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Risk Management in The Conduct of Tenders and Selection of Construction Services in Klungkung Regency

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Keywords

house of risk; risk events; risk agents; procurement of goods/services; preventive actions.

Abstract

The high complexity and uncertainty in the pre-contract stage of construction service procurement through tenders and selection processes create various risks that may cause work delays, cost overruns, decreased quality of construction outcomes, and even state losses. This study aims to identify risk events, analyze risk agents, and formulate preventive mitigation strategies based on the priority of risk agents to support the implementation of risk management and improve government procurement governance. This study used a mixed-methods approach with an exploratory design through literature reviews, in-depth interviews, brainstorming, and surveys of construction service procurement stakeholders in the Klungkung Regency Government. The data were analyzed using the House of Risk (HOR) model, which includes HOR Phase 1 to determine the priority of risk agents and HOR Phase 2 to formulate the most effective mitigation actions. The study identified 30 risk events and 38 risk agents in the pre-contract stage of construction service procurement. The HOR Phase 1 analysis identified 17 priority risk agents, with the primary cause being the limited competence and capacity of the Commitment-Making Officer (Pejabat Pembuat Komitmen; PPK) in preparing procurement preparation documents. HOR Phase 2 identified 37 preventive actions prioritized based on the effectiveness-to-difficulty ratio. The top-priority action was requiring Commitment-Making Officers to participate in procurement competency training and certification. Improving human resource competence, strengthening document review and supervision, developing standards and standard operating procedures (SOPs), and optimizing internal controls were proven effective in minimizing risks and supporting effective, transparent, and accountable construction service procurement.

INTRODUCTION

Government procurement of goods and services is a strategic instrument in government administration that supports the achievement of development goals through the effective, efficient, transparent, and accountable use of the state budget. Based on Presidential Regulation of the Republic of Indonesia Number 46 of 2025 concerning the Second Amendment to Presidential Regulation Number 16 of 2018 concerning Government Procurement of Goods and Services, procurement is defined as an activity that begins with identifying needs and ends with the handover of work results. In practice, procurement is not merely administrative but

constitutes a complex managerial system involving multiple stages, stakeholders, and continuously evolving regulatory dynamics.

One type of procurement with a high level of complexity is construction service procurement. Based on Law of the Republic of Indonesia Number 2 of 2017 concerning Construction Services, construction services include construction consultancy services and/or construction work involving technical, managerial, administrative, and legal aspects. The dynamic and unique characteristics of construction projects, combined with the involvement of multiple parties, create a high level of uncertainty that may develop into risks at every stage of procurement. These risks may arise from procurement planning, preparation, supplier selection, selection implementation, and contract execution.

In construction service procurement through suppliers, selection methods may include e-purchasing, direct procurement, direct appointment, tender, and selection. Compared to other methods, tender and selection are generally used for work packages with large values and high levels of complexity, requiring more comprehensive administrative, technical, and price evaluation processes. This condition increases uncertainty and potential risks in these methods. Research by Janita et al. (2023) shows that most problems in construction procurement originate from the supplier selection stage, particularly the tender process.

Several previous studies have also identified significant risks in the early stages of construction procurement. Kusumarukmi (2018) found that supplier selection still faces obstacles such as limited procurement competency, the absence of an expert database, and overlapping regulations. Meanwhile, Pratin and Wahyuningsih (2025) identified that critical risks often occur during the planning and preparation stages, including budget estimation errors, weak inter-party coordination, and incomplete planning documents. These findings indicate that the pre-contract stage plays a crucial role in determining project success.

A similar phenomenon was also identified in the Klungkung Regency Government. Based on initial interviews with procurement actors, various obstacles were encountered during procurement planning and supplier selection stages, including discrepancies between specifications, budgets, and needs, limitations in preparing procurement documents, and complexities in the bid evaluation process. These conditions have the potential to cause delays in project implementation, cost overruns, reduced construction quality, and even project failure. Furthermore, procurement issues may also lead to administrative and legal consequences, including demands for restitution of state losses based on audit findings and legal proceedings by law enforcement authorities (Mamesah et al., 2022).

The urgency of this research is further strengthened by empirical findings from the Audit Results Report (LHP) of the Audit Board of the Republic of Indonesia (BPK) for the 2023 and 2024 fiscal years in Klungkung Regency Government. The report revealed overpayments and underpayments in several construction service packages amounting to more than IDR 1.1 billion. These findings indicate persistent weaknesses in procurement risk control and the potential recurrence of similar problems if systematic mitigation measures are not implemented from the early stages of procurement.

On the other hand, the enactment of Presidential Regulation of the Republic of Indonesia Number 46 of 2025 concerning the Second Amendment to Presidential Regulation Number 16 of 2018 concerning Government Procurement of Goods and Services—which expands the scope of procurement to include other institutions and village governments—has the potential

to further increase the complexity of government procurement. These regulatory changes require adequate human resource readiness, institutional capacity, and regulatory understanding to ensure that emerging risks can be effectively managed. Therefore, procurement risk management must be implemented proactively by identifying potential risks early and formulating appropriate mitigation strategies.

Conceptually, risk refers to uncertainty that may affect the achievement of organizational objectives (Kristiana et al., 2022). In the context of government procurement of goods and services, risk management is a critical instrument for reducing the likelihood of process failure and minimizing its negative impacts. One approach used in this study is the House of Risk (HOR) method, which integrates the identification of risk events, risk agents, and the determination of preventive mitigation strategies based on risk priorities.

Although various studies on construction procurement risks have been conducted, most have focused on risks during the project implementation phase or on evaluating risks that have already occurred. Studies specifically examining risks in the pre-contract phase of construction service procurement through tender and selection methods remain limited. Furthermore, research integrating risk identification, risk agent analysis, and preventive mitigation strategies using the House of Risk approach in the context of local government procurement is still scarce. This indicates a clear research gap that needs to be addressed to strengthen early-stage procurement risk management.

Based on this background and identified research gaps, this study aims to identify risk events that may arise in the pre-contract stage of construction service procurement through tender and selection methods, identify risk agents contributing to these events, and formulate preventive mitigation strategies using the House of Risk method. The results are expected to contribute both theoretically to the development of procurement risk management literature and practically to the Klungkung Regency Government and other public institutions in improving procurement effectiveness and ensuring transparent, accountable, and adaptive governance.

METHOD

Research Design

This study used a mixed-methods approach combining qualitative and quantitative techniques. The qualitative phase identified risk events and risk agents through literature review, semi-structured interviews, and brainstorming with stakeholders involved in construction service procurement. The quantitative phase measured risk severity and occurrence and determined mitigation priorities using the House of Risk (HOR) method.

The study was conducted on construction service procurement packages under tender and selection methods implemented by the Klungkung Regency Government from the 2023 fiscal year to the second quarter of 2025. The scope was limited to the pre-contract stage, covering procurement planning, preparation, supplier selection preparation, selection process implementation, and contract signing.

Population and Sample

The research population comprised actors and stakeholders involved in the construction services procurement process within the Klungkung Regency Government. The sampling

technique used purposive sampling, taking into account respondents' experience, competence, and direct involvement in the procurement process.

The number of respondents was 45 people, consisting of 35 respondents from the government and 10 respondents from the construction service provider element. Respondents from the government element included Commitment Making Officers (PPK), Technical Activity Implementation Officers (PPTK), Selection Working Groups (Pokja), Heads of Goods/Services Procurement Sections, and field coordinators at UKPBJ. Respondents from the provider element were directors, project managers, or staff of construction service companies who had participated in tenders or selection of construction services during the research period.

Data Collection Instruments and Techniques

The research data consists of primary and secondary data. Primary data was obtained through semi-structured interviews, brainstorming, and a questionnaire survey, while secondary data was obtained from laws and regulations, procurement documents, inspection reports, and relevant scientific literature.

Interviews and literature reviews were used to identify risk events and risk agents. Next, brainstorming was conducted to validate and refine the resulting risk list. The initial identification yielded 54 risk events and 75 risk agents. After brainstorming, 30 risk events and 38 risk agents were identified, which served as the basis for developing the questionnaire.

The research instrument was a questionnaire with a 5-point Likert scale to assess the severity of the risk impact and the likelihood of the risk cause occurring. Before being used in the analysis, the instrument was tested for validity and reliability using SPSS software. Validity was tested using Pearson correlation, while reliability was tested using Cronbach's Alpha.

Data Analysis Techniques

Data analysis was conducted using the House of Risk (HOR) method developed by Pujawan and Geraldin (2009) . This method integrates the concepts of Failure Mode and Effect Analysis (FMEA) and House of Quality (HOQ) to determine risk priorities and mitigation strategies.

House of Risk Phase 1

HOR phase 1 aims to identify and prioritize risk agents. Assessments are conducted based on the severity of the impact, the likelihood of the risk occurring, and the relationship between the risk event and the risk agent. Correlation values are determined using a scale of 0, 1, 3, and 9, indicating levels of correlation ranging from no correlation to a very strong correlation.

The priority of risk agents is determined through the calculation of Aggregate Risk Potential (ARP) with the following equation:

$$ARP_j = O_j \sum_i S_i R_{ij} \quad (1)$$

Information :

ARPj = aggregate risk potential
Oh = probability of occurrence of risk agent j (occurrence)
S = impact caused by risk event i if it occurs (severity)
Rij = correlation between risk event i and risk agent j

The obtained ARP values are then sorted from largest to smallest to determine priority risk agents that require further mitigation action.

House of Risk Phase 2

HOR phase 2 aims to formulate the most effective preventive actions to control priority risk agents. This stage begins with identifying mitigation measures obtained through literature studies, interviews, and brainstorming with government procurement experts. A correlation assessment is also conducted, similar to HOR phase 1, to determine the relationship between preventive actions and risk agents. The total effectiveness of each preventive action is then assessed using the following equation:

$$TE_k = \sum_j ARP_i E_{jk} \quad (2)$$

Information :

TEk = total effectiveness

ARPj = aggregate risk potential agent j

Ejk = risk agent j

Next, an assessment of the degree of implementation difficulty (Degree of Difficulty) for each mitigation measure is carried out. The priority of preventive actions is determined by calculating the ratio of total effectiveness to degree of difficulty (Effectiveness to Difficulty Ratio) as follows:

$$ETD_k = TE_k / D_k \quad (3)$$

Information :

ETD_k = ratio of total effectiveness to difficulty level (effectiveness to difficulty ratio)

TE_k = total effectiveness

D_k = degree of difficulty

Preventive actions with the highest ETD value are determined as the top priority to be recommended in managing the risks of tendering and selecting construction services.

RESULTS AND DISCUSSION

Respondent Characteristics

Based on the characteristics of the respondents, the majority were over 35 years old (68%), had a D4/S1 and S2 education (94%), and had more than five years of work experience (56%). In terms of position, respondents were dominated by the Selection Working Group/JFPPBJ (47%), followed by construction service providers (22%), PPTK (15%), PPK (7%), Coordinators (7%), and Heads of UKPBJ (2%). This composition indicates that respondents are individuals who have adequate education levels, relevant experience, and direct involvement in the construction service procurement process, so they are able to provide credible assessments in the identification, analysis, and mitigation of risks at the pre-contract stage of procurement.

Research Instrument Testing

a. Validity Test

In this study, construct validity test was used with Pearson correlation method with degree of freedom (df) of 45 respondents reduced by 2 to 43, with significance level (α) used

is 5% (five percent), then r (correlation) table is 0.294. The calculated r (correlation) value was obtained using IBM SPSS Statistics 25 program. The results of validity test after data processing can be seen in Table 1.

Table 1 Validity Test Results

Test Items	N	Average r_{count}	r_{table}	Information
Severity of Possible Impacts (Severity)	30	0.640	0.294	Valid
The level of possibility (probability) of the source of the risk occurring and resulting in failure (occurrence)	38	0.691	0.294	Valid

Based on the validity test results above, it can be concluded that all statement items accurately measure the constructs studied and are suitable for use in research. Therefore, all statements can be used in the next stage, namely reliability testing.

b. Reliability Test

The reliability test on this questionnaire was conducted using the one-shot method (single measurement), then the results were compared with other statement items to determine the level of correlation between answers. The test was conducted using the Cronbach alpha (α) statistic. A construct or statement is declared reliable if it has a Cronbach alpha (α) value >0.70 . The results of the reliability test, processed using the IBM SPSS Statistics 25 program, are presented in Table 2.

Table 2 Reliability Test Results

Severity of Possible Impacts (Severity)		The level of possibility (probability) of the source of the risk occurring and resulting in failure (occurrence)	
Reliability Statistics		**Reliability Statistics**	
Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
0.949	30	0.970	38

Based on the reliability test results in Table 2, all statements showed values above 0.70 . Thus, the instrument was declared reliable and could proceed to the analysis stage according to the method used.

House of Risk Phase 1

Based on data obtained through literature studies, interviews and brainstorming, mapping and identification of risk events and risk agents were carried out, the results of which can be seen in Table 3 and Table 4.

Table 3 Risk Event Identification Results

Code	Risk Event	Severity
E1	Procurement planning is not aligned with regional strategic needs and objectives	5
E2	There was an unreasonable determination of procurement values (mark up) at the budget preparation stage which resulted in inefficient use of the budget.	5
E3	The HPS value is unreasonable (too high, too low, or there is a mark up)	5
E4	The technical specifications/Terms of Reference (TOR) in the procurement preparation documents are drafted in an unclear, too general or loose manner.	4

Code	Risk Event	Severity
E5	The procurement process for goods/services is designed or directed to only be fulfilled by one particular provider, thus indicating unhealthy business competition and not opening up opportunities for other business actors.	5
E6	Construction planning design does not match the scope of work	5
E7	The procurement preparation document review process takes a long time.	3
E8	The election documents are drafted in an unclear or biased manner	4
E9	The preparation of election documents does not comply with statutory provisions.	5
E10	The determination of the selection method, qualification method, provider requirements, bid evaluation method, and document submission method do not comply with the provisions of statutory regulations.	5
E11	Business actors experience difficulties in the registration process	3
E12	No participant submitted the tender documents even though an extension of time had been given.	4
E13	The selection documents were not adequately understood by the participants.	4
E14	The quality of participants' bids is low	4
E15	The process of evaluating the qualifications and tender/selection bids of tender participants has encountered obstacles.	4
E16	Many offers do not meet the requirements	4
E17	An error occurred in the evaluation process	5
E18	No participants passed the bid evaluation stage.	3
E19	The results of the bid evaluation show indications of unfair business competition.	4
E20	There are multiple interpretations in proving qualifications	4
E21	Participants did not attend the proof	3
E22	The emergence of objections/complaints from participants or related parties	4
E23	The tender/selection process was declared a failure	4
E24	The implementation of the provider selection did not go according to schedule or was delayed.	4
E25	Overlapping personnel in participant offers	4
E26	The maximum opportunities are not opened up to business actors due to the special requirements made by the PPK.	4
E27	Business actors are still free to bid even though they have a bad track record from previous construction experience.	5
E28	The Election Document or Election Document Addendum does not appear in the business actor's account	5
E29	Corrupt files and tender documents on SPSE were not submitted by the Selection Working Group	4
E30	The contract documents are incomplete and there are errors in the substance of the contract.	5

Table 4 Risk Agent Identification Results

Code	Risk Agent	Occurrence
A1	The internal planning team does not yet have adequate competency	3
A2	Not carrying out a review or inspection of the proposed budget	2
A3	The competence and capacity of PPK in preparing procurement preparation documents (HPS, KAK, technical specifications, contract drafts) is still limited.	4
A4	The preparation of the HPS is not supported by adequate references, market surveys and review processes, so it has the potential to be unreasonable.	2

Code	Risk Agent	Occurrence
A5	The PPK does not review the technical specifications/KAK resulting from the planning stage.	2
A6	Technical specifications/TOR are not available or not clearly formulated	2
A7	The technical specifications do not describe the method of carrying out the work in detail.	2
A8	No assistance or guidance is available in preparing the Terms of Reference (TOR)/Technical Specifications	3
A9	The absence of an inventory of technical specifications as well as Detailed Engineering Design (DED) and Terms of Reference (TOR)	3
A10	Field surveys are not conducted at the planning stage.	2
A11	Detailed Engineering Design (DED) is incomplete or unavailable	2
A12	Planning is not based on adequate feasibility studies or assessments	3
A13	The procurement preparation documents prepared by the PPK (including Technical Specifications/KAK, HPS, Contract Draft, and others) do not comply with statutory regulations and therefore require improvement.	2
A14	The operational workload of PPK in each OPD/Work Unit is quite high	4
A15	The Election Working Group has limited knowledge in preparing election documents in accordance with statutory provisions.	2
A16	The implementation of procurement of goods/services is experiencing obstacles due to the unavailability of derivative regulations, technical guidelines, and SOPs as a follow-up to Presidential Regulation Number 46 of 2025.	3
A17	There are no tender/selection participants who meet the qualification, technical or price requirements to carry out the work.	3
A18	The qualification and technical requirements in the selection documents are too stringent or excessive and are difficult to meet.	2
A19	Tender participants do not have adequate competence in the goods/services procurement process	3
A20	The participants' skilled/expert staff and equipment do not meet the requirements.	2
A21	The implementation of sanctions against participants/providers is still weak	3
A22	The Selection Working Group was not careful in checking the documents and track records of tender participants.	2
A23	is no database available such as an expert database .	3
A24	The Selection Working Group has limited knowledge in conducting bid evaluations.	1
A25	There is an intention or opportunity for all or some participants to engage in unfair business competition practices.	3
A26	Similarities in technical documents and even errors were found in the tender documents of all or some of the participants.	2
A27	All participants' offers are close to the HPS value	2
A28	Several tender/selection participants are under one control	2
A29	Requirements in the qualification document are ambiguous or unclear	1
A30	Business actors are dissatisfied with the results of the Selection Working Group's evaluation	2
A31	The explanation session was not optimally utilized for clarification and alignment of perceptions.	3
A32	Tender/selection participants behave unprofessionally	2
A33	Limited number of PBJ human resources in regional apparatus	2
A34	There are additional requirements in the procurement preparation documents by the PPK	3
A35	PPK has difficulty in blacklisting problematic business actors on the LKPP list due to the many administrative requirements.	3

Code	Risk Agent	Occurrence
A36	The server is down or experiencing technical problems in the electronic procurement system (SPSE)	2
A37	The completeness of the contract documents was not checked properly and did not comply with statutory regulations.	2
A38	Lack of competence in contract management	3

Risk Event	*Risk Agent*																																							*Severity*
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	
E1	3											9																											5
E2		1		9						3																													5
E3			9	9						3																													5
E4					3	9	3	3	3		3																													4
E5								1	1																									3					5
E6									3	9	9	3																												5
E7			9										9	9																										3
E8						3	1				3				9																									4
E9						3	1				3				9																									5
E10																3																								5
E11																			3																		3			3
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E27																					9	3													3					5
E28																																				3				5
E29																																				3				4
E30																																					3	3	5
Occurrence	3	2	4	2	2	2	2	3	3	2	2	3	2	4	2	3	3	2	3	2	3	2	3	1	3	2	2	2	1	2	3	2	2	3	3	2	2	3	
ARP	45	10	288	180	24	150	50	51	96	150	192	180	54	252	234	45	36	162	243	24	135	30	216	45	36	24	24	72	12	24	144	24	24	180	45	96	30	45	
Ranking	21	38	1	7	30	11	20	19	15	11	6	7	18	2	4	21	26	10	3	30	14	28	5	21	26	30	30	17	37	30	13	30	30	7	21	15	28	21	

Figure 1. House of Risk model phase 1

Based on the calculation and ranking of Aggregate Risk Potential (ARP) values, risk agent priorities are determined using the 80/20 Pareto principle. This principle explains that most potential risks generally originate from a small number of dominant risk agents. Therefore, mitigation efforts are focused on risk agents with the highest ARP values, which cumulatively contribute approximately 80% to the total ARP value.

In practice, not all risk agents are given handling actions due to limited resources, time, costs, and differences in the level of risk impact. Thus, this study focuses on handling risk agents that are the main priority. Based on the Pareto diagram in Figure 1, 17 risk agents were identified that are included in the high priority category and contribute approximately 80% to the total ARP value, namely A3, A14, A19, A15, A23, A11, A4, A12, A34, A18, A6, A10, A31, A21, A36, A9, and A28. Therefore, these 17 risk agents are prioritized to be given preventive action to increase the effectiveness of risk control.

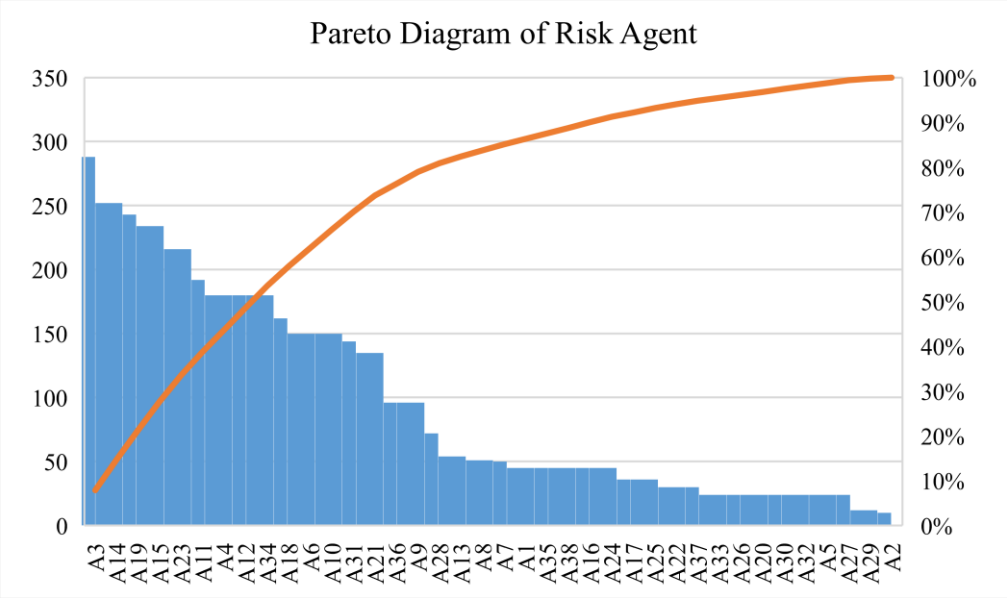

Figure 2. Pareto Diagram of Risk Agents

House of Risk Phase 2

After identifying 17 priority risk agents , a phase 2 HOR analysis was conducted to determine the most effective mitigation strategy. The analysis yielded 37 preventive actions designed to control the agents of priority risks. A complete list of preventive action identification results can be seen in Table 6.

Table 5 List of Preventive Actions

PA Code	Preventive Action	Source
PA1	Requires Commitment Making Officers (PPK) to participate in training and competency certification for procurement of goods/services in accordance with competency standards based on the technical competency dictionary for procurement of goods/services.	[1], [2]
PA2	Carrying out assistance and document reviews by UKPBJ and APIP including supervision of potential discriminatory requirements.	[3], [4]
PA3	Prepare SOPs and standard document templates (HPS, KAK, specifications, contract drafts)	[5], [6]
PA4	Provide performance allowances and remuneration adjusted to the level of competence and risk of the job	[7]
PA5	Implementing rewards and punishments that are oriented towards performance achievement	[8]
PA6	Distribute work packages proportionally based on job analysis and workload analysis guidelines.	[9]
PA7	Form a technical team, expert team/expert staff and support team/support staff to share the PPK workload.	[3], [6]
PA8	Carrying out periodic coaching and outreach to business actors, especially local participants/providers regarding the goods/services procurement process, the impact of losses that can occur in the goods/services procurement process, and sanctions that can be imposed if unfair business competition is carried out.	[2]
PA9	Carrying out competency development of selection working group personnel related to the preparation of selection documents and the selection process	[2]

PA Code	Preventive Action	Source
PA10	Sharing knowledge and discussions between election working groups regarding the preparation of election documents and the election process	[2]
PA11	Compile selection documents based on document templates published by the Government Goods/Services Procurement Policy Agency	[6]
PA12	Carrying out periodic coaching to the election working group regarding refreshing their understanding of the provisions of the election documents and the election process.	[10]
PA13	Develop a database of construction service providers at the national or at least regional level, containing comprehensive information on company profiles, work experience, performance evaluations, ongoing projects, and the expertise they possess and employ. This database must be updated and verified periodically, accessible to the Selection Working Group, and supported by the development of regulations or standard operating procedures (SOPs) governing its management and implementation.	[11]
PA14	Provide budget allocation in planning to support management and operational costs of activities	[7]
PA15	Carrying out DED review by PPK during procurement planning and procurement preparation	[12]
PA16	The PPK and the Selection Working Group carry out a review of the HPS in accordance with applicable provisions before the election process continues.	[7]
PA17	Providing technical guidance to PPK regarding HPS preparation standards for construction work	[7]
PA18	Increase the availability of references and literature related to market intelligence and various other market analysis methods.	[2]
PA19	Identifying needs as an initial stage before entering the advanced planning stage.	[13]
PA20	Involve a team of experts or competent personnel in implementing the planning	[6], [13]
PA21	Carry out a tiered review of Technical Specifications/TOR before implementing the procurement process	[7]
PA22	Developing Technical Specification/TOR standards for construction services	[7]
PA23	Prepare technical specifications/TOR based on identification of end user needs and supplemented with technical validation by a multidisciplinary team to ensure clarity and relevance.	[14]
PA24	Allocate sufficient time for providing explanations (aanwijzing) so that all questions can be accommodated and answered properly.	[15]
PA25	The Selection Working Group can request assistance from a team of experts or expert staff/PPK/KPA/PA to attend and answer questions from participants so that the explanation session can be utilized optimally.	[6]
PA26	Requires PPK to monitor and evaluate provider performance periodically by utilizing the Provider Performance Information System (SiKaP) application organized by LKPP.	[16]
PA27	Implementing strengthening of internal supervision and compliance audits	[3]
PA28	Require PA/KPA to consistently impose blacklist sanctions on business actors who have problems or poor performance based on the proposals of the PPK/Selection Working Group .	[16]
PA29	Create SOPs regarding procedures for determining blacklist sanctions for participants/providers	[5], [16]
PA30	Conduct regular training to improve IT team capacity and preparedness in dealing with system disruptions.	[17], [18]
PA31	Prepare SOPs or emergency procedures (contingency plans) to deal with certain conditions such as technical disruptions to the system.	[5], [16]

PA Code	Preventive Action	Source
PA32	Implementing data backup mechanisms and increasing system capacity to prevent overload at the time of the bid submission deadline, as well as carrying out regular server maintenance.	[14]
PA33	Carrying out digital documentation to ensure accountability and support the development of a digital archive system.	[14], [19]
PA34	Creation of guidelines or standardization of document control specifically for construction services	[5], [20]
PA35	Carry out regular document audits	[21]
PA36	Carrying out probity audits by APIP to prevent the occurrence of Corruption, Collusion and Nepotism (KKN) practices	[2]
PA37	Checking participant access logs, checking for duplication of owner/administrator and expert data submitted by participants in the same package in the SPSE and SiKaP applications	[6]

Source:

[1] : Regulation of the Government Goods/Services Procurement Policy Agency of the Republic of Indonesia Number 7 of 2021 concerning Human Resources for Procurement of Goods/Services

[2] : Procurement of Goods/Services Section of the National Cyber and Crypto Agency (2020)

[3] : Presidential Regulation of the Republic of Indonesia Number 16 of 2018 concerning Government Procurement of Goods/Services

[4] : Circular Letter of the Head of the Government Goods/Services Procurement Policy Agency of the Republic of Indonesia Number 5 of 2022 Concerning the Affirmation of the Prohibition on Adding Qualification Requirements for Providers and Technical Requirements in the Selection Process for Government Goods/Services Procurement

[5] : Regulation of the Minister of State Apparatus Empowerment and Bureaucratic Reform of the Republic of Indonesia Number 35 of 2012 concerning Guidelines for the Preparation of Standard Operating Procedures for Government Administration

[6] : Regulation of the Government Goods/Services Policy Agency of the Republic of Indonesia Number 12 of 2021 concerning Guidelines for the Implementation of Government Goods/Services Through Providers

[7] : Mamesah et al. (2022)

[8] : Tua et al. (2025)

[9] : Regulation of the Minister of State Apparatus Empowerment and Bureaucratic Reform of the Republic of Indonesia Number 1 of 2020 concerning Guidelines for Job Analysis and Workload Analysis

[10] : Procurement of Goods/Services Section of the Denpasar City Regional Secretariat (2021)

[11] : Kusumarukmi (2018)

[12] : Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia Number 14 of 2020 concerning Standards and Guidelines for Procurement of Construction Services Through Providers

[13] : Regulation of the Republic of Indonesia Government Goods/Services Procurement Policy Agency Number 11 of 2021 concerning Guidelines for Government Goods/Services Procurement Planning
[14] : Saraswati et al. (2025)
[15] : Fairuz & Batu (2024)
[16] : Regulation of the Government Goods/Services Procurement Policy Agency Number 4 of 2021 concerning Guidance for Government Goods/Services Procurement Business Actors
[17] : Law of the Republic of Indonesia Number 20 of 2023 concerning State Civil Apparatus
[18] : Maulana (2025)
[19] : Regulation of the National Archives of the Republic of Indonesia Number 6 of 2021 concerning Electronic Archives Management
[20] : Government Regulation of the Republic of Indonesia Number 28 of 2012 concerning the Implementation of Law Number 43 of 2009 concerning Archives
[21] : Regulation of the National Archives of the Republic of Indonesia Number 6 of 2019 concerning Archival Supervision

Next, an assessment of the correlation between preventive actions and the agent of the risk was conducted. This correlation was assessed using a scale of 0, 1, 3, and 9. A value of 0 indicates no correlation, and a value of 9 indicates a strong correlation. The effectiveness of this correlation was assessed through focus group discussions (FGDs). After determining the correlation, the effectiveness of preventive actions was calculated based on the total multiplication of the ARP value of the risk agent and the correlation value of the effectiveness between the preventive actions and the related risk agent . To assess the difficulty level of preventive actions, each preventive action was grouped into three categories: a scale of 3 for low difficulty, a scale of 4 for medium difficulty, and a scale of 5 for high difficulty. This difficulty level reflects the amount of resources required to implement the preventive action. Finally, the prioritization of preventive actions was based on the Effectiveness to Difficulty Ratio (ETDk), which is the ratio between the effectiveness of the measure and the difficulty of its implementation. The overall calculation can be seen in Figure 3.

Risk Agent	*Preventive Action* (PAk)																																			ARP
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
A3	9	1	1	1	9																																	288
A14				1	1	9	9																															252
A19								9																														243
A15									9	3	9	3																										234
A23													9																									216
A11	3													3	9																							192
A4	9															9	9	9																				180
A12	3													3					9	9																		180
A34	9	9																																				180
A18	9	9																																				162
A6	9													3							9	9	9															150
A10														3						3																		150
A31																								9	9													144
A21																										9	3	9	9									135
A36																														9	9	9						96
A9																																	9	9	3			96
A28								3																												9	9	72
TEk	9756	3366	288	540	2844	2268	2268	2403	2106	702	2106	702	1944	2016	1728	1620	1620	1620	1620	2070	1350	1350	1350	1296	1296	1215	405	1215	1215	864	864	864	864	864	288	648	648	
Dk	4	3	3	5	4	4	4	3	4	3	3	3	4	5	4	3	3	3	3	4	3	3	4	3	3	4	4	4	3	4	4	5	3	3	3	4	3	
ETDk	2439	1122	96	108	711	567	567	801	526,5	234	702	234	486	403,2	432	540	540	540	540	517,5	450	450	337,5	432	432	303,75	101,25	303,75	405	216	216	172,8	288	288	96	162	216	
Ranking	1	2	36	34	4	6	6	3	12	27	5	27	14	21	17	8	8	8	8	13	15	15	22	17	17	23	35	23	20	29	29	32	25	25	36	33	29	

Figure 3. House of Risk Model Phase 2

CONCLUSION

This study identified 30 risk events in the implementation of *Risk Management in The Conduct of Tenders and Selection of Construction Services in Klungkung Regency*, consisting of 2 risks at the procurement planning stage, 4 risks at the procurement preparation stage, 4 risks at the provider selection preparation stage, 19 risks at the provider selection implementation stage, and 1 risk at the contract signing stage. The identification results also showed 38 risk agents contributing to the occurrence of these risks. Based on the House of Risk (HOR) Phase 1 analysis and Pareto diagram, 17 priority risk agents were identified for further mitigation.

The highest-priority risk agent was A3, namely the limited competence and capacity of the Commitment-Making Officer (PPK) in preparing procurement documents (HPS, KAK, technical specifications, and draft contracts), with an Aggregate Risk Potential (ARP) value of 288. The lowest-ranked priority agent (17th) was A28, namely multiple tender/selection participants being under a single control, with an ARP value of 72 and a cumulative ARP percentage of 80.88%.

Furthermore, the HOR Phase 2 analysis produced 37 preventive actions focused on controlling the 17 priority risk agents. The highest-priority preventive action, based on the Effectiveness to Difficulty Ratio (ETDk), was requiring Commitment-Making Officers (PPK) to participate in procurement training and competency certification aligned with competency standards guided by the procurement technical competency dictionary (PA1), with an ETDk value of 2,439. This indicates that strengthening procurement human resource competence is a key factor in controlling risks in tender implementation and construction service selection.

Therefore, the Klungkung Regency Government, through the Procurement Services Unit (UKPBJ) and relevant regional apparatuses, needs to strengthen structured risk management at every stage of procurement, optimize the implementation of Klungkung Regent Regulation Number 9 of 2021 concerning Guidelines for Regional Government Risk Management, and enhance procurement human resource competence and coordination through training, certification, mentoring, and periodic evaluation. Further research is recommended to develop alternative risk analysis methods and expand the scope of analysis by increasing respondents or conducting comparative studies across regions to produce more comprehensive findings.

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