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RISK MANAGEMENT IN ARCHITECTURE PROFESSION FOR NATIONAL DEVELOPMENT IN NIGERIA

by
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Abstract

Risk is a measure of the level of uncertainty which may have negative or unfavourable outcomes if not properly managed. In every sphere of activity there are levels of risk and the tendency is to avoid risks. Risk management involves in-built measures to develop acceptable safety levels which not only enhances values but reduces failures, hazard, losses, and wastages. This increases the Gross Domestic Products,(GDP) contribution of architecture to national economy. While manageable and calculated risks may be a measure of value of an endeavour and so an incentive to greater achievements and success, uncalculated and unmitigated ones would normally lead to disaster. Good management practice in architecture starts from the conceptualization of the design and spans through the procurement, construction and maintenance stages. It therefore encompasses pre-contract, contract, post-contract stages and post-occupancy. The paper makes risk management in housing process more proactive so as to improve the confidence of the public in the architecture profession. It identified some quantitative approaches to risk management, highlighting some legal and administrative actions to improve risk management. It evaluated relevant literature on risks measurement, architecture training, practice, ways of mitigation of risks. It found out ways the architect could reduce risk and improve professional opportunities and incentives for national development. It concludes that risk management would reduce building failures, hazard, losses and enhance the contribution of architecture to national development.

Keywords: Failure, management, safety, risk, uncertainty

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Introduction

Risk is the level of future uncertainty in a hazardous action that can harm in terms of human injury, health, property or the environment leading to losses,(Sharma and Kumar,2013). Building failure, collapse, tremor, fire, occupational hazards make the application of risk management to building relevant. Though uncertain, risk elements can be packaged, mainstreamed and analysed to forecast in a predetermined way the likely outcomes through management functions of planning, organizing, controlling, analyzing and feedback system. Traditionally, risk is applied to financial investment in relation to the variability between actual return and expected return,(Chandra,2015). The wider the difference the more risky the investment. Since building process involves financial investment into the future, with tangible and intangible returns, risk management has been applied to building and real estate investment. Returns from building investment could be in form of rentage, sale of building, primary and secondary mortgage market activities. Risk is in-between hazard and safety. While hazard is the tendency of an event to have potential to cause harm or loss, safety is the actual activity of the operators to avoid or mitigate the identified harm. Risk management therefore helps to take care of or mitigate the risk issues of hazard before they occur. These functions can adequately be factored into the three traditional stages of architecture practice of pre-contract, contract and post-contract(stages1,2 and 3). The National Building Code,(NBC),(2006),provided a comprehensive building type classification with the peculiar functional design, safety requirements and specifications, that provide the basic needs in conjunction with the local building regulations. This provides the professional architect and the building team all that is needed for a solid and safe working drawing. The twelve number architectural design classifications of building types of the code are; assembly, business and professional, education, factory and industries ,high hazard, institutional, mercantile, residential, storage, mixed use and occupancy, doubtful use classification and utility and miscellaneous,(NBC,2006). Factoring in the functional requirement of buildings as provided in the NBC in the design process would no doubt reduce risk, hazards and improve safety considerably. The question is why are the governments and the building industry professionals unable to domesticate the NBC years after its production? What about the passage of functional building regulation documents in the states. The architects no doubt have questions to answer as the quest for national development burns across the profession and the allies. The traditional Architectural design involves receiving clients brief, analysing it, factoring in the functional and regulatory requirements to produce the design of the facility

that can be built through strict supervision in compliance to the proposed design. Risk can be managed by the creative combination of design, ordinance, administration and technology. However, deep discussions, knowledge of risk management in construction industry is limited with only the Contractors and Quantity Surveyors assuming a prime position as they are the ones traditionally associated with finance, Mahmud, Muawiya and Abdullahi,(2019), and funding of building projects. Although it is true that risk management is originally associated with industry outside building construction, the fact remains that every action or inaction in the building industry eventually zeros into monetary issues. Risk management should therefore ideally be considered throughout the building process from initiation, design, construction to post-occupancy maintenance. This is so since earth tremor, building collapse and digital technology, information and communication technology, intelligent technology and robotics are now important issues in building process. They have made the traditional functional design needs of site, fire services, insurance, building control and code, imperative in keeping pace with the risk management buildings a necessity. This paper therefore looks at the aspects of the architecture profession by discussing, concept of risk, components risk measurement, designing for risk, architecture training, practice and risk management.

Methodology

The research used evaluative method of some relevant literature to identify some variables that can be measured in other to forestall, forecast and proactively reduce hazards and improve risk management. The study used desk method with integrative, argumentative approaches to evaluate the literature and to take a stand on the best approach to risk management in the building process.

Literature review

Risk is a measure of likely damages and losses that may or may not be remedied in an activity. It is the level of uncertainty and probability associated with a project. For small and local projects the level of risk may be minimal but for large projects that are international in nature risk management is not only important but a factor in the success of the project. For a project to be successful the design must not only identify the risk elements from feasibility, packaging and how to reduce or cushion the effects but must design them into the project documents. These documents are the architecture, structural, mechanical, electrical, bill of quantity, specification and cash flow showing the risk premium within a reasonable short time of stable market indices,(Lucey,1988). Risks that can affect a project may be internal and external. While internal risks are within the control of the stakeholders, external ones are

not but can only be reduced and regulated. Internal risks are project schedules (manpower estimating), technology used, type of contract and legal. The external risks are; credit risks, country risk, sovereign risk, force majeure, cost over-run, delay, currency and foreign exchange risk.(Nevitt,1983). Hazards that can affect building projects and workers are mechanical, chemical, electrical, radiation environmental, fire and explosions. In view of this, The Standard Form of Building Contracts in Nigeria of Nigerian Institute of Architects,(1990),provides the following insurance risks;

i).injury to persons, property and indemnity to employer for liability of contractor for personal injury or death, injury or damage to property with exclusion of the works and site materials

ii).insurance against injury to persons or property as contractors' insurance for personal injury or death, provisional sum for insurance and excepted risks

iii). Insurance of the works;

1. For erection of new building for all risks insurance of the works by the contractor
2. For contractor to take out and maintain a joint names policy
3. Single policy of insurance approved by employer and failure by contractor to ensure
4. Use of annual policy maintained by contractor
5. Loss or damage to the works as insurance claims

Although the employer and the contractor are expected to take out these insurance policies, knowledge and implementation of these have not been properly effected and enforced. This is why all the building collapses, damage and losses due to hostilities and war in Nigeria have gone without the observance of these provisions. Does it then mean that the document on the Standard Form of Building Contracts is not effective in Nigeria or the knowledge and understanding by the industry operators, judiciary and other enforcing agents lack adequate knowledge for implementation of the provision of these documents.

However, Technology is being used to monitor and reduce risks and hazards in building by designing buildings that are 'living' which behave like human beings in early warning signs, safety and reduction of hazards. These buildings are variously referred to as intelligent, automated, computer aided and virtual buildings. With artificial intelligence techniques the devises with appropriate sensors are used in building services to operate, for lighting, heating, security, access control and fire control systems,(Tauheed, Aniya and

Lawal,2007;Adejimi,2007;Owajionyi,2007). They have proved to be effective, though are only sparsely used and developed in Nigeria.

Discussions

Risk Assessment

Risk assessment starts with an attempt to determine quantitatively or qualitatively value of hazard situations that can cause loss or harm to people or the ecosystem in the building process. According to Sharma and Kumar,(2013),it involves;

1. Identification of actual or potential locations and probable frequency of exposure to risky and hazard situations in the building process.
2. Exposure assessment in form of concentration and times or period of exposure to establish if it is within acceptable industry limits
3. Estimating the quantity of the hazard that may reach sensitive organs and tissues of workers and the population that may be exposed during construction and or in the use of the building
4. Risk characteristics that are used to calculate the numerical estimate of the risk

Risk analysis

Once the risk locations are identified as above, a risk rating based on probability(P) and impact (I) factors can be done to rank the risks in order of importance so as to focus attention on higher risk elements. The risk rating is done on P-I table using a range of 3 rating matrix with high, medium and low, values,(Table 1). and 5 rating table (Table II) with very high, high, medium, low and very low. These ratings are based on the impact on project cost, schedule or technical grounds during the building process and use. The analyses help to take appropriate design, specification, contractual and construction decisions in order to reduce, mitigate and or avoid entirely the hazards the building process and increase safety. These according to Sharma and Kumar,(2013) are done through;

1.Comparative risk estimate against accepted building industry criteria

2.Identified risk elements so as to take remedial actions

3.To assess the cost benefit-analysis for implementing the project

4.To address land use planning in siting, site layout planning and design

5.To develop appropriate contingency plans before actual implementation of the building process

Table1:Probability(Likely hood to occur) Matrix

High(3)	PI=3(category3) ;moderate risk, activity undesirable, further work needed to proceed	PI=6(category2);substantial risk, activity intolerable, risk not to be taken	PI=9(category1),intolerable risk; cannot be operated, leave the operation completely
Medium(2)	PI=2(category4); tolerable risk, activity acceptable, proceed with continuous improvement	PI=4(category3);moderate risk, activity undesirable, further work needed to proceed	PI=6;substantial risk, activity intolerable, risk not to be taken
Low(1)	PI=1;insignificant risk, activity safe to operate	PI=2(category4);tolerable risk, activity acceptable, proceed with continuous improvement	PI=3(category3);moderate risk, activity undesirable, further work needed to proceed
	Low(1)	Medium(2)	High(3)

Source: Modified from Sharma and Kumar,(2013)

Table II: Impact description

Value	status	description	classification	Impact to personnel	Impact to assets/property/ecosystem
1	Most unlikely to occur	Never known before	Light	First aid treatment	Minor damage, no delay
2	unlikely	Known to occur in building industry	Serious	Injury requiring treatment but not lost time	Moderate damage, moderate delay
3	likely	Known to occur in other industry	Major	Lost time accident	Serious damage, moderate delay
4	Most likely	Known to have occurred in the past; such as fall,collapse	Catastrophic	Serious injury requiring hospitalization	Major damage, serious delay, action such as insurance, regular supervision needed
5	inevitable	Happens regularly	Multi-catastrophic	Single or multiple fatality	Catastrophic damages, critical delay, insurance ,regular supervision needed

Source: modified from Sharma and Kumar,(2013)

Impact of risks can be assessed based on;

1.Slightly harmful for hazards that can cause;

i).superficial injuries

ii).nuisance and irritation, or ill health that cause temporary discomfort

2.Harmful for;. burns, cuts, .serious sprains, minor fractures, deafness, asthma, work related upper limb disorders, disorders, ill health leading to permanent minor disability

3.Extremely harmful, amputation, major fractures, poisoning, multiple injuries, fatal injuries, occupational cancer, other severely life shortening diseases and acute fatal disease

Risk control

With the identification, analysis and quantification of the risk elements it becomes possible to develop the control measures as good responses.

Table III: Risk control measures

s/no	Risk level	Action to be taken/response
1	Category 5;trivial or insignificant; PI=1;matrix value	No action needed
2	Category 4;tolerable;PI=2,matrix value	Cost effective solution needed without any normal additional control measure
3	Category3;moderate;PI=3/4,matrix values	Efforts to reduce risk, hazards needed with limited cost, such as supervision, insurance
4	Category 2;substantial;PI=6,matrix value	No work until risk is reduced but if work has started urgent cost effective action needed
5	Category 1 intolerable; PI=9,matrix value	Work should not be started or if started should not continued until risk is reduced otherwise work should be prohibited. To avoid risk seek alternative such as reduction of scope, change strategy or seek better expertise and consultants

Source: modified from Sharma and Kumar,(2013)

Effective Risk management

Although effective risk management involves thorough risk analysis and control other actions are;

1.Avoiding the risk entirely or branding the project not feasible,(PI=6) category I

2. Risk transfer to a third part such as insurance, warranties, guarantees, sub-contracting to specialists, passing the risk to the client, customer or suppliers Category3

3.Risk reduction and mitigation by reducing areas of uncertainty, probability and impact

4.Risk acceptance or absorption through investing more on regular monitoring, reporting, reviewing and regular feedback system using monitoring and supervision. This may involve additional cost that can be provided in contingency arrangement.

5.Exploiting opportunities. Some project may lead to better opportunities or experience and improved expertise. This means that actively executing the projects would definitely bring more jobs. Others may be leading to flourishing joint ventures, partnership, technology transfer and technical know how.

6. Smart buildings design techniques to effect early warning and take proactive actions

Potential benefits of risk management in architecture practice are;

1.Training and retraining

1.Partnership with specialists and those with advanced knowledge

3.Appointment of risk officer in an organization

4. Increased partnership

5.Technology transfer

Recommendations

1.Curriculum review to accommodate, risk, safety from natural and man made disaster

2. Training and retraining of architects to have more dosage of designing into drawings risk, safety and hazard prevention.

3.Integration of Technology training on smart buildings, e-buildings, digital buildings both in the curriculum and continuous professional development programmes

Conclusion

Risk management as a process is not only necessary but must be embraced in this increasing era of insurgency, building collapse, terrorism, earth tremor and expansion in high technology in the global building environment. Risk in the building process is real and will continue to expand as the building process continues to expand, the architect, educators and other building professionals need to embrace training and retraining, insurance, risk design approaches, management and the use of technology as necessary tools to embrace and manage risk in the building industry process. However the enactment and domestication of the National Building Code at various levels of the Legislature and provision of current building regulation documents at the appropriate levels of government is a task the profession must embark on without further delay if the quest for national development will be real. The time is now.

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