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## Property development risk management process model

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# Property development risk management process model

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**Abstract.** Property business is one of the most dynamic and risks businesses. The property industry has a bad reputation for managing risk. Businesses in the property sector, as with businesses in all other economic fields, need to manage each risk they face so that a balanced relationship between rentability (rate of return) and business liquidity is not disturbed by events, both economic and non-economic. Knowledge of risk management in property development in Indonesia, as seen from the available references is limited to general management theory both for industry and projects. This research is a simplification of the model 12 (twelve) stages of the development of the property industry in the opinion of Wurtzebach and Miles (1995) into 5 (five) stages namely; initiation phase, feasibility study phase, the commitment phase, the construction phase, and the operation phase by including the risk management process at each stage. The main objective of this research is to develop a risk management model of property development in the tourism area. To achieve the main objectives of this study the following secondary objectives are set: (i) exploring theories and models of risk management that are relevant to property development; (ii) identify the level of potential risk (hazard), the level of vulnerability, capacity, (iii) analyze risk factors based on the level of potential risk (hazard), vulnerability, capacity, (iv) recommend property development risk management model. This research was designed in 6 (six) stages consisting of; (i) problem identification stage, (ii) scope development stage, (iii) data collection stage, (iv) data processing stage, (v) model development stage. Conceptually, the methodology proposed in this study refers to the key steps of risk management which include identification, qualitative/quantitative risk analysis, risk response and risk mitigation. This study justifies that based on literature studies it is necessary to develop a specific risk management model for property development that is more systematic, and easy to apply. qualitative/quantitative risk analysis, risk response and risk mitigation. This study justifies that based on literature studies it is necessary to develop a specific risk management model for property development that is more systematic, and easy to apply. Qualitative/quantitative risk analysis, risk response and risk mitigation. This study justifies that based on literature studies it is necessary to develop a specific risk management model for property development that is more systematic, and easy to apply.



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## 1. Introduction

Property development is unique and dynamic business field. This business has special characteristics that distinguish it from other development activities. Physical facilities are operational activities that are generally unique, have a non-repetitive implementation period, have the intensity of activities and use diverse resources and involve many scientific disciplines. Risks and uncertainties always occur in real estate development projects. Risk influences every project stage from conceptual, feasibility analysis, design and planning, bidding and tendering, construction and implementation, and up to the operation stage. The other researchers states that the risk management process is generally a continuous and repetitive process, even each property development project is different and unique. The project risk management approach is three basic steps namely; risk identification and initial assessment, response and mitigation, and subsequent risk analysis.

Risk is a function of the chance of an unwanted event occurring and the consequences that result from the event. The greater the chance of an unwanted event occurring and the greater the consequences of the event, the higher the risk level for the event. While the consequences caused depend on the level of vulnerability (vulnerability index) or tolerance interval (coping range index). Estimating investment risks in the property sector faced in various countries. The RREEF estimation method takes into account, inter alia, macroeconomic conditions, political stability, level of transparency, legislation, tenancy risk, and company liquidity. Using a scale between zero and five, the RREEF gives an average of 3.0 for the global environment and 3.7 for Asia, on a scale between zero and five. The risk levels of several cities in Asia in the context of global and Asian averages are shown in Table 1. This table shows that there are no cities with risk levels below the global average, whereas those below the Asian average but in above the global average are Hong Kong, Singapore and Tokyo.

**Table 1.** Risk level of property business in several cities in Asia

Country	Risk Level
Global Average	3.0
Asian average	3.7
Hong Kong	3.1
Singapore	3.4
Bangkok	4,1
Kuala Lumpur	3.8
New Delhi	4.2
Seoul	3,7
Tokyo	3.3

Sources: Whiting, dominic, asia's new real estate investment

Based on previous studies that in property development, risk management is very important to be included in the analysis to avoid failure in investing. Research on property risk management that has been carried out is still limited to identifying dominant risks that occur, whereas in the process of risk management there are 4 stages namely identifying, analyzing, mitigating, and responding to risks.

This is shown by [1] research to merely identify risk factors for property development and respondents taken are not focused on certain types of property, for example commercial property or residential property, because risks are very specific or specific. Research [2,3] is also limited to identifying risks in the property business (real estate) including factors; social, technological, economic, environmental and political, have not yet carried out in an integrated manner that is identifying, analyzing, responding and taking action at all stages of the property development process.

P.This research aims to develop a risk management model in the development of the property industry. The specific objectives are:

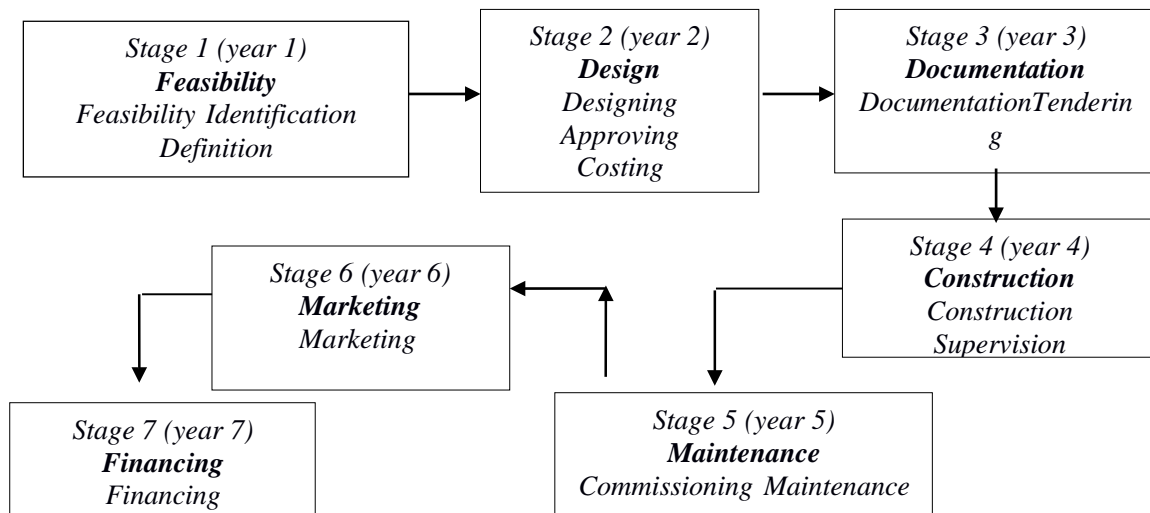
- 1). Explore the theory of property development and risk management
- 2). Recommend a property business risk management model

## 2. Theoretical basis

### 2.1 Property business

Understanding of the property business as disclosed Wurtzebach "Property refers to things and objects capable of ownership, that is things and objects that can be used, controlled, or disposed of by an owner. Real property (and Real Estate, which is treated as synonymous) consists of physical land plus structures other improvements that are permanently attached '. The property business is a business that is related to all things that are material, there are ownership rights, and have a period of time of use. While investment property (real estate), simply means issuing or investing in assets in the form of land or buildings on it.

### 2.2 Property development process



**Figure 1.** Stages of property development

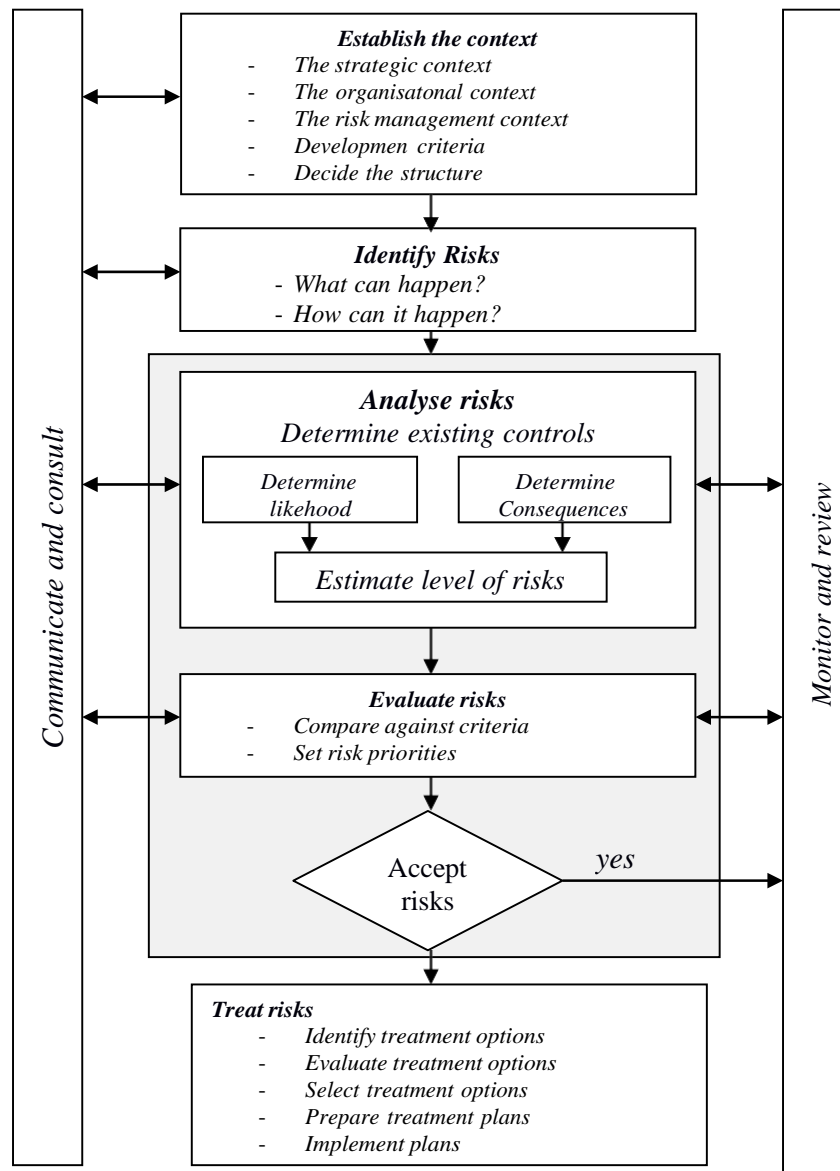
The real property or real estate development process consists of 8 (eight) stages [4]. That the flow of activities through several stages constitutes a special sequence in property development. Although this sequence is not followed in all cases, the process provides a very useful framework for analyzing processes and also creating a structure for evaluating project properties. The eight stages of development of the Wurtzebach model property, development includes the following stages [4]: (1) Idea (inception), (2) Preliminary feasibility study, (3) Location control / site (gaining control of the site), (4) Feasibility analysis and design, (5) Costs (financing), (6) Construction, (7) Marketing, (8) Leasing, (9) Sale (sale of the project). [5] Property development is very profitable and beneficial. But it has a long development period before profits can be realized. The development process is long and difficult. In each property development project the activities to be managed are diverse, broad, varying from simple to complex and complicated. This involves a variety of managerial and technical disciplines. Developers or developers will involve professionals in their fields and have the quality of being a project consultant. Project consultants as project leaders and coordinators function as a unifier that binds all individual parts into a complete unit. Consultants will take action and jointly coordinate to make decisions.

### *2.3 Risks*

The concept of risk broadly needs to be understood as a basis for understanding the notion of risk management. In the context of property development which is the focus of this study, the most appropriate understanding of risk is the definition from other researchers which states that risk is a threat, a danger, a loss. And the definition that risk is the spread of the actual results of the expected results (dispersion of actual from the expected results) and risk is the possibility of an outcome different from the expected outcome will be more relevant to be used in relation to risk identification and analysis. The common thread that can connect the above notions is that risk is always associated with "possibility" and "uncertainty". These "uncertain" conditions can arise due to various reasons: (1) the time gap between planning for the activity until the activity ends; (2) limited availability of information needed; (3) limited knowledge or skills or decision making techniques.

### *2.4 Risks management model*

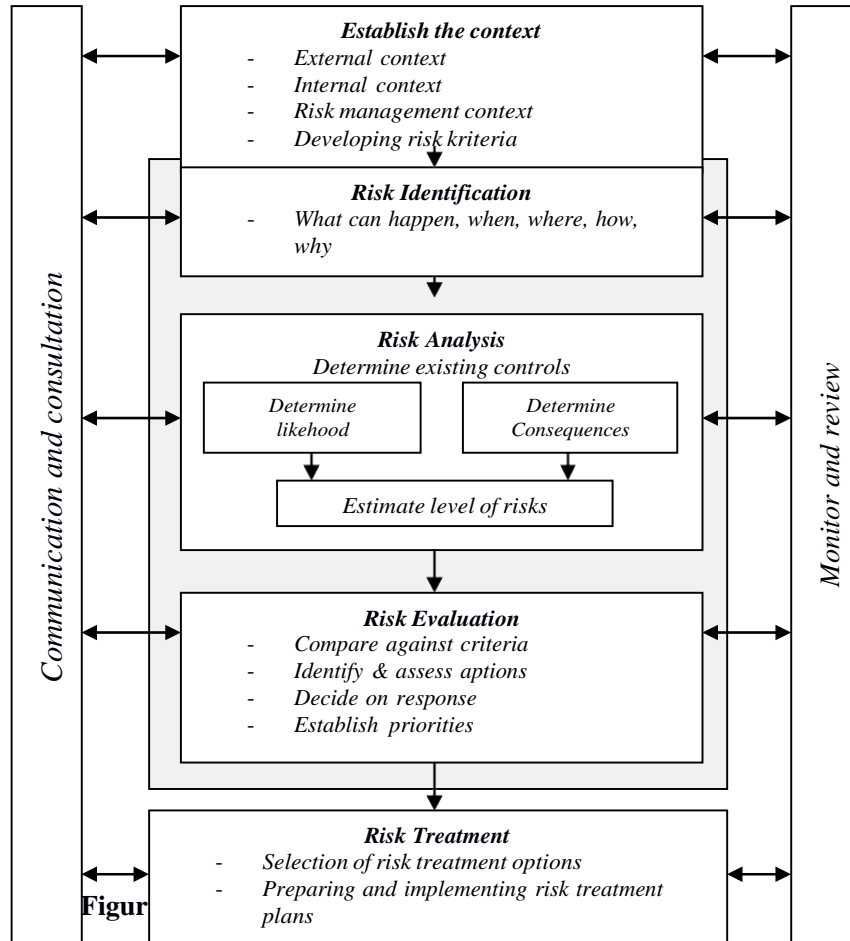
The AS/NZS risk management model, 1999 [6] is a breakdown of the risk management process as shown in Figure 2. The process that occurs within the framework of the strategic organization, the context of organizational risk management. This risk management process needs to be developed to determine the basic parameters on which risk must be successful in providing guidance for decisions that make more accurate decisions in organizational management studies. This model establishes a comprehensive scope of risk management processes for all organizations and shows that the risk management process is an iterative process that can contribute to organizational improvement. The first step is to establish context, at the stage of the context of the strategy activities undertaken include defining the relationship between the organization and the surrounding environment, identifying strengths, weaknesses, opportunities and obstacles. The context includes finance, operational, competitors, political, social, client, cultural, legal aspects of the organization's functions. The second step is risk identification. At this stage, the risks that will be managed are identified. The third step is risk analysis. The purpose of risk analysis in this model is to distinguish minor risks that are acceptable and major risks that are not acceptable and to prepare data to help evaluate and handle risks. The fourth step is evaluating risks. This stage is comparing the level of risk that has been calculated at the risk analysis stage with the standard criteria used. The fifth step is risk control. Risk control involves identifying alternative risk controls, analyzing the types of risk responses available, and implementing controls. The sixth step is risk management. The ISO 31000: 2009 risk management model is in accordance with Figure 3 and is explained as follows: The first process is Establishing The Context which is setting the context. In the risk management process a very important first step is to set the context including setting goals, strategies, scope and other parameters related to an organization's risk management process. The second process is Risk Identification, which is identifying risks that can occur in the future. The third process is Risk Analysis, which is the process of determining how much impact (impact or consequence) and likelihood (frequency or likelihood) of risks that will occur, and calculate the level of risk by multiplying the magnitude of the impact and the likelihood ( $\text{Risk} = \text{Consequences} \times \text{Likelihood}$ ). The fourth process is the Risk Evaluation or comparing the risks that have been calculated above with the Risk Criteria that have been standardized (placing the risks in the risk criteria picture), are those risks acceptable, acceptable issues to watch out for, or unacceptable (not accepted), as well as prioritizing mitigation or handling. The fifth process is Risk Treatment or mitigation of risks. Mitigation of risks must be planned as well as possible and considered all alternative solutions, before mitigation is implemented, in order to obtain the expected results effectively and efficiently.



**Figure 2.** AS/NZW, 1999 Risk management model [6]

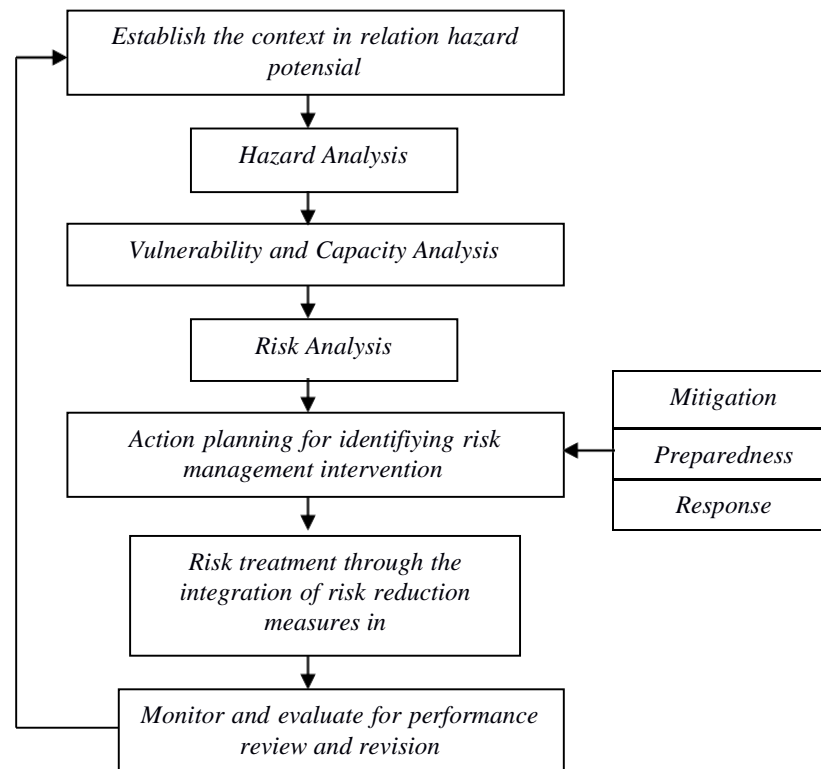
The disaster risk management (DRM) model is described in accordance with Figure 4. The steps in the disaster risk management process are: Setting the context in relation to potential potential hazards. Conduct a hazard or hazard analysis. Conducting vulnerability analysis and capacity analysis. Take action to overcome the risks identified by; mitigation, preparedness and risk response. Overcoming risks by minimizing the risks that might occur. Monitor and evaluate risks. Disaster risk management is part of disaster management, with prior focus on prevention, preparedness from extreme natural events, and those related to during and after a disaster. DRM (disaster risk management) is a tool to reduce disaster risk, especially by reducing vulnerability. The main objective of DRM actions is to reduce vulnerability and strengthen protection capacity. DRM takes into account technical, political, socio-economic, ecological and socio-cultural aspects. The network of various DRM components and various

aspects listed forms an integrated system. This integrated system allows DRM to reduce the risks that occur.



**Figure 3.** The sixth step is risk management





**Figure 4.** Disaster Risk management model [8]

### 3. Research methods

This research was designed in 6 (six) stages consisting of; 1) the problem identification stage, 2) the scope development stage, 3) the data collection stage, 4) the data processing stage, 5) the model development stage, 6) the model validation/trial phase. Conceptually, the methodology proposed in this study refers to the key steps of risk management which include identification, qualitative risk analysis and risk analysis. Literature study is used to obtain concepts, theories and methods related to the problem and research objectives. In addition to getting the desired objectives from this study, research is also needed research that has been done before and related to the problem. Areas of literature review in this study include; (1) definitions and concepts of property business; (2) property development sector; (3) property development process; (4) property management models; (5) the concept of risk; (6) the concept of risk management; (7) vulnerability theory, capacity theory, hazard potential theory, (8) modeling disaster risk analysis according to the general concept is to measure how much risk occurs due to threats, vulnerabilities and capacity used in formulas in accordance with Equation .

$$Risk = \frac{Hazard \times Vulnerability}{Capacity}$$

Hazard is a physical condition that has the potential for causing loss, property damage, infrastructure damage, environmental damage and disruption of the economy. Vulnerability is the condition of the area or the built environment that is not safe or at risk of being impacted by a hazard. Capacity is a combination of the overall strengths, completeness, and resources owned by an organization that can be used to achieve agreed goals including those related to risk reduction.

In the next stage, a business risk management process model is prepared, which was previously validated, calibrated and benchmarked against the existing model. The model that will be made in this research is a schematic model. The first will be a descriptive model that aims to understand the mechanism of risk management and form the basic parameters to be developed. This model builds on the theory of project risk management in general and a literature review on the application of risk management which is considered successful. Descriptive models are also made for case studies. Several descriptive models are then compared using the same parameters. The outcome of this process is a generalization of the risk management framework for property development. To test the validity of the model, a discussion forum called Focus Group Discussion was held. This discussion forum consisted of several experts selected from the related fields to discuss and test the proposed models. The experts presented in testing this model are property practitioners, academics, property researchers and risk management. The results of the discussion are used to perfect the proposed model, and are brought back to a similar forum to be discussed again.

#### **4. Results and discussion**

Conceptually, the property development model proposed in this study refers to the process of property development and key general risk management steps which include risk identification, risk assessment, risk control, and risk monitoring in accordance with the process of risk management model namely the AS/NZW 4360 model : 1999 (US / NZW, 1999); ISO 31000: 2009 model [7]; and the DRM Model (UN / ISDR, 2007). The results of the literature review study indicate the urgency of implementing risk management to help resolve and make business decisions in a number of countries, particularly in the context of property development that has provided comprehensive solutions. However, some opinions and research that risk management can be developed according to the conditions and type of organization or company. In this study several general risk management process models and property development models are analyzed through Focus Group Discussions involving experts in their fields. The results of the Focus Group Discussion produced a reference in the form of a property development process model in Indonesia.

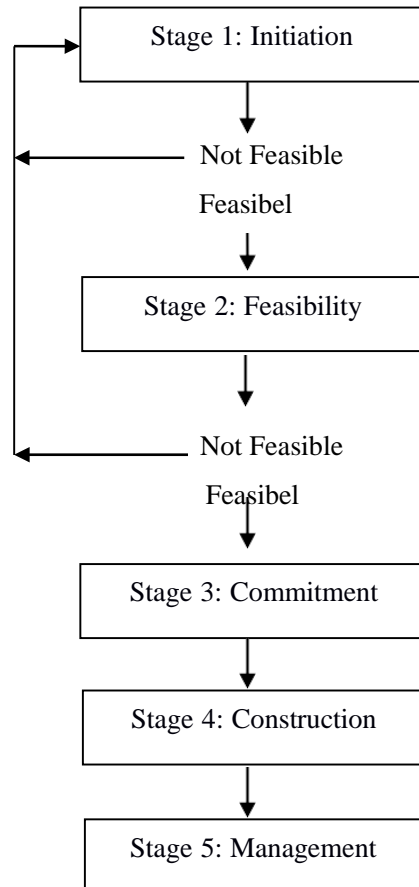
##### *4.1 Proposed model development process property*

This study aims to build a risk management model on property development. The property development process of [4,9,10] which has been described in the literature review section, in this study was combined to obtain a more practical and complete property development model. In general, the proposed property development model adopts the [9] model is complemented by adding feasible and not feasible criteria at the initiation and feasibility stages of the model like [4,9] model consists of 5 (five) property development processes.

- 1) The first stage: Planning and initiation.  
At this stage it starts with project administration preparations such as preliminary design, site selection, market opportunity viewing.
- 2) Second stage: Feasibility.  
Conducting market opportunity studies, project financing feasibility, planning adjusted to local government regulations.
- 3) Third stage: Commitment .  
Applying for building permits, buying land, marketing
- 4) Stage four: Construction.  
At this stage it starts with the tender of construction work with partners or contractors, starting construction work, cost control, quality and time.
- 5) The fifth stage: Management at this stage is carried out activities of property marketing, sales and asset maintenance.

The five property development processes of [9] model above, in this study were developed and simplified in accordance with Figure 5 as follows:

- 1) The planning and initiation stage in the [9] model, simplified into the idea stage (initiation), [3].
- 2) The feasibility stage in the [9] model, in this study, is called the feasibility study stage, [3].
- 3) The initiation stage to the feasibility study stage, and from the feasibility study stage to the commitment stage (feasible criteria) and not feasible criteria; the model of [10].
- 4) Each stage of property development is integrated with the risk management process.



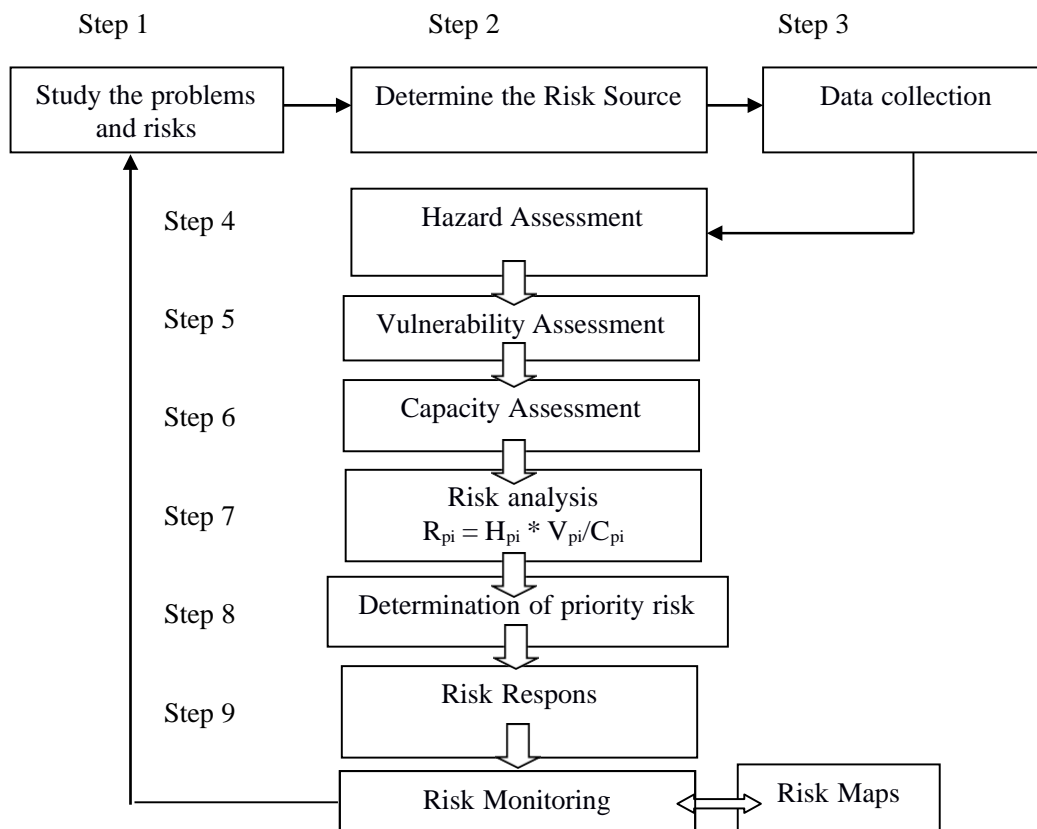
**Figure 5.** Proposed Model of the Property Development Process

#### 4.2 Proposed risk management process model

The proposed risk management process in this study uses the model consisting of; risk identification, risk assessment, risk response, risk monitoring. Specifically at the risk assessment stage an integrated system is developed to reduce risk by identifying the level of vulnerability, vulnerability and capacity, this refers to the disaster risk management model [8] which states that the purpose of this model is to reduce vulnerability and strengthen capacity. Figure 6 illustrates the proposed property management risk management process. Based on the opinion of Robillard (2000), AS/NZW risk management model 4360: 1999, risk management model ISO 31000: 2009;

- 1) Step 1: Getting started and learning risk property.
- 2) Step 2: Introduction to risk assessment.

- 3) Step 3: Data collection.
- 4) Step 4: Hazard assessment.
- 5) Step 5: Vulnerability assessment.
- 6) Step 6: Capacity assessment.
- 7) Step 7: Risk analysis.
- 8) Step 8: Determine priority risks and risk maps.
- 9) Step 9: Determine the risk response.
- 10) Step 10: Risk monitoring.



**Figure 6.** Proposed risk management process model for property development

#### 4.3 Property development risk management model

In accordance with the purpose of this research, which is to produce an integrated property development model, the proposed model results from the integration of the proposed property development process according to Figure 5 and the proposed risk management process according to Figure 6. The proposed integrated property development model is a type of schematic model according to Figure 7. The property development process built in this research is the development of the [9] model. While the risk management process built in this study is based on various risk factors including the level of hazard, the level of vulnerability, the level of capacity. The model built is an integration of the property development process by carrying out a risk management process at each stage of development. The risk management process includes; study problems with risk, determine the source of risk, assess the level of hazard, assess the level of vulnerability, assess the level of capacity, risk

analysis, determine risk priorities, carry out risk responses, and risk monitoring. The risk management process is carried out in 5 (five) stages of the property development process, namely: the initiation phase, the feasibility phase, the commitment phase, the construction phase, and the management phase. The proposed property development risk management process model according to Figure 7 can be explained as follows:

1) Stage 1: Study the risk of property development risks.

At this stage a literature review is carried out such as journals, articles, scientific research, which addresses issues of property development and risk management. This stage also began to identify problems related to property development and the need for risk management as part of the solution.

2) Stage 2: Identification of sources of risk and risk factors.

At this stage identification of risk sources and risk factors is carried out in property development. The source of risk used in this study is based on the source of risk from property development activities [3] There are seven activities in property development namely; Land development, design, feasibility study, financing, construction, marketing and sales. Property development activities [3] in research are a source of risk namely; land development risk, design risk, feasibility study risk, financing risk, construction risk, market risk , sales risk . The sources of risk are analyzed at each stage of property development namely; the initiation phase, the feasibility study phase, the commitment phase, the construction phase, the management phase. The source of risk at each stage of property development is influenced by the level of hazard, the level of vulnerability, and the level of capacity. Indicators of the level of hazard, the level of vulnerability, and the level of capacity were identified based on literature studies and surveys through interviews. Risk identification such as; source of risk; risk factors, hazard level, vulnerability level, and capacity level. construction phase, management stage. The source of risk at each stage of property development is influenced by the level of hazard, the level of vulnerability, and the level of capacity. Indicators of the level of hazard, the level of vulnerability, and the level of capacity were identified based on literature studies and surveys through interviews. Risk identification such as; source of risk; risk factors, hazard level, vulnerability level, and capacity level. construction phase, management stage. The source of risk at each stage of property development is influenced by the level of hazard, the level of vulnerability, and the level of capacity. Indicators of the level of hazard, the level of vulnerability, and the level of capacity were identified based on literature studies and surveys through interviews. Risk identification such as; source of risk; risk factors, hazard level, vulnerability level, and capacity level. and the level of capacity identified based on literature studies and surveys through interviews. Risk identification such as; source of risk; risk factors, hazard level, vulnerability level, and capacity level. and the level of capacity identified based on literature studies and surveys through interviews. Risk identification such as; source of risk; risk factors, hazard level, vulnerability level, and capacity level.

3) Stage 3: Assessment of the level of hazard, vulnerability and capacity

At this stage, the level of threat, vulnerability and capacity in property development is identified. According to the United Nations (2002) states that the source of risk in property section can be influenced by the level of hazard, the level of vulnerability, and capacity. At this stage, identifying the types of hazards or threats in property development, identifying vulnerabilities and weaknesses in property development, and identifying the capacity or strength owned by the company or project environment to overcome threats.

4) Stage 4: Risk assessment and analysis

At this stage a risk assessment is carried out at each stage of property development. For the project from the initial stage, the analysis is carried out starting at the initiation stage. To proceed to the feasibility study stage, the commitment phase is determined by the size of the risk priority index.

- 5) Stage 5: Determination of priority risks  
At this stage begins with an assessment of the level of interest of the parties against the criteria and sub-criteria in accordance with the hierarchy of the interests of the parties.
- 6) Stage 6: Carry out a risk response. At this stage, the risk response is carried out to the most important / most critical risks that must receive priority handling or action.
- 7) Stage 7: Risk monitoring  
At this stage, supervision of risk factors is prioritized at each stage of property development.

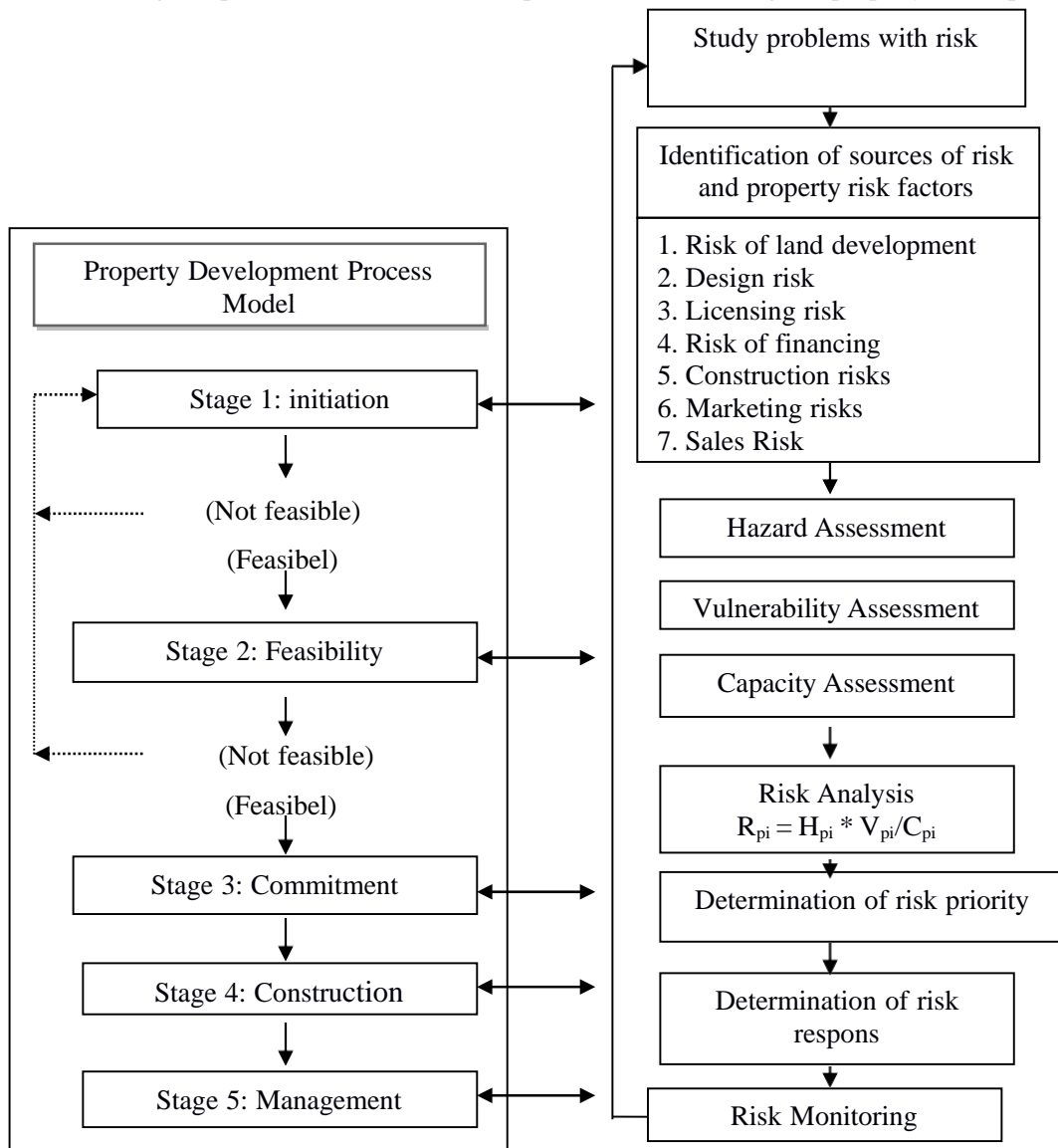


Figure 7. Property Development Risk Management Process Model

## 5. Conclusion

1. Risk management is a formal process carried out to balance the risks and opportunities that arise as a result of a decision being taken, and make actions to produce an acceptable balance between those risks and opportunities.
2. The general risk management process model has several differences with risk management practices in case study property development projects and best practice. This shows the specificity of the risk management process of property development.
3. The risk management process model is proposed based on the generalization of several case studies, theories and expert advice through the Focus Group Discussion Method.
4. The property development process model that involves a lot of resources and lasts for a long time is risk sensitive and requires risk management practices in a systematic and responsible manner. Risk management in the property development process in a systematic and responsible manner can be helped by the existence of a risk management model. The risk management model in this research can be applied to property management projects to help interested parties make decisions in property investment. This model can provide decision choices to the parties, especially the developer (developer) whether the activity can be continued or not to the next stage. So that losses in particular in property management can be anticipated earlier starting from the stage of initiation, feasibility, commitment, construction, and management.

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