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Risk Identification Techniques in Residential Property Development for Sustainability in Port Harcourt

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Abstract:
Risk influences the failure and success of a development even if some development fails and succeeds regardless of how these risks are tackled. Every developers aim is tomaximize return and obtain end users satisfaction; although residential property developments have faced several risks during the development processes. Therefore the aim of the study is to access the risk identification techniques in residential property development processes for sustainability of development in Port Harcourt metropolis, Rivers State, Nigeria. The study adopted explanatory and exploratory case study research design. Both qualitative and quantitative data were collected using simple random sampling and purposive sampling respectively. A total number of 80 questionnaires were distributed, 60 were retrieved representing 75.0% response rate and 10 (ten) interviewee were sampled. Data collected was analysed with descriptive statistical tool of simple percentage and frequency analysis.
The finding of the study reveal and confirmed that nine techniques are the techniques to be used in identifying risk in residential property development processes for sustainability they include: experience with similar projects; brainstorming; questionnaire; interview; checklist; expert system; Monte Carlo; Delphi Techniques; and Scenario analysis. The study therefore reflects that the understanding of risk identification techniques must be brought to the awareness of residential property developers, professionals and governments in order to assist in decision making and to eliminate residential property development failure.

Keywords: *Risk, techniques, identification, development, processes, sustainability*

1. Introduction

The study is limited to residential property development in Port Harcourt, Rivers State, Nigeria. This is because the case study has recorded several residential property development processes which created possibilities for dependable information that was appropriate for comprehensive data analysis. However, it is seen that every residential property development process takes almost the same pattern during execution and as such it is necessary to be studied in order to address the objective of the study.

Property development is complex in nature which makes every development process to be critical and dynamic thereby making risk a key element as the aim of every developer is to maximize returns. The processes involve several stages from initialization to management of the property. Residential property development is an important aspect in the society at large and to every individual, family or group. Many property developers venture into residential property development as it is always on the high demand since the dawn of population growth and the aim of every average populace is to have a place of dwelling.

Risk identification technique is carried out to determine the events that will affect the successful proceedings of development during the implementation in order to monitor and analyze (Chong &Yaow, 2018). XiuLiet.al., (2007) as cited in Chen, (2010)stated that the identification techniques were based on five characteristics which are: individuality; subjectivity; continuity; complexity; and comprehensiveness. Individuality is risks that differs base on the particular property. Subjectivity is development that is carried out base on practical knowledge and experience which makes risk identification subjective. Complexity: property development is complex in nature so it faces complex risk factors. Continuity after development and handing over there is room for changes and improvement which makes development continues process and with this new risk will come to play so also risks identification. Finally comprehensiveness, identification of risks is linked to one stage to another and can be identified in the entire development process. Wiegelmann, (2012) opined that risk identification cannot be totally done but that it is based on environmental risk, enterprise risk, and political risk. Environmental risks are risks that are identified based on the environment in which the development is carried out. Secondly enterprise risks are identified based on the development operations and finally project risks are risk identified based on the potential of the property.

Risk is the probability of more than one outcome; it is a circumstance when it occurs, it has a positive or negative effect in the development thereby causing failure or success (PMI 2002 cited in Hillson 2010). Therefore, to tackle and reduce the level of risk occurrence in development process, techniques in identifying risk should be used by property developers. Risk identification techniques should be used at every stage of the development processes but due to the unpredictability and intricacy in the development process that has not been effective (Gehner, (2008) as cited in (Nnamani, 2017).

Several residential properties in Port Harcourt have recorded collapse, poor project delivery, and increase in cost overrun which is due to several risks and as a result of this it has created several circumstances to the development industry. Residential property development process is fixed on risk factors and for it to be sustainable it must be delivered at the right time, marketed at the right time with the right price. Risk identification technique is important as it is a tool in achieving successful development. Threats that are seen by the developers through its experience require diverse professionals who are knowledgeable and experienced in the development process to monitor and tackle them (Dale, Stephen, Geoffry, and Phil, 2005). This has shown that unidentified risk can cause disasters which are damages or losses in residential development processes. It is in this light of the above, that the study seeks to address the risk identification techniques in residential property development processes for sustainable residential property development in the Port Harcourt.

Consequently the aim and objective of thisstudy is tohighlight the techniques that will be used in identifying risk in residential property development processes for sustainability of the development in Port Harcourt.

2. Theoretical Frameworks

2.1. Property Development Process

Development is as a result of price signals from property markets, it relies on the estimated rental values based on the letting market evidence and estimated yield is based on investment market evidence (fisher, 2005). Development is carrying out of building or other operations in, on, or under land or making material changes in the use of any building or other land (Millinton, 2000). Properties are developed or redeveloped on undeveloped land because of the high demand on the need and usage of such property and base on that the developer aims at optimizing the optimum return thereby focusing on the targeted users' needs and satisfaction.

Property development processes involves several stages; Miles, Berens and Weiss, (2000) mentioned Eight stages of property development such as; Inception of an idea, Refinement of the idea, Feasibility, Contract negotiation, Formal commitment, Construction, Completion and formal opening, Property asset and portfolio management. Further, Wilkinson and Reed, (2008) also outlined eight stages which are: 'Initiation', 'Evaluation', 'Acquisition', 'Design and costing', 'Permissions', 'Commitment', 'Implementation', 'Let / manage / dispose'. However in all the work as indicated above it is clear that property development processes are classified into eight stages they include: *Development conceptualization; Site search; Development financing; Planning and designing stage; Assembling of development team members; Construction stage; Project completion and handing over stage; and Marketing and management stage*(Millington, 2007).

2.2. Risk in Residential Property Development Processes

Risk is defined in two perspectives either in negative and positive aspects. In the negative aspect it is defined as a loss and therefore a threat to every development activity, while the positive aspect it is defined as the possibility between the actual value and the expected value (profit) which is described as an opportunity (Wiegelman, 2012). Enever and Isaac (2002) opined that 'risk is related to a situation where a probability or loss can be assigned to a possible outcome arising from a decision. Generally risk is perceived as an undesirable situation which should be avoided but it does not change the situation that risk is an integral part of every development activities especially when the development is profitable. Risks in residential property development are threats that arise during the development activities processes which by one way or the other affect the entire development delivery (Chen, 2010). These risks display difficulties in tackling them and thereby making it difficult to control the actual development cost, quality and delivery.

2.3. Sustainable Development

If development did not meet its criteria (completion on time, accomplished within the cost budget, meets the set quality requirements and safety during and after development) it is said that the development has failed its purpose and can be said not to be sustainable. There have been over 300 definitions of sustainable development which showed the diverse view of the world and the conflicting interest in the field (De Veries&Peterson, 2008). Sustainable development or sustainability is perceived in different ways but in particularly in the context of environmental issues, economic, social and political developments and sustaining development benefits (Worika, 2002 as cited in ihuah 2013). Similarly The World Commission on Environmental development WCED as cited in Ihuah, (2013) defined sustainable development as development which meets the needs of the present without compromising the ability of future generations to meet their own needs.

However, from the above definitions it is seen that sustainability varies from nation to nation, time, economic, social and cultural background. Therefore what constitute sustainable development is the three dimension of sustainable development (Environmental, Economic and social perspective) which are equal but the environmental aspect is the most discussed. The research on sustainable development centers around the WCED definitions and it has remained the

accepted definitions as it supports the concept of sustainability in the built environment and the world at large (Ihuah, 2013).

2.4. Techniques of Identifying Risk in Residential Property Development Process

Identification of risk is important in property development processes because if ignored it can led to an undesirable outcome. Risk identification helps in ensuring smooth property development activities, the process is very broad and if not properly done it cannot be identified (Dale et al., 2005). Identification of risk helps the property developer to understand the nature, causes and the possible further outcome of risk that will occur during the development process which enables the developer in taking solid decision (Dale et al., 2005Risk is categorized so as to have an insight in the various risks and they are used for structuring and placing them on critical path (Gehner, 2008). However, in identification of risk, risk should be identified meticulously through the use of appropriate methods so as to increase successful sustainable development activities.

There are different techniques in identifying risks and how they are identified is based on valid and existing information; analyzing the likelihood and consequences of the risks; opinions of experts; and stakeholders involvements (Dale et.al. 2005).). In property development risk identification is performed naturally based on subjective experience, level of knowledge, qualification and experience of a developer involved in identification of risk (Wiegelmann, 2012). Also Dale et.al., (2005) outlined four procedures in identifying risk such as: Brainstorming; Examination of local or overseas; experience with similar development activities; Checklists, Interviews and focus group discussions; Scenario analyses; Surveys and Questionnaires; and Work Breakdown Structure analysis. GreyCampus, (2021) stated seven techniques in identifying risks they include: Brainstorming; Checklist analysis; Delphi technique; Interviewing; Root Cause Analysis; Strength, Weakness, Opportunities and Threats (SWOT); Assumption analysis; and Monte Carlo analysis. Therefore, in order to identify risk in residential property development the following techniques is adoptable.

2.5. Brainstorming

This is the most preferred approach which is more demanding and effective, it is used where there is a high occurrence of risk and in unique high projects, the technique is based on the developer who is the facilitator, he raises the issues that arise and it is done with a group of people (Gray, 2021).

2.6. Experience with Similar Properties

This techniques involves the knowledge and information gathered from different projects that the developer have executed in the past in addressing risks that are likely to occur. However, most of the previous experiences have limitations and may not be considered.

2.7. Checklists Analysis

Checklist is used in properties that are standard or routine in nature, in this method a list of risk is made already by the developer and at every level of occurrence the developer checks and ticks the list that occurred (GreyCampus, 2021).

2.7.1. Interviews

This is a process where an interview is conducted by the developer with the project participants, stakeholders, experts etc. to identify the possible risk that can be faced during the development process(GreyCampus, 2021).

2.7.2. Sensitivity/ Scenario Analyses

Sensitivity analysis is also called sometimes what if analysis, it values the key factors or variables in a development process (for example site cost) and measures the possible outcome Royal Institution of Chartered Surveyors (RICS, 2015). This method highlights the key factors that may affect development outcome should there be changes (RICS, 2015).

2.7.3. Monte Carlo

It is a computer generated model outcome. It is a tool adopted to estimate risk in the capital market, and the result is spread to describe the risks in the various sources and the possible outcomes by randomly selecting input values from the prearranged distribution Chong and Yaowu(2018). This method gives the developer greater understanding and clarity, also its assist the developer in making decision

2.7.4. Delphi Techniques

This technique is similar to brainstorming, the process involves where the facilitator consults the experts and a list of outline risk is sent to the experts, responses are complied, and results are sent back to them for further review until a consensus is reached (GreyCampus, 2021).

2.7.5. Expert System

Here personals with sufficient experience and knowledge in the development industry are selected in avoiding and solving risk that may arise over and over again during the development process (Calle, 2019).

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2.7.6. Questionnaire

It is a series of questions which its objective is to determine the possibility of occurrence of some situations that could generate losses. The risk that are answered is established the most representative risks that is why before a list of risk is made it must be thoroughly revised and complemented with the specific needs of the development (Calle, 2019).

3. Paper Methodology

Thisstudy adoptedcase study research designwhich allows the use of mixed methods (that is quantitative and qualitative strategy). Data were collected by self-administered survey through questionnaires and interviews. The population size consist of five professionals (Architects, Property developers, project managers, quantity surveyors and estate surveyors) of 80 professionals involved in residential property developers was sampled; 60 professionals was used as the sample for this study which represents 75.0% of the respondents rate and 10 interviewee ware sampled. The distribution of questionnaires was done evenly based on random sampling from Architects, Property developers, project managers, quantity surveyors and estate surveyors. The data collected was analysed using the, descriptive statistics such as percentage, frequency analysis and narration for data numerical and verbal in nature were used.

4. Data Analysis and Discussion

From the literature, questionnaire and interview, the following theme emerged from the result of the analysis and discussed below:

Items	Very High		High		Moderate		Low		Very Low		Total	
	Freq	Per%	Freq	Per%	Freq	Per%	Freq	Per%	Freq	Per%	Freq	Per%
Brainstorming	18	30	42	70	0	0	0	0	0	0	60	100
Experience with similar project	42	70	14	23.3	4	6.7	0	0	0	0	60	100
Checklist	35	58.3	23	38.3	2	3.3	0	0	0	0	60	100
Interview	16	26.7	35	58.3	9	15.0	0	0	0	0	60	100
Sensitivity analysis	1	1.7	17	28.3	16	26.7	21	35.0	5	8.3	60	100
Questionnaire	2	3.3	9	15.0	18	30.0	15	25.0	16	26.7	60	100
Monte Carlo	0	0	6	10.0	13	21.7	20	33.3	12	20.0	60	100
Delphi technique	0	0	7	11.7	11	18.3	12	20.0	30	50.0	60	100
Expert system	7	11.7	13	21.7	21	35.0	16	26.7	3	5.0		

Table 1: Techniques Used in Identifying Risk
Source: Field Survey 2021

From Table 1 above, the analysis shows that there are nine (9) techniques used in identifying risk in residential property development processes for sustainability in Port Harcourt, these techniques are discussed below:

4.1. Brainstorming

As shown above in Table 1, the analysis shows that out of Sixty (60) respondents, 18No. (30) Rated Brainstorming Very High, while 42 (70.0%) whereas none which is 0% of the respondents rated it moderate or low or very low whether it is used or not. From the analysis it therefor shows that 100% of the respondents rated it very high and high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of the Ten (10) interviewed, Ten (10) opined that Brainstorming is a type of techniques used in identifying risk in residential property development. From both quantitative and qualitative analysis it reveals and confirms that brainstorming is a type of techniques used in identifying risk in residential property development.

4.2. Experience with Similar Project

From the analysis, out of sixty (60) respondents, 42No (70.0) rated very high, while 14No (23.3%) rated very low and 4No (6.3%) rated moderate whereas none which is 0% of the respondents rated low or very low whether it is used or not. From the analysis, it therefore shows that 100% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, Ten (10) opined that it is a techniques used in identifying risk. From both qualitative and quantitative analysis it revels and confirms that Experience with Similar Project is a type of techniques used in identifying risk in residential property development.

4.3. Checklist

The analysis shows that out of sixty (60) respondents, 35No (58.3%) rated very high, while 23No (38.3&) rated High and 2No (3.3%) rated moderate, whereas none which is 0% of the respondents rated low or very low whether it is used or not. From the analysis it therefore shows that 100% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, Eight (8) opined that it is a type of techniques used in identifying risk while two (2) noted that it is not regularly used. Nevertheless, from the qualitative and quantitative analysis it revels and confirms that Checklist is a type of techniques used in identifying risk in residential property development.

4.4. Interview

The analysis shows that out of Sixty (60) respondents 16No (26.7%) rated very high, while 35No. (58.3%) rated high and 9No. (15.0%) rated moderate, whereas none which is 0% of the respondents rated low or very low whether it is used or not. From the analysis it therefore shows that 100% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, Seven (7) opined that it is a type of techniques used in identifying risk while three (3) noted that it is not used in Port Harcourt as it is time consuming and more expensive. Nevertheless, from the qualitative and quantitative analysis it revels and confirms that Interview/Expert Opinion is a type of techniques used in identifying risk in residential property development.

4.5. Sensitivity/Scenario Analysis Techniques

The analysis shows that out of Sixty (60) respondents, 1No (1.7%) rated very high, while 17No. (28.3%) rated high and 16No. (26.7%) rated moderate, whereas 21No (35.5%) rated low and 5No (8.3%) rated very low whether it is a type of techniques used or not. From the analysis it therefore shows that 63.9% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, five (5) opined that it is a type of techniques used in identifying risk but it is not common on Port Harcourt while Five (3) noted that it is not used and not known in Port Harcourt residential property development. Although, from the qualitative and quantitative analysis it revels and confirms that Sensitivity/Scenario Analysis is a type of techniques used in identifying risk in residential property development.

4.6. Questionnaire Techniques

From the analysis, it shows that out of Sixty (60) respondents, 2No. (3.3%) rated very high, while 9No. (15.0%) rated high and 18No. (30.0%) rated moderate, whereas 15No. (25.0%) rated low and 16No. (26.7%) rated very low whether it is a type of techniques used or not. From the analysis it therefore shows that 48.3% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, five (5) opined that it is a type of techniques used in identifying risk but it is not commonly used while Five (5) noted that it is not used and not known. Although, from the qualitative and quantitative analysis it revels and confirms that Questionnaire is a type of techniques used in identifying risk but it is not used by most developers.

4.7. Monte Carlo techniques

From the analysis in Table 1, it shows that out of Sixty (60) respondents none which is 0% of the respondents rated very high, while 6No. (10.0%) rated high and 13No. (21.7%) rated moderate, whereas 20No. (33.3%) rated low and 21No. (35.0%) rated very low whether it is a type of techniques or not. From the analysis it therefore shows that 31.7% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, four (4) opined that it is a type of techniques used in identifying risk but that it is not commonly used while six (6) noted that it is not used and not known. However, the result of Monte Carlo is poor but the literature confirms that it is a type of risk but maybe the respondents are not aware that it is a type of techniques used in identifying risk.

4.8. Delphi techniques

From the analysis in Table 1, it shows that out of Sixty (60) respondents none which is 0% of the respondents rated very high, while 7No. (11.7%) rated high and 11No. (18.3%) rated moderate, whereas 12No. (20.0%) rated low and 30No. (50.0%) rated very low whether it is a type of techniques or not. From the analysis it therefore shows that 29.3% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, four (4) opined that it is a type of techniques used in identifying risk but that it is not commonly used while six (6) noted that it is not used and not known. However, the result of Delphi techniques is poor but the literature confirms that it is a type of risk but maybe the respondents are not aware that it is a type of techniques used in identifying risk.

4.9. Expert System Techniques

From the analysis in Table 1, it shows that out of Sixty (60) respondents 7No (11.7%) rated very high, while 13No. (21.7%) rated high and 21No. (35.0%) rated moderate, whereas 16No. (26.7%) rated low and 3No. (5.0%) rated very low whether it is a type of techniques or not. From the analysis it therefore shows that 68.4% of the respondents rated it very high or high, agreeing that it is a type of techniques used in identifying risk.

However, from the qualitative analysis out of Ten (10) interviewee, five (5) opined that it is a type of techniques used in identifying risk, while five (5) noted that it is not used. Although, from the qualitative and quantitative analysis it revels and confirms that Expert System is a type of techniques used in identifying risk.

In summary, from the qualitative analysis above the result shows that there are nine techniques used in identifying risk, and out of 60 respondents Brainstorming, Experience with similar project, checklist, interview and expert system was rated very high, high and moderate while Questionnaire, Monte Carlo , Delphi Technique, and Sensitivity analysis was rated poor although in the literature it confirms that it is a type of risk but maybe the respondents are not aware that it is a type of techniques used in identifying risk.

> '…It has been known by developers that there are techniques used in identifying risk which mainly brainstorming and experience with similar projects is commonly used. Monte Carlo and Delphi techniques are not known and are not used…

5. Conclusions and Recommendation

Through the study conducted, it was established that there are 9 risk identification techniques in residential property development that needs to be adopted which includes: brainstorming;Checklist; experience with similar projects; sensitivity analysis; interview; questionnaire; Monte Carlo; Delphi techniques; and expert system techniques.Were Monte Carlo, Delphi Techniques and Sensitivity analysis were not used and was recorded poorly. Also these techniques that were identified can be used concurrently or independently depending on the size of the project or the property developer. The study established that the risk identification techniques are important in tackling and monitoring risk occurrence during the development process in order for sustainability

Consequently, the study recommends that. property developer should be aware of these techniques, adopt them when carrying out a project and use any of these techniques listed above in identifying risk for sustainable residential property development. Also, that government should provide a policy that will enforce property developers, owners and individuals to use any of the risk identification techniques from the beginning of the development process so as to tackle any further damages which will reduce and increase quality project delivery within the stipulated time, use of actual cost budget and to attain end users 'satisfactionsin residential property development if the given solutions are followed.

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