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Evaluation of the Implementation of Integrated Design and Build Construction Contracts Based on LKPP Regulation No. 12 of 2021 Based on Contract Management Body of Knowledge and Risk Minimizing Dispute Claims from the Service Provider's Perspective

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Abstract

Infrastructure development in Indonesia is key to improving connectivity and equitable development, although it often faces project management challenges such as errors in contract documents that trigger disputes. The government has adopted the Design and Build method to accelerate construction and reduce design errors, but this method often creates more disputes than conventional methods. This study evaluates the implementation of the Integrated Design and Build Contract system in government projects based on LKPP Regulation No. 12 of 2021 and the Contract Management Body of Knowledge (CMBOK) 7th Edition, focusing on integrating contract management processes and risk analysis. Through questionnaires, expert interviews, and statistical data analysis, this study identified 10 significant high-risk risks, such as incorrect selection of design consultants, inaccurate cost estimates, and frequent design changes, although unidentified utility risks were not proven to be significant to disputes. The results of the study provide strategic recommendations to improve the effectiveness of the contract system, reduce disputes, and support the performance of infrastructure projects in Indonesia.

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1 Introduction

Infrastructure development plays a crucial role in driving economic growth and increasing global competitiveness, especially for Indonesia as an archipelagic country with diverse geographical characteristics. The government has allocated an infrastructure budget of IDR423.4 trillion in the 2024 State Budget, reflecting a 6% increase compared to the previous year. This policy is aimed at supporting the development of the Indonesian Capital City (IKN), improving regional connectivity, food security, and basic infrastructure services. As a result, Indonesia's infrastructure competitiveness ranking has shown a significant increase, from 71st in 2018 to 51st in 2023, as recorded in the IMD World Competitiveness Booklet. However, to meet the demands of increasingly complex needs and project completion targets, innovation is needed in the procurement and project management system.

One approach that is starting to be widely used is the Integrated Design and Build Contract system, which offers integration between design and construction to increase time efficiency and project flexibility. This approach has been proven to be 12% faster than conventional methods, although it tends to increase costs by up to 6% per square meter of work (Rostiyanti et al., 2019). However, research shows that this system can trigger more disputes than conventional methods, with key factors such as incomplete designs, sudden change instructions, and lack of clarity of contractual responsibilities. This indicates the need for a thorough evaluation of the application of this system, especially in government infrastructure projects that have more complex risk characteristics than private projects (Lu et al., 2015; Lee et al., 2016).

Dispute in construction projects have significant negative impacts, including decreased infrastructure competitiveness, financial losses, work delays, and damage to relationships between stakeholders. Based on previous research, suboptimal contract management is one of the main causes of disputes in Design and Build-based projects (Elziny et al., 2016). Therefore, this study aims to evaluate the implementation of the Design and Build Integrated Contract system in government infrastructure projects, by referring to the Contract Management Body of Knowledge (CMBOK) and risk management framework (Turner & Simister, 2001; Abdel-Khalek et al., 2019). The expected results are strategic recommendations to minimize risks and disputes, thereby supporting the success of infrastructure projects in Indonesia more effectively. The objectives of this research are as follows identifying the stages and processes of managing the Integrated Design and Build Contract based on LKPP Regulation No. 12 of 2021 from the Service Provider's Perspective, identifying stages and processes in Contract management based on CMBOK 7th Edition from a Service Provider's Perspective, identifying outputs from Contract management processes and activities based on CMBOK 7th Edition and LKPP Regulation No. 12 of 2021, identifying risk factors from each process in the management of Integrated Design and Build Contracts based on LKPP Regulation No. 12 of 2021 based on CMBOK 7th Edition which has an impact on the occurrence of disputes, developing a model that describes the relationship between risks in the management of Integrated Design and Build Contracts and disputes, and developing the Integrated Design and Build Contract management process based on LKPP Regulation No. 12 of 2021 referring to the risk-based CMBOK 7th Edition.

Literature Review
Design Build Contract

In a Design Build project, the contractor is responsible for the design and construction based on the project brief from the client. Design Build projects are undertaken when a high degree of cost certainty is required at the time of contract award and when increased constructability is required (Rajaratnam et al., 2022).

LKPP Regulation No. 12 of 2021

The Government Goods/Services Procurement and Policy Agency (LKPP) issued Agency Regulation Number 12 of 2021 concerning Guidelines for the Implementation of Government Goods/Services Procurement Through Providers, which revokes Agency Regulation Number 9 of 2018 concerning Guidelines for the Implementation of Government Goods/Services Procurement Through Providers. Goods/Services (Smith & Kumar, 2004; Goodale et al., 1997).

Based on Article 2 of LKPP Regulation Number 12 of 2021, the Guidelines for the Implementation of Government Procurement of Goods/Services through Providers include:

1) Preparation of Procurement of Goods/Services;
2) Preparation for Supplier Selection;

3) Implementation of provider selection through Tender/Selection;
4) Preparation and implementation of Supplier selection through E-purchasing, Direct Appointment, Direct Procurement and Fast Tender;
5) Consolidation;
6) Contract Execution;
7) Handover; and
8) Provider Performance Assessment.

Contract Management Body of Knowledge (CMBOK) 7th Edition

A contract is a legally enforceable agreement for the sale, purchase, or lease of products, goods, supplies, or services; or the construction, alteration, or improvement of property. Contract Management is the act of contract managers to develop solicitations, develop bids, form contracts, execute contracts, and close contracts. Contract Management integrates the processes used to manage contracts throughout the contract lifecycle while ensuring customer satisfaction (NCMA, 2023).

CMBOK serves to provide a general understanding of the terminology, practices, policies, and processes used in contract management. The competency system contained in CMBOK as seen in Figure 2 displays an interactive relationship system between core competencies and course materials.

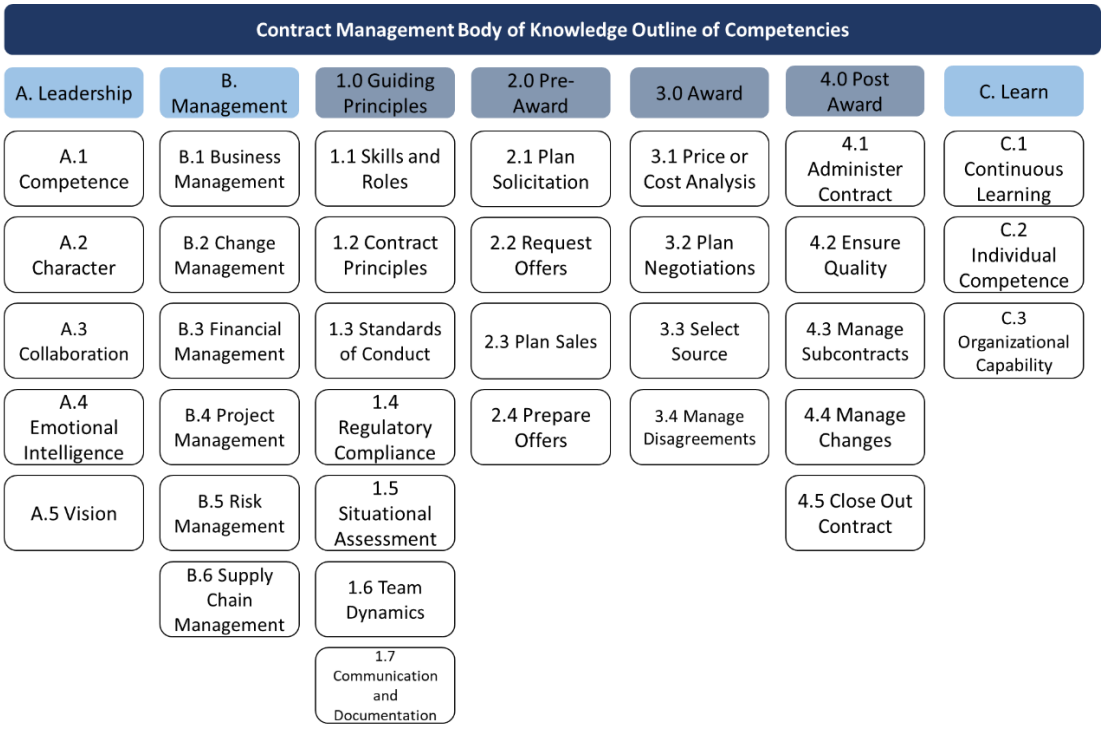

Figure 1. CMBOK Outline of Competencies

Dispute

Dispute is defined as a situation where two parties, usually the Service User and the Service Provider, do not agree on the assertion of a contract right, resulting in a determination issued by the Service User by the process specified in the contract resulting in a contract decision becoming a formal dispute and found to occur due to many factors (Arcadis, 2023). Dispute arises when the other party rejects a claim or statement made by one of the parties (Kumaraswamy, 1997).

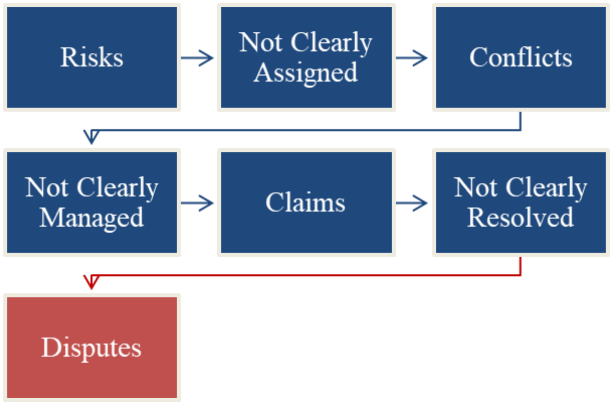

Figure 2. Risk, Conflict, Claims and Dispute

Riskin Design and Build Contract Management

Design Build Contracts are susceptible to several risks. Some of these risks are borne by the Contractor and the Service User individually but in some cases are borne jointly by both parties (Ogunsanmi et al., 2011). In Design-Build Contracts, this method of contract transfers more risks to the contractor than other construction contracts (Seng & Yusof, 2006; Lenferink et al., 2013).

2 Materials and Methods

The following are the research stages arranged by the author in conducting this research. These stages describe the workflow applied to answer the research objectives that have been explained previously.

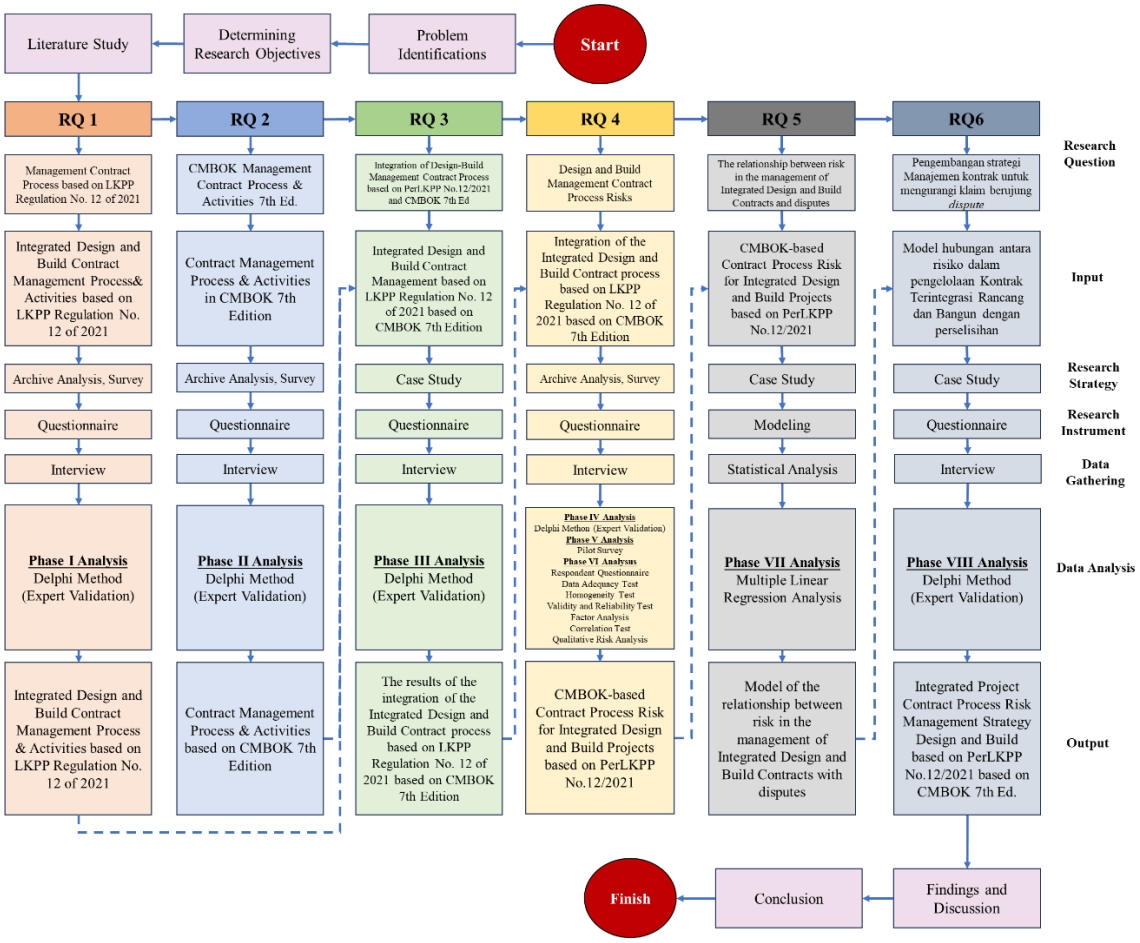

Figure 3. Research Process Flowchart

3 Results and Discussions

A. Process Activities or Stages in Integrated Design and Build Contract Management in Government Construction Projects Based on LKPP Regulation No. 12 of 2021 from the Service Provider's Perspective

Based on the results of the analysis of the Integrated Design and Build Contract management process in Government Construction Projects based on LKPP Regulation No. 12 of 2021, as well as validation with experts, it was found that:

1. Key Stages from a Service Provider's Perspective
   Of the 6 (six) stages regulated in the regulations, only 3 (three) stages are considered relevant from the Service Provider's point of view, namely:
   a) Selection Implementation: Focuses on the competition process, from preparation of tender documents to evaluation.
   b) Contract Execution: This is the core of work implementation which involves managing design, construction, time, cost and quality.
   c) Handover of Work Results: The final stage which includes completion of the Service Provider's responsibilities and handover of project results to the Service User.

2. Stages Not Considered Part of Contract Management by Service Providers
   The procurement planning, procurement preparation, and selection preparation stages are not included in contract management from the service provider's perspective because:

a) The main focus is on the duties and responsibilities of the Service User.
b) There is no direct role or risk faced by the Service Provider at this stage.
c) This process is more administrative and supports the implementation of procurement from the Service User's side.

B. Stages and Processes in the Contract Management Process based on the Contract Management Body of Knowledge (CMBOK) 7th Edition

Based on the results of Research Question 2, regarding the stages and processes in the Contract Management Process based on the Contract Management Body of Knowledge (CMBOK) 7th Edition, 3 (three) processes were obtained which were reviewed from the Service Provider's perspective, namely:

1. Pre-Award Process: includes preparation of contract bidding documents and strategies. The main focus is to strategically prepare the request and bidding documents to suit the needs of the Service User.
2. Award Process: includes contract formation through negotiation activities, resource evaluation, and management of potential disputes or differences of opinion.
3. Post-Award Process: the contract execution stage involving quality management, subcontractor management, and contract closing.

C. Integration of Output from Contract Management Processes and Activities based on Contract Management Body of Knowledge (CMBOK) 7th Edition and LKPP Regulation No. 12 of 2021

Based on the results of Research Question 1 related to the implementation of the identification of the Integrated Design and Build Contract Management Process based on LKPP Regulation No. 12 of 2021 from the perspective of the Service Provider and Research Question 2 related to the implementation of the identification of the Integrated Design and Build Contract Management process based on CMBOK 7th Edition, an integration of the outputs of the process and activities based on the results of Research Question 1 and Research Question 2 was carried out (Wu et al., 2019). After expert validation was carried out, it was found that all variables had a total of 73 objectives and outputs in each activity.

D. Risk Factors of Each Integrated Contract Management Activity Design and Build based on LKPP Regulation No. 12 of 2021 based on Contract Management Body of Knowledge (CMBOK) 7th Edition

Based on the results of the risk analysis, it can be seen that the risks included in the high-risk category are X4.1, X4.2, X4.3, X5.2, X5.10, X5.12, X5.15, X5.21, X5.38, and X6.1. The 10 (ten) variables come from 3 (three) different management processes, namely Selection Implementation, Contract Implementation, and Handover of Work Results.

Table 1
Risk Category and Value

Contract Process	Code	Risk Potential	Risk Category and Value
Implementation of Elections	X4.1	Mistake in selecting a Design Consultant / Design Consultant with little experience	High
	X4.2	Inadequate risk identification/allocation	High
	X4.3	Responsibility for inaccurate cost estimates and risk of cost overruns	High
Contract Execution	X5.2	Frequent changes to the design	High
	X5.10	Lack of experience of contractor staff in implementing Design and Build Contracts	High
	X5.12	Rework and modification of construction	High
	X5.15	Deviation between specification and implementation	High
	X5.21	Errors and or omissions in contract documents	High
	X5.38	Unidentified utility	High
Handover of Work Results	X6.1	The construction process was poorly managed, resulting in the quality of the contractor's work not	High

Contract Process	Code	Risk Potential	Risk Category and Value
		being up to the service user's criteria and specifications, thus hampering the implementation of the handover.	

E. Relationship Model between Risk in Integrated Design and Build Contract Management with Dispute
After conducting a factor analysis and regression analysis, the relationship between the dependent variable and the independent variable was obtained:

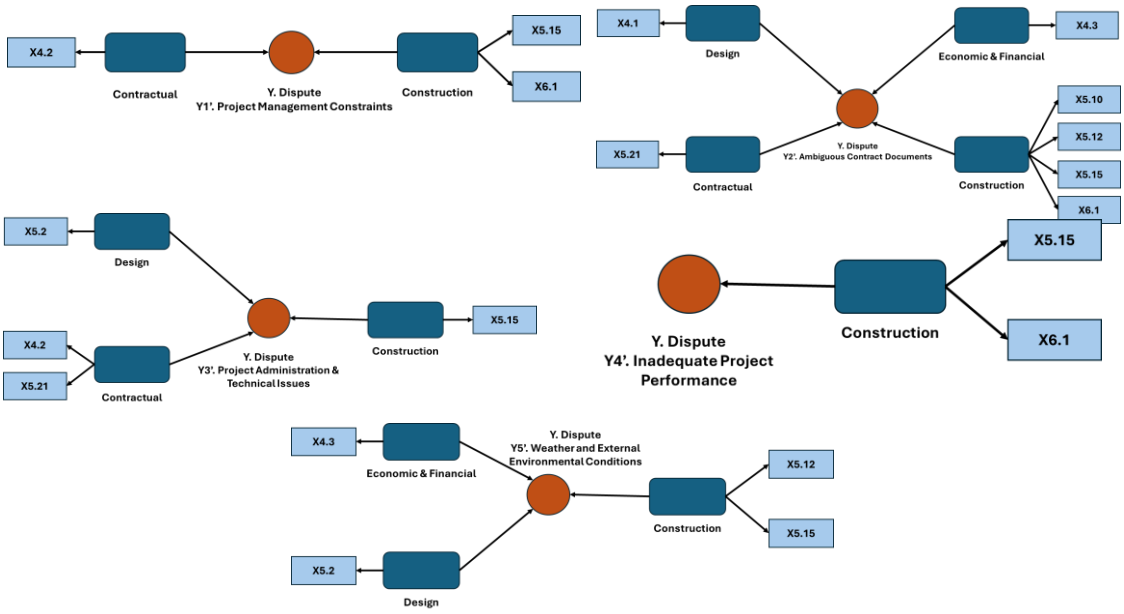

Figure 4. Relationship Between the Dependent Variable and the Independent Variable

F. Integrated Design and Build Contract Management Strategy based on LKPP Regulation No. 12 of 2021 Referring to the Contract Management Body of Knowledge (CMBOK) 7th Edition based on Risk

1. Mistakes in Selecting a Design Consultant
   The selection of competent service providers refers to the "Select Source" competency of CMBOK. Design consultants must have satisfactory performance, relevant technical skills, and integrity according to applicable laws. Evaluation techniques based on non-cost factors and digital-based documentation can increase the objectivity of the process.
2. Inadequate Allocation Risk
   The CMBOK “Risk Mitigating” based approach emphasizes the importance of knowledge about customers, competitors, and the organization to proactively manage risk.
3. Responsibility for Inaccurate Cost Estimates and Cost Overrun Risk
   Inaccurate cost estimates often lead to project cost overruns. Price analysis focuses on evaluating the final price based on market or list price comparisons. Meanwhile, cost analysis evaluates detailed elements, including direct, indirect, fixed, and variable costs, to ensure fair pricing. Techniques such as parametric estimating, price trend analysis, and labor or material hour evaluation can improve the accuracy of estimates and the efficiency of contractor management.
4. Frequent Design Changes
   Optimizing initial planning documents using Building Information Modeling (BIM) and digital platform-based change order procedures helps reduce unnecessary design changes.
5. Lack of Contractor Staff Experience
   Professional development of staff through training in contracting, risk management, and complex negotiations is a priority to increase the capacity of project implementers.
6. Construction Rework and Modifications

Early design audits, periodic inspections based on Quality Control Plans, and the use of technology such as drones help reduce rework.

7. Errors in Contract Documents
   Validation of contract documents with cross-functional teams and the use of standard templates based on FIDIC and LKPP minimizes ambiguity.
8. Specification and Implementation Deviations
   Regular coordination and progress monitoring based on digital platforms ensure alignment between specifications and implementation.
9. The construction process was poorly managed, resulting in the quality of the contractor's work not being by the service user's criteria and specifications, thus hampering the implementation of the handover.
   Sub-specification quality of work is often caused by poor construction management, delaying the handover process. An effective contract-closing process requires:
   a) Consistent Process: Clear guidelines for employee responsibilities.
   b) Early Planning: Determining closing requirements at the outset.
   c) Organized Filing: A filing system that simplifies the closing process.
   d) Complete Documentation: Provision of neat documents to minimize obstacles.
   e) Problem Resolution: All issues are resolved before the contract ends.
   f) Proactive Approach: Verify completeness of contracts and policy flexibility for special situations.
   g) Backlog Management: Handling backlog in stages with realistic schedules.

4 Conclusion

The study identified three variables in the Integrated Design and Build Contract management process according to LKPP Regulation No. 12 of 2021 from the service provider's perspective, namely: 1) Implementation of Selection, 2) Contract Implementation, and 3) Handover of Work Results. Based on the Contract Management Body of Knowledge (CMBOK) 7th Edition, there are three variables of the contract management process from the service provider's perspective, namely: 1) Pre-Award Process, 2) Award Process, and 3) Post-Award Process. The integration process between LKPP Regulation No. 12 of 2021 and CMBOK 7th Edition resulted in 73 objectives and outputs in the management of Integrated Design and Build Contracts. Expert validation and analysis of respondent questionnaires identified 41 risks, with 10 risks in the high-risk category, including incorrect selection of design consultants, inadequate risk identification/allocation, inaccurate cost estimates, design changes, lack of staff experience, construction rework, specification deviations, contract document errors, unidentified utilities, and poor construction management. Analysis shows that unidentified utility risks are not significant to disputes in contract management, indicating effective risk management or the influence of other, greater factors. The development of the Integrated Design and Build Contract management process based on LKPP Regulation No. 12 of 2021 and the 7th Edition of CMBOK is carried out through preventive actions. This includes the addition and updating of 9 activity outputs based on literature studies and expert validation (Mesa et al., 2016).

Conflict of interest statement
The authors declared that they have no competing interests.

Statement of authorship
The authors have a responsibility for the conception and design of the study. The authors have approved the final article.

Acknowledgments
As a development, further research is recommended to:

a. Referring to LKPP Regulation No. 4 of 2024 as a regulatory update, to ensure relevance with the latest policies.
b. Exploring the Service User's perspective to provide a more comprehensive understanding of the dynamics and risks in contract management.

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