components that can protect agencies from many problems.

2.4. Regulation of the Minister of Administrative Reform and Bureaucratic Reform (PerMen PANRB) Number 5 of 2020

PerMen PANRB No 5 of 2020 is a guideline for SPBE risk management. Systematic Guidelines for the SPBE risk management document according to PerMen PANRB No 5 of 2020 is structured in 5 (five) chapters, namely:

1. Chapter I Introduction
2. Chapter II SPBE Risk Management Framework
3. Chapter III SPBE Risk Management Process
4. Chapter IV SPBE Risk Awareness Management Structure and Culture
5. Chapter V Closing[13]

2.5. ISO 31000 Year 2018

ISO 31000 is a risk management standard issued by the International Organization for Standardization (ISO). This standard contains principles and guidelines that can be applied by organizations or companies in the process of identifying, assessing and mitigating risks.[14]. Implementation of ISO 31000 in an effort to manage risk in a company takes place as a whole.

III. RESEARCH METHODS

The method that researchers chose in the research process is PDCA (Plan-Do-Check-Action). The PDCA method is a method used to find problems in stages so that problems can be handled appropriately[15]. The PDCA process can be seen in Figure 1.

Figure 1. PDCA Method
(Source: Risk Management Based on SNI ISO 31000[16])

According to Nasution 2001, the stages of PDCA are explained as follows:

1. Plan (Develop a plan)
2. Do (Implement the plans that have been put forward)
3. Check (Checking the results achieved)
4. Action (Take action if necessary based on research results)[15].

3.1. Research instrument

As an introduction, the researcher made observations at the XYZ Institutions to obtain more complete information regarding the implementation of the SPBE and the design of risk management. Researchers also conducted interviews by asking several questions to obtain additional information and data.

3.2. Data Type

This study uses qualitative data types. Qualitative data is data that shows quality, in the form of non-parametric numbers [17]. The type of qualitative data in this study was obtained from observations and interviews.

3.3. Data source

Sources of data used in this study are as follows:

1. Primary data sources, in this study primary data were obtained from observations and interviews with XYZ Institutions.
2. Secondary data sources, in this study secondary data were obtained from literature studies such as books, journals, regulations and documents available or owned by XYZ Institutions which were used by the author.

3.4. Research Flow

Plan the author made observations at XYZ Institutions to see the risks that might have an impact on the sustainability of the organization. The author also conducts interviews with relevant agencies to obtain information and data. This phase begins in September 2022. Data obtained from the field is collected to be able to compile risk management documents.

Do at this stage, the author conducts an analysis of risk assessment and preparation of risk management documents at the XYZ Institutions according to PerMen PANRB No. 5 of 2020 and ISO 31000. The author will determine the risk category and impact of the risk area and then proceed with determining the probability criteria and risk impact criteria of SPBE. After that the author will analyze the risk assessment.

Check at the check stage, risk management is prepared for SPBE implementation at the XYZ Institutions. Later discussions and evaluations will also be carried out to obtain suggestions and input from relevant agencies.

Action from the discussion and evaluation results, the authors provide recommendations according to suggestions and input from agencies. Based on the results of the discussions and the collection of various evidence related to the existing implementation, the next stage is to provide recommendations in accordance with the risk management flow process that has been running from the agency. In addition, various suggestions and input from related agencies were included to adjust the final document to be prepared.

IV. RESULTS

4.1. Plan

The application of risk management focuses on 21 indicators to improve the implementation of SPBE risk management. Based on the facts in the field, the XYZ Institutions risk management document is still in the form of a Draft, and is not yet in accordance with the standards of the PANRB Regulation No. 5 of 2020 and the XYZ Institutions Government ICT Audit Report 2022. From the draft analysis it was found that: (1) In the SPBE risk management process section still using a level 3 matrix, (2) there is no risk management conscious culture structure, (3) there is no defined risk area, (4) there is no categorization of types of risk, (5) there is no definite template for risk analysis. The author also conducted interviews with the Head of the Information & Communication Technology Communication Division and the Coordinating Officer of the XYZ Institutions to obtain data or documents for the purposes of this research.

4.2. Do

Based on the data obtained and based on PerMen PANRB No 5 of 2020, the preparation of risk management documents consists of 5 (five) chapters, namely [13]:

1. Chapter I Introduction contains background, aims and objectives, benefits, scope, and general understanding.
2. Chapter II of the SPBE Risk Management Framework contains a description of the basic components that make up the framework.
3. Chapter III The SPBE Risk Management Process contains communication and consultation processes, setting the SPBE Risk context, SPBE Risk assessment, SPBE Risk

handling, recording and reporting, as well as monitoring and evaluation.

4. Chapter IV SPBE Risk Management Structure and Awareness Culture contains the duties and functions of the SPBE Risk Management structure and the implementation of SPBE Risk awareness culture development.
5. Chapter V Closing contains a summary of the SPBE Risk Management guidelines.

The document contained in the determination of SPBE risk categories aims to ensure that the process of identifying, analyzing and evaluating SPBE Risks can be carried out as a whole. There are 16 SPBE Risk categories in PerMen PANRB No 5 of 2020, but based on the results of interviews and analysis of documents related to SPBE, 8 categories are used in XYZ Institutions, explained in table 1 below:

Table 1. SPBE Risk Categories

No	SPBE Risk Category
1	Project Development/ System Development
2	Data and Information
3	SPBE Infrastructure
4	SPBE application
5	SBE Security
6	SBE Service
7	SPBE Human Resources
8	Natural disasters

(Source: Results of research data processing based on PerMen PANRB No. 5 of 2020[13])

Furthermore, the SPBE risk impact area is determined, aiming to find out which areas are affected by the risk. The SPBE risk impact areas which are the focus of SPBE risk management implementation can be seen in table 2:

Tabel 2. Impact Area Risiko SPBE

No	Area Impact	Description
1	Reputation	SPBE Risk Impact in the form of aspects related to the level of stakeholder trust
2	Performance	SPBE Risk Impact in the form of aspects related to the achievement of SPBE targets
3	Organization Services	SPBE Risk Impacts are in the form of aspects related to fulfilling needs or services to stakeholders
4	ICT Operations and Assets	The SPBE Risk Impact is in the form of aspects related to ICT operational activities and ICT asset management
5	Human Resources	The impact of SPBE Risk is in the form of aspects related to the physical and mental aspects of employees

(Source: Results of research data processing based on PerMen PANRB No. 5 of 2020[13])

Setting SPBE risk criteria aims to measure and determine how likely the SPBE Risk event and impact can occur in an instancei[13]. XYZ Institutions uses a level of possibility with 5 levels. For the 5 levels of possibility, it can be described in table 3 below.

Table 3. SPBE Possible Levels

Likelihood Levels		Total Frequency of Possible Occurrence in One Year
1	Almost Certain	$X < 2$ times
2	Likely	$2 \leq X \leq 5$ times
3	Moderate	$6 \leq X \leq 9$ times
4	Unlikely	$10 \leq X \leq 12$ times
5	Rare	> 12 times

(Source: Results of research data processing based on PerMen PANRB No. 5 of 2020[13])

SPBE risk impact criteria are determined by a combination of SPBE risk impact areas and SPBE impact levels. XYZ Institutions uses 5 levels with SPBE Risk complexity. For the 5 levels of impact, it can be described as follows:

Table 4. Impact of Reputation Risk Areas

Impact Area		Impact Levels				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Major	Catastrophic
Reputation	Positive	Small contribution to improving public image and trust.	Little influence on improving public image and trust.	Moderate influence on improving public image and trust.	Great influence on improving public image and trust.	Huge influence on improving public image and trust.
	Negative	Has minimal influence on public image and trust.	Little influence on image and public trust.	Moderate influence on public image and trust.	Great influence on public image and trust.	Huge and damaging influence on public image and trust.

(Source: Results of research data processing)

Table 5. Impact of Performance Risk Areas

Impact Area		Impact Levels				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Major	Catastrophic
Performance	Positive	Minimum contribution to the achievement of SPBE targets.	Limited contribution to the achievement of SPBE targets.	Moderate contribution to the achievement of SPBE targets.	Great contribution to the achievement of SPBE targets.	A very big contribution to the achievement of SPBE targets.
	Negative	Minimal influence on the achievement of SPBE targets.	Little influence on the achievement of SPBE targets.	Moderate influence on the achievement of SPBE targets.	Great influence on the achievement of SPBE	Very large and damaging influence on the achievement of SPBE targets.

(Source: Results of research data processing)

Table 6. Impact of Organizational Service Risk Areas

Impact Area		Impact Levels				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Major	Catastrophic
Organization Services	Positive	There is no improvement in meeting stakeholder needs or services	Limited improvement in meeting stakeholder needs or services.	Moderate improvement in meeting stakeholder needs or services.	Substantial improvements in meeting stakeholder needs or services.	Significant improvement in meeting stakeholder needs or services.
	Negative	Minimal impact on meeting stakeholder needs or services.	Limited influence on meeting stakeholder needs or services.	Moderate influence on meeting stakeholder needs or services.	Great influence on meeting the needs or services of stakeholders	Very large influence on the fulfillment of stakeholder needs or services.

(Source: Results of research data processing)

Table 7. Impact of Operational Risk Areas and ICT Assets

Impact Area		Impact Levels				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Major	Catastrophic
ICT Operations and Assets	Positive	There is no influence on ICT operational activities and management of ICT assets.	Limited influence over ICT operational activities and management of ICT	Moderate influence on ICT operational activities and management of ICT	Great influence on ICT operational activities and management of ICT	Huge influence on ICT operational activities and management of ICT assets.
	Negative	There is no influence on ICT operational activities and management of ICT assets.	Limited influence over ICT operational activities and management of ICT assets.	Moderate influence on ICT operational activities and management of ICT assets.	Great influence on ICT operational activities and management of ICT assets.	Huge influence on ICT operational activities and management of ICT assets.

(Source: Results of research data processing)

Table 8. Impact of Human Resources Risk Areas

Impact Area		Impact Levels				
		1	2	3	4	5
		Insignificant	Minor	Moderate	Major	Catastrophic
Human Resources	Positive	There is no effect on increasing the welfare and performance of human resources.	Limited influence on increasing the welfare and performance of human resources.	Moderate influence on improving the welfare and performance of human resources.	Great influence on improving the welfare and performance of human resources.	Huge influence on improving the welfare and performance of human resources.
	Negative	There is no influence on the welfare and performance of human resources.	Limited influence on the welfare and performance of human resources.	Limited influence on the welfare and performance of human resources.	Great influence on the welfare and performance of human resources.	Huge influence on the welfare and performance of human resources.

(Source: Results of research data processing)

The SPBE risk analysis matrix contains a combination of likelihood and impact levels to be able to determine the amount of SPBE risk represented in numerical form. The analysis to be able to determine the amount of SPBE risk can be seen in table 9.

Table 9. Risk Analysis Matrix

5 x 5 Risk Analysis Matrix			Impact Levels				
			1	2	3	4	5
			Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood Levels	5	Almost Certain	5	10	15	20	25
	4	Likely	4	8	12	16	20
	3	Moderate	3	6	9	12	15
	2	Unlikely	2	4	6	8	10
	1	Rare	1	2	3	4	5

(Source: Results of research data processing based on PerMen PANRB No. 5 of 2020[13][18])

After obtaining these levels, they will be grouped into risk sizes, shown in table 10

Table 10. Risk Level

Risk Levels		Magnitude Range	Color Description Risk
1	1 – 5	Insignificant	Blue
2	6 – 10	Minor	Green
3	11 – 15	Moderate	Yellow
4	16 – 20	Major	Orange
5	21 – 25	Catastrophic	Red

(Source: PerMen PANRB No. 5 of 2020 [13])

4.3. Check

After the preparation of the risk management document was completed, the author discussed again with the Head of the Information Technology & Communication Division and the Head of the XYZ Institutions Encryption Division. From the results of the discussion of risk management documents it is suggested that: (1) Background is added to the discussion regarding XYZ Institutions (2) The layout of the level 5 matrix is adjusted and easy to understand, (3) Adjustments to the impact criteria and impact areas used Reputation, Performance, Service Organization, Operations and ICT Assets, Human Resources. And the risk management document needs to be reviewed again so that it can be ratified and applied to XYZ Institutions.

4.4 Action

In implementing SPBE within the scope of risk management carried out by XYZ Institutions, a risk management guideline is needed as a guide to determine the level, criteria, impact of a risk. In this regard, XYZ Institutions needs to develop a risk management standard that includes risk identification, analysis and treatment.

As a form of recommendation that can be given on the implementation of risk management, especially the implementation of the SPBE organized by XYZ Institutions, it is given in the form of a Risk

Management guideline document. The document was prepared by adjusting the research results to the XYZ Institutions directly.

In June 2023, XYZ Institutions conducted an evaluation of SPBE management again using the KAMI Index tools. The results of the final evaluation of the implementation of SPBE management are said to be Fulfillment of the Basic Framework with risk management maturity level I+. Which is where the results of the final evaluation of the implementation of SPBE management in July 2022 are said to be inappropriate with risk management for maturity level I, for comparison can be seen in Figure 4.1.

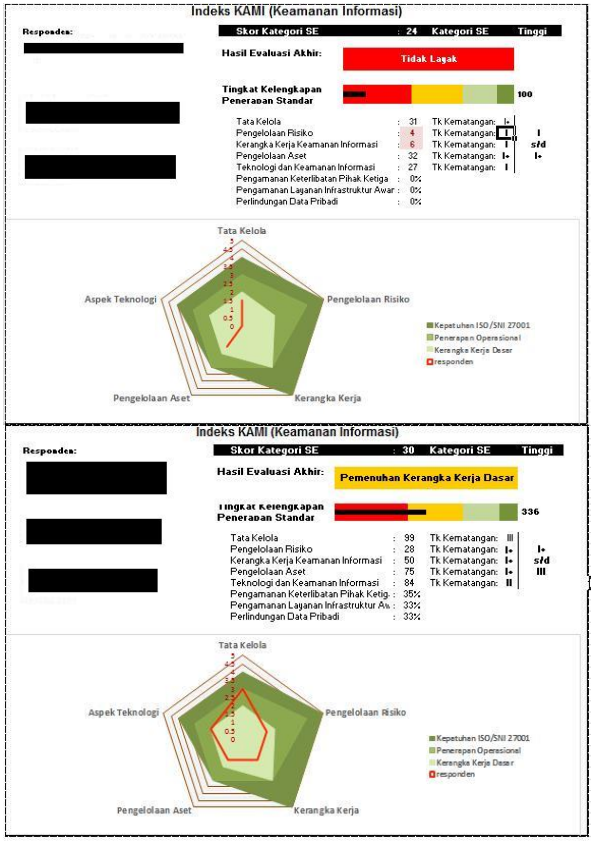

Figure 2. Comparison of Evaluation Results Using the KAMI Index Tools

V. CONCLUSION

Based on research that has been conducted at XYZ Institutions regarding SPBE Risk Management, it can be concluded that the risk management documents owned by XYZ Institutions are not in accordance with PerMen PANRB No 5 of 2020 and the audit results requested. Besides that, the draft document owned by XYZ Institutions uses a level 3 matrix while the audit evaluation results suggest using a level 5 matrix. 5 of 2020. Based on the final results of this study, the authors suggest further research to focus more on the risk mitigation aspects of the existing risk register analysis. This aims to further develop and focus on the mitigation process of risks that have not been planned until they have not emerged from the relevant agencies as a whole.

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