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Research Paper

Analysis of Risk Management and Internal Control Implementation in the Procurement of Construction Goods/Services in the Area of Probolinggo City Government, East Java Province

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ABSTRACT : *Procurement of construction material or services within Probolinggo City Government gradually implemented through electronic way (e-procurement) since 2012 and make the opportunity of potential fraud due to transparency lackness in the procurement process is minimized. The government agency who responsible for procurement policy also stated the conventional way of goods or service procurement is frail to many unfair activities such as kickback, bribe, mark-up price (the supplier setting higher price for their commodities) or project manager intended to hide or not announcing the procurement plans, and non-transparent procurement process. These activities can result in losses for the state and/or the community that involved in the construction project. However, the e-procurement implementation does not necessarily eliminate probability of risks to occur. Therefore, identifying risks in the government procurement process in particular for construction service is very important to build an understanding about causes that trigger the emergence of risk event. By understanding the causes of a risk, it is expected to be able to take action to minimize risk occurrence from its source.*
Analysis method selected in this study is Failure Mode and Effect Analysis or FMEA. The qualitative research method was used to identify risks and determine risk mitigation, meanwhile the quantitative method was used to test data from questionnaire results and calculate the RPN value for assessing the magnitude of the risk value. The result of the study found that risk analysis using FMEA showed type of risk with highest RPN value was "Delayed payment due to incomplete supporting documents" (RPN: 318,01) which has big impact and high probability of risk. There are 11 highest priority risks require immediate control to avoid procurement failure, delays and/or budget losses.

KEYWORDS: *Construction Service, Risk Management, Intern Procurement, Material or Goods.*

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I. INTRODUCTION

There are many strategies have been implemented by the government within the framework of national development to increase the economic growth rate, alleviate poverty and reduce social inequality in which one of them is the government program for goods and services procurement. It is known that goods and services procurement by government will play an essential role aims to achieve economic benefits for service users and community also reducing negative impact to the environment.

In the process of government's good/service procurement implementation especially in the construction service, it often carries potential risks to occur which later able to bring impact to the procurement result, where the potentiality of risks could happen to user or construction service provider/supplier, also to the community as the beneficiary of the construction result, and those risk potentials can bring negative or positive impact.

Procurement of construction material or services within Probolinggo City Government gradually implemented through electronic way (*e-procurement*) since 2012 and make the opportunity of potential fraud due to transparency lackness in the procurement process is minimized. The government agency who responsible for procurement policy also stated the conventional way of goods or service procurement is frail to many unfair activities such as kickback, bribe, mark-up price (the supplier setting higher price for their commodities) or project manager intended to hide or not announcing the procurement plans, and non-transparent procurement process. These activities can result in losses for the state and/or the community that involved in the construction project.

However, the e-procurement implementation does not necessarily eliminate probability of risks to occur. Therefore, identifying risks in the government procurement process in particular for construction service is very important to build an understanding about causes that trigger the emergence of risk event. By understanding the causes of a risk, it is expected to be able to take action to minimize risk occurrence from its source.

So far, discussion related to analysis of risk management application and internal control in the procurement of construction good and services within scope of Probolinggo City Government, East Java have not been carried out by many researchers, therefore the problems raised in this study are: (1) what are the risk events posed by procurement doer that able to cause potential failure in the procurement process for goods/services in the construction service sector within the Probolinggo City government? (2) How the assessment of risk priority level which must be dealt by procurement doers during procurement process for goods or services in the construction services sector within Probolinggo City Government? (3) What are the selected action to mitigate risks with high or very high priority level?

II. LITERATURE REVIEW

2.1. Risk Management

Risk management is a structured approach for managing uncertainty related to threats or a series of human activities, including risk assessment, strategy development to manage the risks, and risk mitigation through empowerment of resource management. There are possible strategies such as transferring risk to another party, avoiding risk, reducing the negative effect of risk, and absorbing some or all consequences of a particular risk. [1]

According to ISO 31000, risk management defines as a coordinated effort or activity to direct and control activities of a company against various potential risks. In other words, risk management is a set of architecture method (consisting of principles, frameworks and processes) for managing risk in effective way. The process of risk management implementation can be continuously develop and its workperformance can be improved so that the company or organization can integrate the risk management process into its overall governance system. Risk management is carried out continuously and monitored periodically (not as one time event).

Risk management is a mandatory matter for government agencies as ruled in Government Regulation Number 60 of 2008, stated that every agency is required to implement risk management for attaining the agency goals. Risk management can easily be defined as a comprehensive risk management system to minimize or eliminate potential risks which could arise in the organization effort for achieving its goals. The management process or function mostly translated into three steps: planning, implementation and control. By following these stages, the risk management process also can be divided into three stages: planning, implementation and control of risk management. [2]

Risk management is closely related to uncertainty. A risk may or may not occur, and it cannot be known until it occurs. However, uncertainty can be addressed by:

1. Clarifying the probability of the risk occurence;
2. Understanding the consequences or alternatives if the risk occurs; and
3. Determining what constitutes the risk, such as factors influencing the magnitude of the risk (likelihood x consequence).

An event can be understood by looking at its probability (*likelihood*) and impact (*consequence*). An event can have a low probability with high impact or vice versa, high probability with a low impact. From here, the researchers can calculate which event brings more dangerous or riskier impact than the others.

By implementing risk management to a project, it can minimize losses, increase production and break the chain of loss events resulting from failure. Practitioners take risk management actions as a respond when posing so many risks. Respondents undertake two types of risk management actions: prevention and remediation. Preventive actions are used to reduce, avoid, or transfer risks in construction project, while remedial actions, on the other hand are used to mitigate the effects when there is an occurrence of risk or when a risk must be taken.

The risk management process starts from identifying risks from planning stage. Then, try to produce a list of all type of risks that may affect the project, making risk assessment steps, compiling risk responses and controlling risk responses.

2.2. Internal Control

According to Government Regulation No.60 of 2008, the Internal Control System is an integral process of actions and activities performed continuously by management leaders and all employees to provide adequate assurance of achieving organizational goals through effective and efficient activities, reliable financial reporting, safeguarding state assets, and compliance with laws and regulations. [2]

2.3. Government Procurement of Goods/Services

The government procurement of goods/services is mentioned in Presidential Regulation of Indonesia Republic Number 16 of 2018 and its amendments, where in Article 1 stated that "Procurement of goods/services is an activity to obtain goods/services by ministries/institutions/regional government whose process starts from planning necessities until completion of all activities to obtain goods/services". For the government, availability of goods and services in each regional apparatus organization is a determining factor for success of the implementation of task and functions of each working unit. [3]

Tender process is an activity with goal of achieving a winning bid in an auction held by the project owner. The emergence of so many events could jeopardize the goal, and constitutes risk that must be addressed effectively. By implementing risk management to the tender process enable the goal can be achieved successfully. [4]

2.4. Failure Mode and Effects Analysis (FMEA)

The government procurement of goods/services is mentioned in Presidential Regulation of Indonesia Republic Number 16 of 2018 and its amendments, where in Article 1 stated that "Procurement of goods/services is an activity to obtain goods/services by ministries/institutions/regional government whose process starts from planning necessities until completion of all. [3]

FMEA is an engineering technique used to determine, identify, and eliminate known failures, problems, errors, and the like from a system, design, process, and/or service before it reaches the consumer. [5]

Meanwhile, failures are categorized based on their impact to the success of a system's mission. In general, FMEA is defined as a technique for identifying three matters:

1. The potential causes of the failure of system, design, product, and processes throughout the life cycle.
2. Effects from these failures.
3. The critical level of the failure effect on the functions of the system, design, product and process.

FMEA is a tool that systematically able to identify effect or consequences of system or process failures and reduces or eliminates the likelihood of failure. The risk impact and failure mode analysis (risk FMEA) is a primary method for calculating risk management. FMEA is an analytical technique for identifying and eliminating potential failures, problems, or damage to a system, design, process, or service. [5]

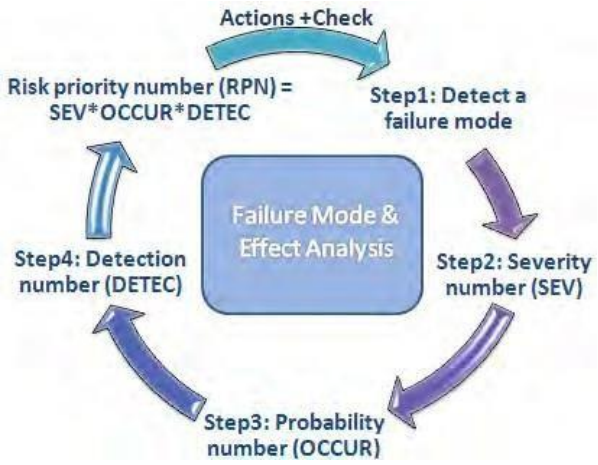

Figure 1. Method of Failure Mode and Effect Analysis (FMEA). [5]

The stages assessment by FMEA method are as follows:

1. Identify the system and the system elements, including failures and their effect.
2. Determine the severity level of the effect of a failure (Severity).
3. Determine the frequency of the risk's likelihood to occur (Occurence).
4. Determine the detection level that has been conducted to prevent the risks (Detection).
5. Calculate the risk priority number (RPN) which indicates the risk level of a failure. The RPN ranges from 1-1000; the higher the RPN, the higher the risk of a potential failure to the system, design, process, or service. RPN = Severity x Occurrence x Detection.
6. Provide recommendation for actions that can be implemented to reduce the risk level of failure.

The FMEA method provides a risk calculation method by creating a risk priority number (RPN) based on the severity, occurrence, and detection values. The following table contains a risk level determination based on the RPN value:

Table 1. Risk level determination

Risk Level	RPN Value Scale
Very low	x < 20
Low	20≤ x <80
Medium	80≤ x <120
High	120≤ x <200
Very high	x>200

With the presence of RPN categorization, type or risks with high RPN values can be seen and will be included into very high category, so these risks can be prioritized while the company/business doer determining anticipatory, mitigation and strategic actions which must be taken to addressing the risks with highest level, so the business operation of the company still able to continue in optimal way even there is a disruption or disaster occur.

III. RESEARCH METHOD

3.1. Type of Data Research

To achieve the final objective of this research, it requires two types of data:

1. Primary Data

The obtained data from respondents by distributing questionnaries and/or conducting interviews with selected individuals according to certain criteria or characteristics (commitment=making or contract-signing officials, procurement officials or selection working group, as well as the government goods/service procurement expert, practitioners, lecturers, and/or internal auditors (APIP).

2. Secondary Data

Secondary data is obtained from literature studies which can take the form of government regulations, monographs, articles, or journals.

3.2. Determination of Sample and Respondents of the Study

In this study, the sampling technique was carefully selected to make the sample relevant to the research structure, with individuals that selected based on specific traits and characteristics (purposive sampling). In this study, the number of respondents was 30 individuals. The criteria for respondents to be selected as sample in this study are explained below:

1. Commitment Making Officers or Contract Signing Officers (*Pejabat Pembuat Komitmen atau Pejabat Penandatanganan Kontrak/PPK*) who have ample experience in carrying out construction project at least 10 times in the last five years (either through tender selection or direct procurement) with minimum education level of Bachelor's degree or equivalent.
2. Procurement officers (*Pejabat Pengadaan/PP*) or Selection Working Group (*Pokja Pemilihan/Pokmil*) who have experiences in processing construction project selections at least 10 times in the last five years (either through tender selection or direct procurement), whether the officers who hold the status of Good or Services Procurement Manager (*JF Pengelola Pengadaan Barang atau Jasa/JF PPBJ*) or non JF-PPBJ with minimum education level of Diploma III (D3).
3. Expert practitioners in government procurement of goods and services, also lecturers and/or internal auditor (APIP) in their respective fields.

3.3. Method of Data Analysis

In this research, data analysis was carried out to answer the problems that had been established, namely:

3.3.1. Data Identification

1. Risk identification: The risk identification was performed in procurement of construction goods/services within the scope of Probolinggo City government.
2. Potential risk identification: the potential risk identification was performed to seek potential risks that may arise in the procurement of construction goods/services within the Probolinggo City Government.

Table 2. Code and Risk Events

Code	Risk Events
Stage of Compiling/Arranging Selection Documents	
R1	Technical specifications are unclear, ambiguous, or open to multiple interpretation
R2	Tehnical specifications do not meet requirement, no presence of necessity evaluation involving end user.
Stage of Selection Announcement	
R3	Procurement information is not well socialized; announcement is made in irrelevant media or difficult to access the media.
R4	Annoucement schedule is too short so that potential participants do not have enough time to prepare the documents.
Stage of Registration and Retrieval the Selection Document	
R5	The prospective provider/supplier did not understand the selection document.
R6	The prospective provider/supplier do not receive complete documentation, leading to misunderstanding of the requirements.
Stage of Information Briefing (*Aanwijzing*)	
R7	The explanation (*aanwijzing*) less detailed or incomplete.
R8	The answers were not documented, so participants did not get the same information.
Stage of Bid Submission	
R9	The provider/supplier is late, or does not submit a bid.
R10	The LPSE system experienced disruption, delaying the uploading tender document process.
Stage of Bid Evaluation	
R11	The evaluation was carried out not in an objective manner or not according to the criteria.
R12	No clarification or evidence was provided in the evaluation, resulting in errors of evaluation result.
Stage of Selection and Announcement the Bid Winner	
R13	Determination of winner does not match the evaluation result.
R14	The winner is announced without considering important administrative requirements.
State of Rebuttal/Objection	
R15	Inadequate or ineffective resolution to any objection.
R16	No response to any objection from participants, prolong the procurement process.

3.3.2. Secondary Data

In this stage, an analysis by employing FEMA method is conducted under sequences as stated in the following explanation:

1. Determination of Severity Rating (S): Severity rating is seriousness level of a consequences caused by potential failure. The higher the severity value, the greater the effect will be. The severity rating scale ranges from 1 to 10 based on the level of seriousness or danger that able to be caused. These results are obtained through a questionnaire administered to respondents who met the required criteria. Severity becomes the first step in analyzing risk, by calculating how much the magnitude of impact/intensity of an incident will affect the process output. These impacts are put into rank on a scale of 1 to 10 where 10 is the worst impact.
2. Determination of Rating Detection (D): Rating Detection is performed by measuring the ability to detect or control failures that occur. The detection rating scale ranges from 1 to 10. These results are obtained through a questionnaire administered to respondents who met the required criteria. Detection is a measurement to the detecting ability or control the failure that occur. Detection uses an assessment scale of 1 to 10.
3. Determination of Rating Occurrence (O): Rating Occurrence is the level of frequency from the cause of specific failure occurring which resulting in a form of failure. The occurrence rating scale ranges from 1

(never) to 10 (always occur). These results are obtained through a questionnaire administered to respondents who met the required criteria. Occurrence is the frequency from the cause of specific failure of a project occurs.

4. RPN Value Calculation: aims to obtain a rank of importance level from potential failures in the FMEA method. The RPN value is obtained by multiplying the severity, occurrence, and detection values.

IV. RESULT AND DISCUSSION

4.1. Road Equipment Management in Traffic Order Zone of Probolinggo City

4.1.1. The Type of Risk Event in the Planning and Preparation of Procurement Stages

The type of risk event in the planning and preparation of procurement stages. Procurement planning and procurement preparation stages are two crucial phases that determine the direction and quality of the implementation of goods/service procurement. Based on the result of this study, there are two dominant risk events that able to be identified at these stages: (1) unclear or ambiguous technical specification/R1 and technical specification that do not meet the necessities because do not involve the end user/R2. Both risks are showing high RPN value (250.95 for R1) and (252.75 for R2), reflecting the severity and probability of significant risk occurrence. When the goods/services specification is not explicitly formulated, it can open to multiple interpretation and the service provider will struggle to understand the actual needs of the project, resulting in error at the bidding and implementation phase. Furthermore, failure to invite or involve users in the necessity evaluation process can lead to mismatch between the procured goods/services and the field's requirement.

The risk management principle outlined in ISO 31000 emphasize the importance of involving all stakeholders since the beginning of planning stage to comprehensively identify, analyze, and address the potential risks. In the context of government procurement, it also regulated by Presindential Regulation No.12 of 2021 which stated that technical specifications must be relevant and prepared in accurate way to the users' need. In support to this argument, Thai reported the common causes of procurement inefficiency in the public sector are poor quality of procurement documents and the failure to create a collaborative design for all necessities. Without a validation mechanism for the prepared specifications, the procurement process can be disrupted by many objections from the participants, document revisions, and post-contract disputes. These risks fall into technical and administrative category, rooted in a rushed, non-data-driven planning processes and a lack of human resource capacity that responsible in the procurement process. [6,7]

The finding of this study indicates that strengthening the collaborative mechanism during specification arrangement/development is the key to risk prevention. Procurement documents should be designed through coordination between units of user, technical team, and procurement official and get review by internal auditor to ensure the accuracy and completeness level of these documents. As emphasized by Emirsyah et al., errors in arranging the technical specifications are the major cause of disputes in government construction project.Therefore, standardization of specification formulation, technical training for the procurement officials and the use of database from the previous procurement result as a reference are necessary since these activities will support preventative risk mitigation efforts and increase the efficiency and accountability level in the goods/services procurement process within Probolinggo City government. [8]

4.1.2. The Supplier/Provider Selection Stage is the Core of Goods/Services Procurement Process

The supplier/provider selection stage is the core of goods/services procurement process because the quality of the project implementation is determined in this phase through supplier/provider selection who meet the technical, administrative and price requirements. Based on the result of FMEA analysis in this study, there are several major risks found which occurred repeatedly and have high RPN values, such as supplier is late or not submitting bids (R9, RPN: 144.27), non-objective evaluation (R11, RPN:109.74), and winner is announced without considering important administrative requirements (R14, RPN: 90.06).

These risks indicate there are procedural weaknesses and discipline lackness for adhering the operational standards that become the dominant sources of failure at this stage. Inappropriate bids, biased evaluations and decision regarding the winner lacking administrative support which able to lessen the legitimacy of the procurement process and open the door to disputes or objections from other participants. Evaluation of bids which do not meet criteria reflects unreliable capacity and integrity of the evaluation team or the selection of procurement working group (*Pokja).*

Thai emphasized a good procurement system requires objective and transparent evaluation criteria and the help of trained evaluators. In practice, non-objective evaluations often be influenced by external pressure, subjective interpretation to the procurement documents, or a lack of understanding about the evaluation method. This problem get worsened by the failure to clarify and verify the validity of tender documents (R12, RPN:85.94), although the Presidential Regulation No.12 of 2021 explicitly requires a clarification process before selecting the tender winner. If the evaluation stage is not cautiously carried out and also equipped with reliable documents, the

procurement outcome will have potential to undermine the principles of transparency and accountability which brings significant impact to the work quality of incompetent supplier who is selected for this job. [9]

The administrative aspect also plays very significant role in ensuring the validity of provider selection result. One significant finding is the tendency to determine the winner without examine or fully verifying crucial administrative requirements. It leads to risks of disrupting contract implementation because the supplier/provider is incompetent or unfit to be selected as winner (such as those who lack of financial support, similar work experience, or appropriate key personnel). Likewise, a very short time announcement schedule (R4, RPN: 96.07), media announcement that difficult to access (R3, RPN: 79.50) increase the potential for information exclusivity thus limiting potential supplier/provider participation. The low level of information transparency as mentioned about is contradicting to the fair competition principle as outline in the Decree of the Head of LKPP No.9 of 2018. Therefore, this stage carries administrative and systemic risks that need to be addressed through system improvement and strengthened control.

To prevent risk occurrence in the supplier/provider selection stage, intervention is needed through three main approaches: (1) strengthening human resource capacity in the procurement working group (*Pokja*), improving the procurement information system, and enhancing internal supervision. The selection working group (*Pokja)* should receive regular training on evaluation techniques, clarification method, and procurement ethics to avoid bias and conflict of interest. LPSE system is the digital procurement platform that also needs to improve its functionality to support data integrity and ease the access to information. Furthermore, the Government Internal Supervisory Apparatus (*Aparat Pengawasan Intern Pemerintah/APIP)* must be more active in reviewing selection documents and evaluation result as part of quality assurance. Thus, it will ensure a more transparent and accountable supplier/provider selection process, resulting in high-quality partners in the procurement of construction services for the Probolinggo City Government.

4.2. Analysis of Risk Priority Based on FEMA Assesment

4.2.1. Risk Order Based on the Highest RPN (Risk Priority Number) Value

The result of FMEA measurement to construction procurement stage indicates the risks order with the highest priority is determined based on the Risk Priority Number (RPN) value, a result value from multiplying the Severity, Occurrence and Detection values. RPN value describes the degree of risk in a comprehensive manner-the higher the value, the more urgency for the risk to be addressed systematically. In this study, there are three highest risk found in sequencial order: P11 (RPN = 318.01), P10 (RPN = 309.31) and P6 (RPN = 276.48). Risk P11 is related to late payment due to incomplete documents, risk P10 is related to work accepted without quality inspection, and risk P6 concerns about supervisor who does not understand technical specification of the work. All three risks represent a fatal combination of administrative failure, technical inaccuracy and a weak oversight system.

Risk with highest RPN values in general not only reflects the magnitude of the impact (*severity*), but also a high probability of occurrence (*occurrence*) and weak detection capabilities (*detection*). In the context of government construction procurement, this combination is particularly dangerous because it able to result in budget losses, reduced infrastructure quality, and a crisis of confidence to the implementer agency. As reported by research of Himawan and Mahbubah, RPN can be a key indicator in establishing risk mitigation priorities for public project. This is also supported by Kerzner, who stated that RPN rankings need to be reviewed periodically since high scored risks tend to be systemic and cannot be adequately addressed through reactive measures alone. Consequently, a structural approach involving procedural improvements and increased human resource capacity is imperative to be constructed. [10,11]

By means of RPN approach, the regional government or UKPBJ can focus more on allocating control resources whether in the form of budgets, trainings, or human resources.

4.2.2. Mapping of High Risk and Very High Risk Events as the Control Priority

Based on the result of Risk Priority Number (RPN) calculation in the FMEA analysis, risk mitigation is created into four priority level categories: very high category, high category, medium category, and low category. In this study, risks were categorized into very high risk if the RPN value is > 250, and into high risk category if the RPN value between the range of 200 – 250. Of 30 risk events identified in the selection and implementation stages of construction service procurement, there were 5 risk events found to be included in very high risk category and 6 risk events were found to be included in high risk category. Risks classified into very high risk category are: P11 (RPN = 318.01), P10 (309.31), P6 (276.48), P3 (267.26), and P4 (264.18). meanwhile, the risks included in high category are: P7 (243,12), P1 (212,97), P12 (203,32), P15 (202,87) also R1 (250,95) and R2 (252,75) from the selection stage.

This mapping is vital for developing a focused and targeted control strategy. As stated by Chapman and Ward, RPN-based risk mapping helps organization establish risk appetite and determine corrective actions based

on their level of urgency. In the case of this study, administrative risk found in P11 is related to late payments and it needs to be controlled by improving the document checklist system and digitizing verification. Meanwhile, the technical risks such as in P6 and P10 emphasize the importance of upgrading human resource capacity and strengthening technical SOPs. This mapping also shows that bureaucratic inefficiencies (for example innapropriate use of advance payments) pose risks equal to, or in some cases exceeding the technical issues pose in the field, so the control approach must include administrative reform and improved internal management. [12]

Based on this mapping, decision-makers in Probolinggo City Government then will be able to develop intervention priority based on resource availability and the potential impact of failure. As explained by Smith et al., the RPN risk mapping-based control strategy encourages data-driven-decision-making. Furthermore, this mapping also reliable to be used to organize risk control performance indicators (KPI) in the procurement units or APIP as part of the SPIP evaluation. Therefore, this mapping is not only part of analytical result, but also acts as the foundation for building an integrated and adaptive risk control system to the risk dynamic within the scope of construction procurement. [13]

4.2.3. Implication of FEMA Result to Control Decision Making

The result of FEMA analysis in this study provides an objective and structured framework for the risk control decision-making process in the procurement of construction material/services within Probolinggo City government. By using the Risk Priority Number (RPN) approach, decision-makers can identify vulnerable areas that require priority handling. Risks with the highest RPN values such as late payment due to incomplete documents (P11), acceptance of work without quality inspection (P10), and low technical supervisor competency (P6) indicate systemic weaknesses from administrative and technical aspects. The use of FMEA method helps provide quantitative evidence that can be used as basis for developing control measures, which are not subjective in nature and empowered by basis of empirical data.

Another implication of FEMA is its ability to help the organization to direct resource allocation through appropriate and efficient ways. As explained by Kerzner, structured risk mapping allows organization to prioritize intervention for real crucial risks while at the same time avoiding over-allocating efforts that exerted for handling low impact risks. In the context of this study, risks originating from administrative aspect such as unprepared payment documents (P11), and utilization of advance payments (P3 and P4) require bureaucratic procedural reform and upgrading capacity from the apparatus staff. These reinforce the finding of Mujenah and Wondabio research which emphasizes the importance of strong internal control for improving the effectiveness of public sector procurement. Therefore, result of FMEA also have substantial value for developing training plans, document reform, and designing procurement monitoring system. [14,15]

Furthermore, another positive outcome comes from integrating FMEA result with supervision system (such as the Government Internal Control System/SPIP) that able to strengthen overall accountability and efficiency belongs to an organization. The Financial and Development Supervisory Agency stated that SPIP maturity evaluation should consider a risk-based approach. Therefore, the FEMA findings in this study can serve as a basis for developing control policy that is not only reactive, but also has preventive and strategic nature. By utilizing risk analysis result as the primary input in the design of control system, the local government has opportunity to improve integrity of the procurement process and prevent potential irregularities before occur. Simultaneously, it also creates a more risk-adaptive work culture and strengthens public trust in the management of development budget.

4.3. Mitigation Strategy for High Priority Risk

4.3.1. Mitigation Strategy to High Priority Risk at Provider/Supplier Selection Stage

The supplier/provider selection stage is the most critical part of the construction goods/services procurement process because it determined the main doers who will carry out the project in accordance to the established specifications and quality. Based on the FMEA results, risks with the highest risk priority number (RPN) values at this stage are: preparation of unclear or ambiguous technical specifications (R1), specifications that do not meet user needs (R2), LPSE system disruptions during bid submission (R10), and bid evaluation which is not objective and without clarification (R11 and R12). These risks are rooted from weaknesses in planning, human resource capacity, and non-adaptive system and procedures. As stated by Janita (2023), public procurement requires systematic risk mapping to prevent public service failures due to errors from the preparation and supplier/provider selection stages. [16]

Mitigation strategy for these risks emphasize strengthening quality of the tender documents. Technical specifications should be developed through a process of identifying the end-user needs which accompany by technical validation from a multidisciplinary team to guarantee clarity and relevance are met. This strategy is align with the ‘Value for Money’ principle in procurement that demands the tender documents should encourage healthy competition and selection of the best provider/supplier. To anticipate disruption in LPSE system, it is

recommended to implement back up mechanism and increase system capacity to prevent overloading during the bid submission deadline. The selection working group (*Pokja*) should also undergo objectivity-based evaluation training and maintain digital documentation to ensure accountability. [17]

Furthermore, internal supervision function must be actively integrated into every stage of the selection process. Review of selection documents and evaluation results by the Inspectorate or Quality Assurance (QA) team can be conducted before the winner is announced to prevent administrative errors or manipulation of results. In addition, the reporting system such as whistleblowing mechanism from LKPP (National Agency for Public Procurement) or internal mechanism that operates within local government must be expanded to allow the public and employees access to report suspected irregularities in the selection process. Through a combination of technical, administrative, and participatory supervision measures, high-priority risks in the provider/supplier selection stage can be effectively and sustainably minimized. [18]

4.3.2. Mitigation Strategy to High Priority Risk at Contract Implementation Stage

Contract implementation stage carries high risk which has significant impact to the success of a construction project. Based on FMEA results, risks wih highest RPN values at this stage include late payments due to incomplete supporting documents (P11, RPN: 318,01), acceptance of work without quality inspection (P10, RPN:309,31), and lack of technical specification understanding from the supervisors (P6, RPN:276,48). These risks reflect the weaknesses in internal control, low technical human resource capacity, and underutilization of a digitalized contract administration system. As explained by Syafar and Ramadhan, inadequate control in contract implementation will lead to inefficiency, potential moral hazard and infrastructure failure. [19]

Mitigation strategies for these risks emphasize the importance of strict documentation system and standard operating procedures (SOPs) for work quality inspections which carried out prior to the handover process. For overcome the payment risk, an administrative checklist must be completed before the PPTK and PPK disburse the fund. All supporting documents, for example the Handover Report (BAST), supervision report, and inspection evidence must be verified before budget disbursement. On the other hand, strengthening technical capacity from the supervisor must be obligatory through training based on national standards, such as SNI or following guidelines from the Ministry of Public Works and Housing (PUPR) as well as technical certification requirement for the project supervisors. This is supported by a statement from Wibowo et al., affirming that low competency from the construction supervisor has a direct impact to quality of project and increases the risk of work repetition. [20]

Furthermore, mitigation efforts in this stage must include a digital integrated monitoring and evaluation system. Utilization of e-monitoring and e-contract technology can improve the visibility of project progress and strengthen the accountability of construction service supplier/provider. A multi-level supervision mechanism by UKPBJ and the Inspectorate, together with their regular field inspection is able to perform early detection to any deviations in work implementation stage. Furthermore, documentation procedures for contract changes (addendum) also must be standardized to ensure the accountability of any revision in the project specifications and project budget. By implementing preventive and adaptive mitigation strategy, the contract implementation stage can be effectively and efficiently carried out and able to minimize the risk of construction failure.

4.3.3. Recommendation for Improving the Risk Mitigation System for Construction Procurement

To improve effectiveness of risk mitigation system in construction service procurement within the scope of Probolinggo City government, it necessitates a systemic integration-based approach and institutional capacity building. First, the risk mitigation should not only be responsive after an incident occurs, but it should be designed as preventive measures since the planning stage has been established. This strategy can be conducted through implementation of Risk-Based Procurement Planning (RBPP), an approach that encourages procurement planning by considering the risk profile from each stage and type of work.

According to Latifah and Zakiyatun, RBPP has proven effective in minimizing project failure because it gives dominant focus to vulnerable points with potential significant impact for the success of the construction procurement. Second, it is crucial to to improve human resource compentency within procurement actors, in particular for understanding the technical and non-technical risks. Regular training on risk management, the optimal utilization of SPSE (Special Operational Procedure) and an understanding of procurement regulations and construction market dynamics are mandatory. Implementation of a procurement management certification system should also be completed by specific training on FEMA analysis so the procurement doers can identifty and mitigate the risks according to the appropriate guidance. Apart from it, to build a risk-aware culture at the organization level is also an essential matter. [21]

This perspective is align with Firmansyah standpoint that said the effectiveness of mitigation is strongly influenced by integrity and accountability values inherent in procurement implementer. Third, from an

institutional perspective, strengthening multi-layered supervision function and integrating risk data into the procurement monitoring system must be upgraded, with one way to do is by integrating FEMA into SPSE module or digital procurement supervision dashboard, so the high-priority risks can be monitored in real time and receive faster intervention. Further, the role of Inspectorate as the Government Internal Supervisory Apparatus (*Aparat Pengawas Intern Pemerintah*/APIP) must also be expanded, not only conducting reactive audit but also have active participation in providing regular mitigation input. A study by ICW (2024) emphasized that participatory and risk-data-driven supervision model are far more effective in detecting irregularities than traditional audit approaches. Therefore, improving the quality of risk mitigation system must be done in comprehensive way: from the regulation, human resources, information system to the supervision structures. [22]

V. CONCLUTION

1. This study is able to identify 31 risk events spreading across two stages of construction service and goods procurement in Probolinggo City Government: (a) supplier/provider selection stage and (b) contract implementation stage. The key risk are include document inconsistency, lack of procurement competency, and weak supervision which all of them can bring negative impact to the work quality and accountability of the procurement process.
2. From the risk analysis conducted in this study by employing FEMA method, it is able to reveal the risk with highest RPN value is "Delayed payment due to incompleted supporting documents" (RPN:318.01) which has a large impact and high probability of risk. There are 11 risks with the highest priority risk value that require immediate control to avoid procurement failure, procurement delay or budget losses.
3. Mitigation strategy proposed in this study is focus on system improvement, strengthening human resource capacity, and enhancing the supervision. While mitigation measures recommendation are include developing Standard Operational Procedures (SOPs), training procurement doers and supervisors, using alternative checklist, conducting internal audit, and improving coordination between the involved parties. The main goal is to improve the reliability of procurement process and minimize potential losses, both in terms of work quality and state finances.

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