

Development of Business Process Based on Risk in Procurement Process of High-Rise Vertical Housing to Improve Performance Time in The Ministry of Public Works and Housing

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ABSTRACT

The implementation of the construction of vertical housing has a record that there are still many experience delays in completing work. One of the contributing factors is the imperfect procurement process. Therefore, it is necessary to develop business processes in the procurement process. This study aims to develop a business process base on risk in the process of procuring high-rise vertical housing to improve performance time. Qualitative risk analysis is carried out to determine the highest risk and use the risk response to analyze its business process development actions. The results obtained are in the form of the highest risk in the procurement process and the development of the procurement business process.

Keywords: Business Process, Procurement Management, High-Rise Vertical Housing, Risk Management

JEL Classification Codes: M10, M19, M11

INTRODUCTION

Every citizen of the Republic of Indonesia has the right to get a good and healthy place to live as mandated in the 1945 Constitution and Article 28 H of the 1945 Amendment to the 1945 Constitution. A house or a place to live is a basic human need in increasing dignity, quality of life and livelihood, and as a personal reflection in an effort to improve the standard of living, the formation of character, character and personality of the nation (Prayitno & Kindangen, 2019).

A house or a place to live is a basic human need in increasing dignity, quality of life and livelihood, as well as a personal reflection in an effort to improve the standard of living, the formation of character, and personality of the nation. Currently, there are still 61.7% of households occupying inadequate housing based on four aspects of feasibility in building resilience, floor area per capita, drinking water and sanitation where most of them live in slums (Ministry of National Planning, 2017).

The rapid growth in urban areas due to natural growth and urbanization has led to an increase in the demand for housing in urban areas. However, limited land is a crucial challenge faced in the effort to fulfill decent and affordable housing. Low-income people need a place to live near their place of work which causes them to live in uninhabitable housing and some even live-in slums or illegal settlements (Ministry of National Planning, 2020).

In order to fulfill the housing needs, the Government through the Directorate General of Housing, Ministry of Public Works and Public Housing cumulatively with the

participation of all stakeholders, with the implementation of the One Million Houses Program which was launched by the President of the Republic of Indonesia Joko Widodo in 2015 (Ministry of Communication and Informatics, 2016). In the 2015-2019 period, it has succeeded in building 4,800,170 livable housing units in the success of the program (Directorate General of Housing, 2020).

One of the implementation activities of the program is the construction of vertical housing to meet the needs of livable and healthy houses for every community in Indonesia. With limited availability of land in urban areas, high-rise vertical housing is a solution to meet the needs of decent housing (Anggita, 2020). The vertical housing is a building that has strategic value as a form of government responsibility in housing management where the implementation is carried out in an orderly and regular manner so that it can play a role in improving the social and economic standard of living of the community

According to the Law of the Republic of Indonesia Number 20 of 2011 concerning vertical housing, vertical housing are multi-story buildings that are built in an environment divided into functionally structured parts, both horizontally and vertically and are units that each can be owned and used separately, especially for dwellings that are equipped with a shared share of shared objects and shared land. According to the Regulation of the Minister of Public Works Number 05 of 2007 concerning technical guidelines for the construction of simple high-rise vertical housing, high-rise simple vertical housing is simple vertical housing with more than 8 floors and a maximum of 20 floors.

High-rise vertical housing is more multifunctional where the design on the 1 (one) to 3 (three) floors below is a non-residential area. The area is used as a place for vertical housing facilities and infrastructure, including commercial areas, school/educational areas, parking lots, shared areas, etc. This is what distinguishes high-rise vertical housing from other vertical housing that have been built previously.

The Ministry of Public Works and Housing has carried out several constructions of high-rise vertical housing, especially in the province of DKI Jakarta. Based on the report of the Housing Development Work Unit, it was also conveyed that the construction work for the vertical housing had a delay in the completion of the work. Constraints that result in delays in completing work are caused by factors in each procurement process, including the planning process, the selection process and also the process of implementing the work.

Based on the report of the housing development work unit, it was submitted that the obstacles that occur include the following (Housing Development Work Unit, 2020):

1. The land for which the high-rise vertical housing will be constructed is not yet mature or ready to build;
2. The construction permit process has just started during the execution of the work;
3. The length of the selection process carried out by the Procurement Committee/Procurement Working Group;
4. Many changes were made by the licensing party so that a design review was needed by the planner;
5. Social problems around the construction area of high-rise vertical housing.

Between the results of the procurement implementation and the quality of the results of the work, there is an inseparable red thread (Wiyana, 2012). Both directly and indirectly, procurement performance will affect the performance of work implementation (Oktaviani, 2015). So that to improve the quality of a work, it is

necessary to ensure that the performance of the procurement of work goes as planned.

A good procurement system will produce output that is in accordance with the specifications and desires of the job owner and has assurance in the suitability of price, quality, and time (Susanto & Makmur, 2013). The effectiveness and efficiency of the process carried out will have a significant impact on the success or failure of a work implementation. While Poor procurement systems can result in time delays, cost increases, poor results, delays in utilization for customers (Oktaviani, 2015). With the delay in the completion of the implementation of high-rise vertical housing, it also results in delays in the utilization of vertical housing by users.

Indonesia is currently facing a high demand for construction projects. With the increasing number of construction projects, especially building projects, if they are not supported by the ability to complete the work, it can result in delays and less effective working time (Suryani & Riantini, 2019).

According to Presidential Regulation Number 16 of 2018 concerning Government Procurement of Goods/Services, Procurement of Goods/Services is an activity of procuring goods/services by Ministries/Institutions/Regional Apparatuses financed by the State Budget/Regional Budget whose process begins with the identification of needs, until the handover of the work. In general, the business process in the procurement process for government goods and services consists of several stages, namely the procurement planning stage, the procurement preparation stage, the selection preparation stage, the selection implementation stage, the procurement implementation stage, and the handover stage.

With the obstacles that arise in the construction of high-rise vertical housing, there are obstacles that arise in the procurement business process, this research will develop a risk-based business process where by recognizing the risks that can occur so that development actions can be pursued to be able to avoid risks that have a negative impact in the future. Related to the obstacles that occur in the procurement of high-rise vertical housing that have been held, it is necessary to evaluate and develop business processes in the procurement process for high-rise vertical housing in order to provide an overview of the dominant/highest factors in the procurement process and obtain strategic in dealing with the risks that occur in order to improve procurement performance which results in an increase in the performance of the implementation of high-rise vertical housing. The results of this study are expected to provide benefits for the parties involved in the procurement of high-rise vertical housing in general and for the Directorate General of Housing, Ministry of Public Works and Housing in particular in the timely implementation of the procurement of high-rise vertical housing.

RESEARCH METHOD

Before carrying out the research process, researchers must carry out a preparatory stage including collecting or searching for project data. Searching for data can be carried out both on the owner, planning consultant, and contractor who handles the project. After getting the project data, the researcher conducted a survey to the project site to get an overview of the conditions in the field. In addition, researchers conducted a literature study either through books, journals, internet media, and other regulations that can be used as reference material and additional knowledge.

The research method aims to determine and explain the right method to answer the problems in this research, namely regarding the analysis of risks that occur, and how to handle them. The research method determines how the research process is

carried out starting from data collection, processing data into information for analysis and finally finding a conclusion that can be drawn.

The operational model of research in this study is illustrated in Figure 1. below. The research operational model describes the relationship between variables, namely variable X is a variable that affects variable Y, namely: The process of procuring high-rise vertical housing and risk management. While the Y variable is the variable that is influenced by the X variable, and in this study the Y variable is the Procurement Performance.

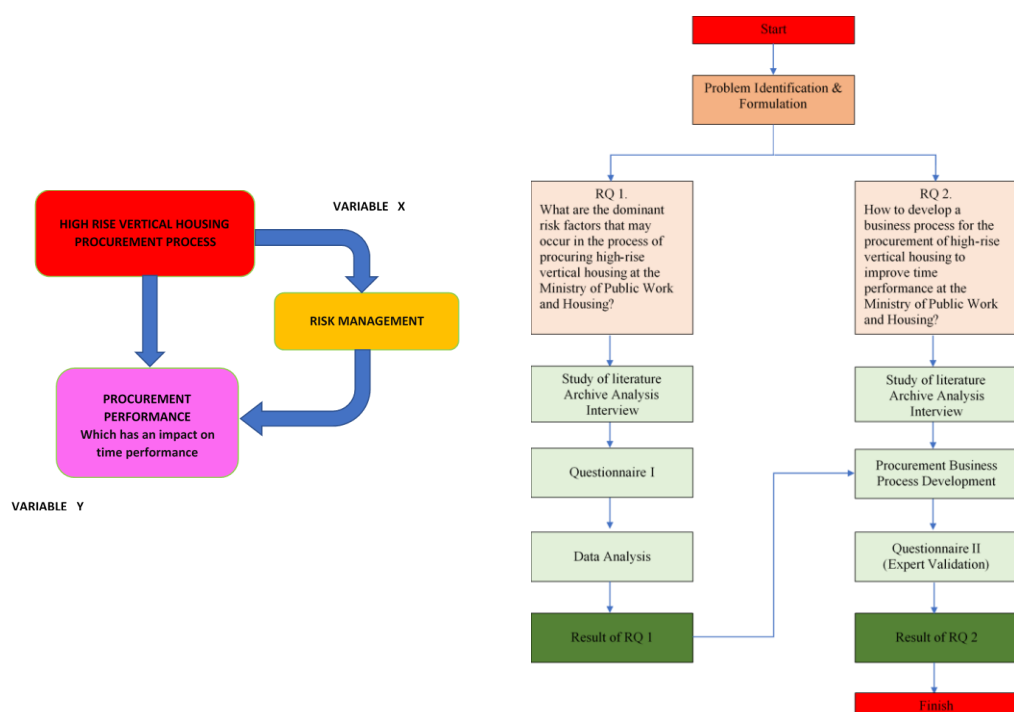
This research is a qualitative research. In order to answer research questions in this study using research instruments in the form of literature studies, archive analysis, questionnaires and interviews. The flow chart of the research process is shown in Figure 1 below.

In this study, the measurement scale used is the Likert scale. Likert scale which measures the frequency and impact of each risk factor with a scale value of 1 to 5, provided that 1 is the lowest scale, while 5 is the highest scale.

In the data analysis, identification of activities/activities in the procurement process, risk events that may occur in the procurement process is carried out by means of a literature study and archival records or documents related to the construction of high-rise vertical housing at the Ministry of Public Works and Public Housing for the last 5 years.

The results of the questionnaire carried out a qualitative risk analysis. The risk analysis is determined by the scale of determining the frequency (probability) and impact of the risks that have been identified previously. The results of the first questionnaire were analyzed with a probability and impact matrix so that the highest risk factor was obtained by multiplying the frequency (probability) value with the impact on each risk factor so that later a risk rating would be obtained.

Figure 1. The Operational Model of Research and The Flow Chart of Research



At the final stage, discussions were held regarding preventive actions that could be taken against the dominant/highest risk factors to the development of business processes in the procurement process and validation by experts to be used as recommendations for development of business processes in the procurement process for high-rise vertical housing

RESULTS AND DISCUSSION

The collection of the data obtained from the study of literature, journals, previous studies related to this research, archive analysis, questionnaires and interviews. The references used in determining these variables are, previous research (Desiyandri, 2016; Okifitriana, 2020; Prameiswari, 2014; Wijayanti, 2016) that has been carried out, Ministerial of Public Work and Housing Regulation No. 1 of 2018 and No. 14 of 2020 as well as from analysis of document archives for high-rise vertical housing on the Friday Market vertical housing, President Security Force vertical housing, Grass Market vertical housing and Wisma Athletes vertical housing. The data collection obtained research variables as many as 106 research variables.

The research variables were processed into a questionnaire that was distributed and got 25 respondents who had answered the prepared questionnaire. The characteristics of the respondent's profile data in this study can be seen in 4 (four) categories, namely the category of gender, age, experience and last education. The characteristic of the respondent, there is most of them is male for 76%, aged 31-40 years for 60%, works experienced 6-10 years for 52% and last education it is bachelor's degree for 76%. The results of these characteristics can be seen in the following tables.

Table 1. The Characteristics of Respondents Base on Gender, Age, Time Experience and Last Education.

Gender	Frequency	Percentage
Man	19	76%
Woman	6	24%
Age	Frequency	Percentage
21-30 years	4	16%
31-40 years	15	60%
41-50 years	3	12%
51-60 years	3	12%
Time of Experience	Frequency	Percentage
<5 years	3	12%
6-10 years	13	52%
11-15 years	4	16%
16-20 years	1	4%
>20 years	4	16%
Last Education	Frequency	Percentage
Associate Degree	1	4%
Bachelor's Degree	19	76%
Master's Degree	5	20%

After the data is collected from the respondents, the magnitude of the risk is analyzed qualitatively which is obtained from the frequency assessment and the

impact assessment of the risk variables with the *mean* value on the frequency and impact of the risk. The formula for the *mean* as follow below.

$$\text{Mean} = X = \sum x_i/n;$$

Remark: n = the number of respondents; xi = the score given by respondents.

After obtaining the mean frequency and impact, the risk factor value is determined by multiplying the mean frequency value and the mean impact value on the risk variable to obtain a risk rating that affects the performance of the work execution time in the procurement process. Using the risk matrix, the risk level of the risk variables is also obtained based on the risk value obtained.

The highest risk variable in the study that can be used as a discussion is as much as 10% of the risk variables (Tan, 2011). There are 106 variables in this study, so the highest risk variables that will be discussed are the 11 highest variables. However, the highest risk factors do not represent the stages of the business process in the procurement process, so the highest risk is added at each stage of the business process to be able to represent it. So that the total variables that will be discussed further are 15 (fifteen) variables. The 15 variables in the Risk rating can be seen in the following table 2.

Table 2. Highest Risk Table

Risk	Var	Value of Risk	Level of Risk	Rating of Risk
The feasibility study for construction work has not yet been carried out	X1.1	10.77	Medium	6
DED documents are not available properly	X1.2	11.09	Medium	4
The land for development is not ready to build	X1.3	13.40	Medium	1
Planning is not done properly	X1.5	10.24	Medium	8
Technical specifications / terms of reference are not clear	X2.1	8.74	Medium	17
The tight schedule of the selection process	X3.9	8.45	Medium	21
Additional time to evaluate bid documents	X4.15	7.59	Medium	33
Delay in the implementation of mobilization	X5.15	10.58	Medium	7
Plans with realization not achieved	X5.17	12.05	Medium	3
There is an additional job from the user/owner	X5.20	10.86	Medium	5
The length of the material approval submission process approval	X5.24	9.85	Medium	9
Work stoppage due to the lack of a permit process	X5.25	9.82	Medium	10
Design changes due to the licensing process or government regulations	X5.26	12.88	Medium	2
Work stoppage due to social community	X5.27	9.77	Medium	11

Incomplete work administration documents	X6.1	9.00	Medium	15
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Note. Var = Variable.

Furthermore, the highest risk is analyzed and discussed with experts related to the cause, risk response (preventive and corrective) to anticipate the highest risk. There are 26 (twenty-six) types of mitigated risk response, where the action if taken can reduce the frequency and impact of the risk that arises and 1 (one) type of risk response Avoid, where the action if taken is to eliminate the threat from the impact of the risk that arises. As for corrective action, it is a type of accept risk response, where the action accepts the risk but is still controlled against the risk. After knowing the risk responses, the next step is to develop business processes in the procurement process for high-level flats to improve performance in execution time.

Risk response in the form of preventive and corrective actions taken to deal with risks (Suwandari & Riantini, 2019). Then from the risk response that has been obtained, it is also analyzed to obtain development actions for the procurement business process. With the development action obtained, a gap analysis was carried out to obtain recommendations in the development of business processes in the process of procuring high-rise vertical housing in order to improve performance in implementation time at the Ministry of Public Works and Housing.

Table 3. Risk Response and Development Action

Preventive Risk Response	Code	Var	Actions in Business Process	Activities in Business Process
Carrying out a Feasibility Study	PR1	X1.1	"Implementation of feasibility studies" Activity	Feasibility Study Implementation
Giving time limit and postponement or cancellation	PR2	X1.1	"Delay/cancellation of procurement" Activity	Procurement Delay/Cancellation
Re-checking the DED document	PR3	X1.2	"Review DED document" Activity	Review of Procurement Preparation Documents
Update applicable regulations	PR4	X1.2	"Review DED document" Activity	Review of Procurement Preparation Documents
Ensure the specification of building needs	PR5	X1.2	"Review DED document" Activity	Review of Procurement Preparation Documents
Re-checking the condition of the land	PR6	X1.3	"Re-checking of land condition" Activity	Re-checking land condition
Carry out socialization of the requirements to get a vertical housing	PR7	X1.3	"Re-checking of land condition" Activity	Re-checking land condition
Additional time to prepare the land	PR8	X1.3	"Re-checking of land condition" Activity	Re-checking land condition
Adequate addition of planning time	PR9		"Review planning documents" Activity	Review of Procurement Preparation Documents

Obedience in following the rules of applicable regulations	PR10	X1.5	"Review planning documents" Activity	Review of Procurement Preparation Documents
Review of technical specifications / Terms of Reference	PR11	X1.5	"Review planning documents" Activity	Review and Determination of Technical Specifications/TOR
Selection planning done well	PR12	X2.1	"Joint review of selection planning" Activity	Joint review of selection planning documents
Addition of personnel of the selection working group	PR13	X3.9	"Joint review of selection planning" Activity	Joint review of selection planning documents
Implementation of the time of the procurement process that is not concurrent	PR14	X4.15	"Joint review of selection planning" Activity	Joint review of selection planning documents
Re-checking of equipment, materials and personnel after contract	PR15	X5.15	"Project monitoring and controlling" Activity	Project Supervision and Controlling
Coordinate with all parties related to site readiness	PR16	X5.15	"Project monitoring and controlling" Activity	Project Supervision and Controlling
Good project management arrangement	PR17	X5.17	"Project monitoring and controlling" Activity	Project Supervision and Controlling
Carry out regular weekly progress meetings	PR18	X5.17	"Project monitoring and controlling" Activity	Project Supervision and Controlling
Needs planning is done well	PR19	X5.20	"Review DED document" Activity	Review of Procurement Preparation Documents
Good coordination between owner, supervisor and contractor	PR20	X5.24	"Project monitoring and controlling" Activity	Project Supervision and Controlling
carry out the permit process before carrying out the work	PR21	X5.25	"Implementation of the permit process" Activity	Implementation of the permit process
Coordination with agencies related to the ease of the permit process	PR22	X5.25	"Implementation of the permit process" Activity	Implementation of the permit process
Proactive in seeking changes to permit regulations	PR23	X5.26	"Implementation of the permit process" Activity	Implementation of the permit process
Coordination with related agencies for permit	PR24	X5.26	"Implementation of the permit process" Activity	Implementation of the permit process
Conducting socialization with the surrounding community with users	PR25	X5.27	"Implementation socialization of works" Activity	Implementation socialization of works

Prepare a document storage area	PR26 X6.1	“Project monitoring and controlling” Activity	Project Supervision and Controlling
Digitizing documents	PR27 X6.1	“Project monitoring and controlling” Activity	Project Supervision and Controlling

Note. Var = Variable, PR = Preventive Response.

Using table 3 above, a gap analysis was carried out with existing business process activities so that it can be concluded that there are 7 (seven) business process development actions that have not been listed in the existing procurement business process activities. This action will become a recommendation in the development of business processes in the process of procuring high-rise vertical housing at the Ministry of Public Works and Housing. The business process development actions can be seen in table 4 below.

Table 4. Development of Business Process on Procurement Process

Business Process	Development of Business Process
Procurement planning	Adding activities “Feasibility Study Implementation”
Procurement planning	Adding activities “Procurement Delay/Cancellation”
Procurement planning	Adding activities “Re-checking land condition”
Selection Preparation	Adding activities “Joint review of selection planning documents”
Procurement Implementation	Adding activities “Project Supervision and Controlling”
Procurement planning	Adding activities “Implementation of the permit process”
Procurement planning	Adding activities “Implementation socialization of works”

After obtaining business process development in the procurement process for high-rise vertical housing at the Ministry of Public Works and Public Housing, expert validation was carried out to be able to validate the development of the business process. Validation is carried out by 3 (three) experts who have experience of more than 10 (ten) years and have been directly involved in the process of procuring high-rise vertical housing at the Ministry of Public Works and Public Housing.

After collecting and analyzing the data carried out in the context of developing the procurement business process in the procurement process for high-rise flats to improve performance within the Ministry of Public Works and Public Housing, the findings will be made and discussed.

The business process in the procurement process for high-rise vertical housing at the Ministry of Public Works and Public Housing is in accordance with Presidential Regulation number 16 of 2018 concerning Government Procurement of Goods/Services and its amendments. The business process includes several stages in the procurement process. These stages include the procurement planning stage, the procurement preparation stage, the election preparation stage, the election implementation stage, the procurement implementation stage, and the handover stage.

Based on the results of data collection and analysis that has been carried out, there are 15 (fifteen) dominant/highest risk events in the procurement process for high-

rise vertical housing at the Ministry of Public Works and Public Housing. The highest risk is obtained from 10% of the highest risk variables in the study added to the highest risk from the stages in the business process that are not included in the 10%. The research variables are 106 variables so that the 10% variable is 11 variables. and the highest risk variables at each stage of the business process that are not included in the 10% are 4 risk variables.

Based on the findings that have been described previously, a more comprehensive and integrated discussion will be carried out with the formulation of the problem. This study uses 15 (fifteen) dominant/highest risks that may occur in the business process of procuring high-rise vertical housing that can have an impact on time performance. Then the cause analysis, risk response and development actions are carried out as well as gap analysis with business processes in the procurement process resulting in the development of business processes in the process of procuring high-level, risk-based vertical housing within the Ministry of Public Works and Public Housing.

The results of the business process development obtained 7 (seven) business process development actions, namely by adding 7 (seven) activities in 3 (three) stages of business processes in the procurement process for high-rise vertical housing. By using the fast-track method, it aims to develop suitable dominant factors in improving work performance so as to reduce time (Indarwati & Latief, 2019).

The addition of this activity is the development of business processes in the existing government goods and service procurement process. This addition is considered necessary because the government procurement process for goods and services is a general procurement of goods and services, while this development is a high-rise vertical housing procurement process that has been analyzed based on risk.

Business process development is carried out on preventive risk responses where preventive risk responses are control/prevention risk responses. Meanwhile, the corrective risk response is a correction/improvement risk response which can be in the form of rework. Rework can have a negative impact on performance and productivity (Palaneeswaran, 2006). The occurrence of rework in construction projects mostly stems from the effort of unnecessary repetition/improvement of improperly implemented processes or activities (Love, 2002). Rework is a significant contributor to time wastage (Kumaraswamy & Chan, 1998). The inefficiencies and bad effects of rework are better to be reversed/reduced through the implementation of some control measures (Palaneeswaran, 2006).

CONCLUSIONS

Based on the research, it can be concluded that the highest risk for business processes in the procurement process for high-level flats that have an impact on the performance of implementation time in the Ministry of Public Works and Public Housing there are 15 risks that are discussed in the development of business processes. The 15 risks are as follows.

1. The land for development is not ready to build;
2. Design changes due to the licensing process or government regulations;
3. Plans with realization not achieved;
4. DED documents are not available properly;
5. There is an additional job from the user/owner;
6. The feasibility study for construction work has not yet been carried out;
7. Delay in the implementation of mobilization;
8. Planning is not done properly;
9. The length of the material approval submission process approval;

10. Work stoppage due to the lack of a permit process;
11. Work stoppage due to social community;
12. Incomplete work administration documents;
13. Technical specifications / terms of reference are not clear;
14. The tight schedule of the selection process;
15. Additional time to evaluate bid documents.

Of the 15 risks, 7 actions were found to develop business processes in the process of procuring high-rise vertical housing at the Ministry of Public Works and Housing. The 7 actions are as follows.

1. Adding activities "Feasibility Study Implementation" on Procurement planning stage;
2. Adding activities "Procurement Delay/Cancellation" on Procurement planning stage;
3. Adding activities "Re-checking land condition" on Procurement planning stage;
4. Adding activities "Joint review of selection planning documents" on Selection preparation stage;
5. Adding activities "Project Supervision and Controlling" on Procurement Implementation stage;
6. Adding activities "Implementation of the permit process" on Procurement planning stage;
7. Adding activities "Implementation socialization of works" on Procurement planning stage.

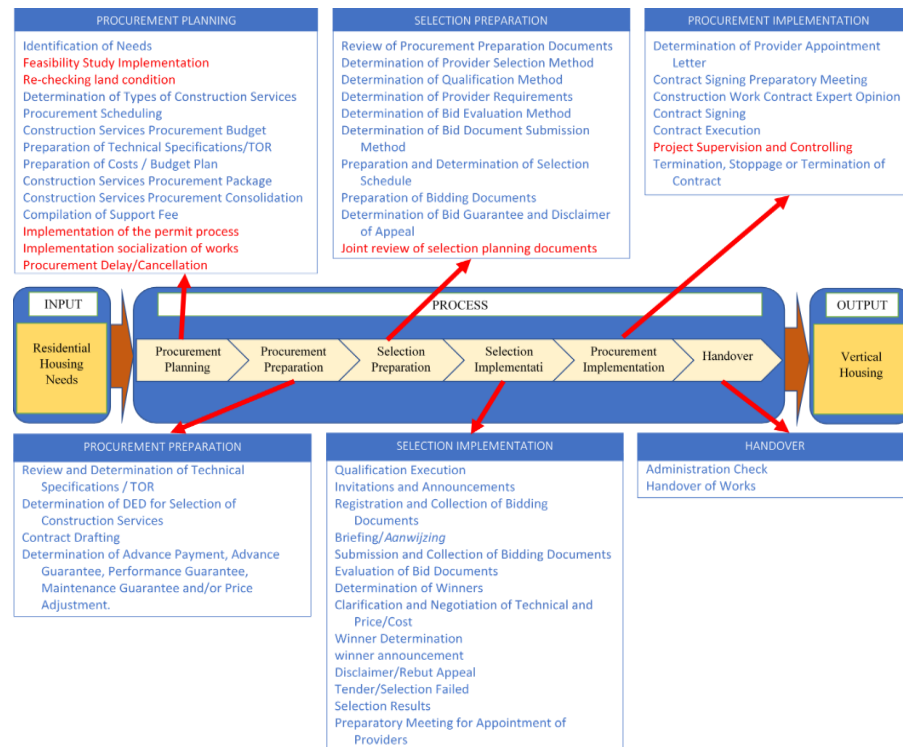
The development of business processes in the procurement process can be seen in Figure 2 below. With this research, researchers really hope that the results of this study can improve the performance of implementation time in the procurement process for high-rise vertical housing at the Ministry of Public Works and Housing.

With this research, the researcher really hopes that the results of the research can improve the performance of the implementation time by reducing the risk of delays that may occur in the implementation of the procurement process for high-rise vertical housing at the Ministry of Public Works and Public Housing.

The suggestions for future research are:

1. This research was conducted using qualitative analysis of risk factors so that further research can be carried out with quantitative analysis;
2. This research is limited to the impact on time performance, so that further research can be carried out on the impact on quality and cost performance;
3. This research gets the development of business processes in the procurement process for high-level flats, so that in future research it can develop a Quality Management System for the procurement of high-rise vertical housing.
4. This research is limited to the procurement process for high-rise vertical housing, so that further research can discuss other procurement processes.

Figure 2. Development of Business Process on Procurement Process



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