Managing Construction Project Risks in Turbulent Times

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Abstract

The construction industry is unique but with uncertainties. This is because of the operating environment. This intricacy gives rise to several risks. If not managed, these risks could influence construction projects' cost, time, quality, and performance. This paper provides a platform to address how stakeholders in the Nigerian construction industry can achieve more gains by taking advantage of the opportunity, mitigating risk and uncertainty in turbulent times. Findings showed lax adoption and implementation of risk management practices in the Nigerian construction industry. The paper identified major issues impeding the adoption and implementation and proffered initiatives that would increase the integration of risk management and offer a comprehensive analysis of potential construction project impacts to mitigate increased delays, costs, and interferences. The paper also identified tools and techniques for managing construction project risks in the Nigerian construction industry.

Keywords: Adoption, Implementation, Nigeria, Risk management, Stakeholders, Sustainable construction.

1.0 Introduction

The 21st Century global community is characterised by encumbrances (internal and external shocks). These shocks include global fragilities, societal upheaval, economic volatility (George *et al.*, 2016), climate change-induced natural disasters, accelerated geometric inflation, migrant crises, cyberattacks, youth restiveness, kidnapping, currency redesign crisis, floating of the naira, fuel subsidy removal, and pandemics such as COVID-19. The movement restriction to prevent or mitigate the spread of COVID-19 across the country makes managing construction projects more difficult in the pandemic era (Ebekozien and Aigbavboa, 2021). The unprecedented lockdown in line with the COVID-19 guidelines may have increased construction risks associated with the projects. The COVID-19 impact on construction projects in developing countries includes firms being incapacitated to honour salaries, the Nigerian economic crippling into recession, cost and time overrun, increased unemployment, etc. These threatening commotions indicate a paradigmatic fracturing of economic, social, and political orders in dysfunctional multilateral societies. They are disruptive developments. It could lead to a fragmented and disintegrated era if pragmatic, collaborative, and coordinated efforts are not inspired and engaged (Bolewski, 2021). The inadequate knowledge about these internal and external multiplex turbulences makes it complicated to comprehend, analyse, alleviate, and react immediately to economic, social, and environmental issues (Rice and Zegart, 2018). The construction industry and its products are not exempted from these vehement and recurring emergencies in complex, changing environments.

Globally, the construction industry is worth over US$10 trillion annually (Bogue, 2018) and key to infrastructural development. The construction industry is a major contributor to many countries' social and economic growth. The industry is complex and unique because of the contexts linked with each construction project. Methods and techniques related to each construction project are key in this regard. Construction projects are pertinent for implementing change and investment (Wu and Zhu, 2021). Therefore, the intricacy gives rise to several risks that can affect construction projects' quality, cost, time, and overall sustainability. These risks could influence construction projects' quality, time, cost, and performance if not managed. The way to sustainable development is to manage construction project risk excellently and ensure

reasonable completion of quality projects within the approved budget through sustainable practices. This is one of this paper's motivations. Oke *et al.* (2023) corroborated this by identifying the impact of unmanaged construction risks on projects. This includes ineffectiveness in decision-making, liabilities, financial issues, and uncertainties in project outcomes. Participants in the industry need to be mindful of the increased construction risks associated with projects to ensure the timely completion of projects within the proposed budget and acceptable quality. Managing construction project risks in turbulent times, especially in developing countries like Nigeria, cannot be over-emphasised.

Thus, this paper will bring to the front burner how stakeholders in the construction industry can achieve more gains by taking advantage of the opportunity and mitigating risk and uncertainty in turbulent times. Also, it will promote the awareness and adoption of risk management among construction practitioners and policymakers, especially in turbulent times. Mechanisms to manage construction project risks in turbulent times and offer lasting measures to reoccurring hindrances cannot be over-emphasised. Thus, identifying issues impeding the adoption and implementation of risk management, especially in turbulent times, in construction projects are germane to achieving this goal. This paper will conclude by highlighting techniques and tools used in managing construction project risks and proffer initiatives that would increase the integration of risk management and offer a comprehensive analysis of potential construction project impacts to mitigate increased delays, costs, and interferences.

2.0 Overview of Risk Management

Risk occurrence and impact on construction project varies during the project life cycle. There is a high degree of risk linked with quality, time, and cost if project information is incomplete, especially in the early phase of the construction project. Oke *et al*. (2023) affirmed that the increased certainty mitigates the project risk level. Construction project risks are interrelated because they can influence the occurrence of one another (Goh and Abdul-Rahman, 2013). Risk perception differs at personal and corporation levels. People's views differ regarding risk consequences, probabilities, sources, elements, and preferred actions. Project Management Institute [PMI] (2004), Loosemore *et al.* (2006), and Belel and Mahmood (2012) opined that risk does not essentially involve only negative outputs; it can enhance positive outcomes or opportunities. Hence, PMI risk definition includes negative consequences and opportunities. It implies that every opportunity has an associated risk, and every risk could lead to opportunity. Loosemore *et al.* (2006) defined risk as "*a possible future event, the occurrence and consequences of which are uncertain, but which could affect the company's ability to achieve its project objectives.*" Managing these risks is pertinent to achieve the set goals of construction projects. Goh and Abdul-Rahman (2013) identified financial, time, personnel, design and technical, contractual, physical, political and regulation, and safety risks as the major risks in the construction industry and their negative impacts on construction project cost, time, and quality in this order. They found that besides the overall rank (risk occurrence) for financial and time risks, both were ranked first and second across impact on cost, time, and quality. For this paper, physical risk implies extreme inclement weather, earthquakes, flood, fire, subsidence, etc., and political and regulation risk means unstable government policy, expropriation, and corruption.

Risk management is a proactive decision-making process to mitigate the impacts of known or negative occurrences. It is impossible to eradicate risk from a construction project, but it could be curtailed with precise proactive initiatives. Goh and Abdul-Rahman (2013) identified key steps in the risk management process. This includes risk planning, identification, analysis, response, monitoring, and control. A competent risk management implementation can

mitigate project time overruns and long-term loss expenses. Similarly, it can assist in ascertaining the viability of a construction project. Goh and Abdul-Rahman (2013) postulated that competent risk management should convert doubt into risk and opportunity. Risk management has a history. In the early 1990s, construction project risks became a concern to stakeholders, leading to the design of various mechanisms by contractors/developers for analysing and evaluating these risks. Al-Bahar (1988) found that this approach threatened the triple constraints (i.e., cost, time, and quality of the project) because of the failure in construction works. To resolve the issue, a mechanism was developed in the millennium. Chapman (2001) and Shen (2001) classified risks. Chapman (2001) grouped risk into project, employer, industrial, and environmental risks. Shen (2001) grouped risk based on its occurrence. This includes political, policy, market, management, legal, and financial risks. During the millennium phase, Goh and Abdul-Rahman (2013) clustered several risk factors into five different stages.

3.0 Risk Management Practices in Nigeria

Nigeria is among the top economies in Africa. The construction industry has played a significant role in this regard. The industry makes important long- and short-term contributions to the Nigerian economy (Olanipekun and Saka, 2019). The industry is challenged with dilapidated and a need for more infrastructure. International Trade Administration (2021) reported that the country's infrastructure stock amount to 30% of its GDP as of 2021. This is far below the benchmark set by the global apex bank. Goh and Abdul-Rahman (2013) identified feasibility, design, tendering, construction, and handling and maintenance stages as the major risk occurrence throughout the construction project stages. They found that the construction stage has the highest risk occurrence, followed by the tendering stage. The construction stage of major projects takes longer to complete and involves many investments. This implies that different types of risk arise at different stages in the life cycle of a construction project. Contribution to construction project success, producing better business outcomes through more informed decision-making, enhanced creative thinking, innovation, reducing overhead and time waste, recognising uncertainty, and providing forecasts of possible outcomes were identified as the major benefits of the use of risk management tools in construction projects (Belel and Mahmood, 2012).

Belel and Mahmood (2012) found insufficient skilled personnel, inadequate contractor experience, new technology, changes in construction project scope and requirements, subcontractors, incompetently defined roles and responsibilities, and design errors and omissions as the top-ranking risk sources in construction projects in Nigeria. Belel and Mahmood (2012) identified four basic widely accepted risk management processes in line with project management literature. The four phases include risk identification, estimation, response planning, and execution. However, an appropriate risk mitigation strategy is key to decreasing the chances of potential impact or probability of occurrence. In Walewski and Gibson's work, as cited in Belel and Mahmood (2012), classified frequently used risk mitigation strategies into:

i. **Avoidance** – when a risk is not accepted, and other lower-risk options are accessible from many alternatives.
ii. **Retention/Acceptance** – when a mindful decision is made to receive the penalties should the event happen.
iii. **Control/Reduction –** when a process of constantly monitoring and revising the condition of the project is employed.
iv. **Transfer/Deflect –** when the risk is shared. Examples include bonds, warranties, performance incentives, and contractual shifting.

3.1 Risk Management Process

Risk management processes are clustered into five steps (Oke *et al*., 2023). This includes-

i. **Describe the case context:** Understanding the context of the risk occurrence is critical as considering the organisation and strategic contexts.

ii. **Identify the risks:** The goal is to determine what is happening and the expected consequences. Basic questions to ask are: What could happen? What causes it to happen? What is the probability of the risk happening? What will be the implications?

iii. **Conduct a risk analysis:** Evaluating the probability and consequences of each identified risk is pertinent. The risk with the biggest impact should be given priority regarding managing and monitoring the risks.

iv. **Treat the risks:** This involves a variety of treatments with options. Risk treatment options should be considered, and the severity of the risk should be considered. Treatment alternatives include accepting the risk, avoiding the risk, reducing the risk, transferring the risk, retaining the risk, and financing the risk.

v. **Monitor and review treated risks:** at this final stage, consultation, monitoring, and reviewing are continuous risk management features. One should ensure the process is documented and records kept for reference.

Managing construction project risks in turbulent times should be a systematic process of identifying, analysing, and responding to them (project risks). This is pertinent because construction activities have risk and becomes compounded during turbulent times such as flood, fire, earthquake, youth restiveness, kidnapping, pandemic, financial meltdown, etc. The systematic process would increase the opportunity and positive events. Also, it would mitigate the probability and effect of negative events. This implies that the chances of a successful construction project will increase (Yusuwan *et al*., 2008; Oke *et al*., 2023). As previously described, risk management as a mechanism is a decision-making process to ensure that appropriate measures are put in place to reduce the impact of already identified risks and their probability of happening. This would mitigate the risks and intricacies and increase the prospect of construction project accomplishment. Attempts at coordinating risk analysis management between developers/construction contractors and employers/clients have not been formalised. This is because stakeholders' objectives differ. Belel and Mahmood (2012) highlighted the four processes involved in risk management. This includes risk identification, risk quantification, risk response development, and risk response control. Figure 1 illustrates the three major stages.

i. **Risk Identification:** This is the first phase in the risk management process, determining which risks will likely influence the construction project. It involves detecting, evaluating, and clustering the main effects of the risks linked to projects and their interrelationships among risks analytically and continuously. This concept is accepted and germane to risk managers because a faulty identification might lead to project hazards.

ii. **Risk Evaluation/Analysis:** A successful risk identification will progress to evaluation/analysis. At this stage, possible risks are categorised based on significance, and attention is given to essential risks. Besides evaluating the prospect of the risks, their effect on the construction project is considered to define the magnitude of such events.

iii. **Risk Response:** Risk response is critical to risk managers and defines improvement steps for opportunities and responses to consequences. At this stage, a suitable risk mitigation mechanism should be engaged once the project

risks are identified and analysed. It is a stage designed to improve risk management strategy and mitigate potential effects on the projects.

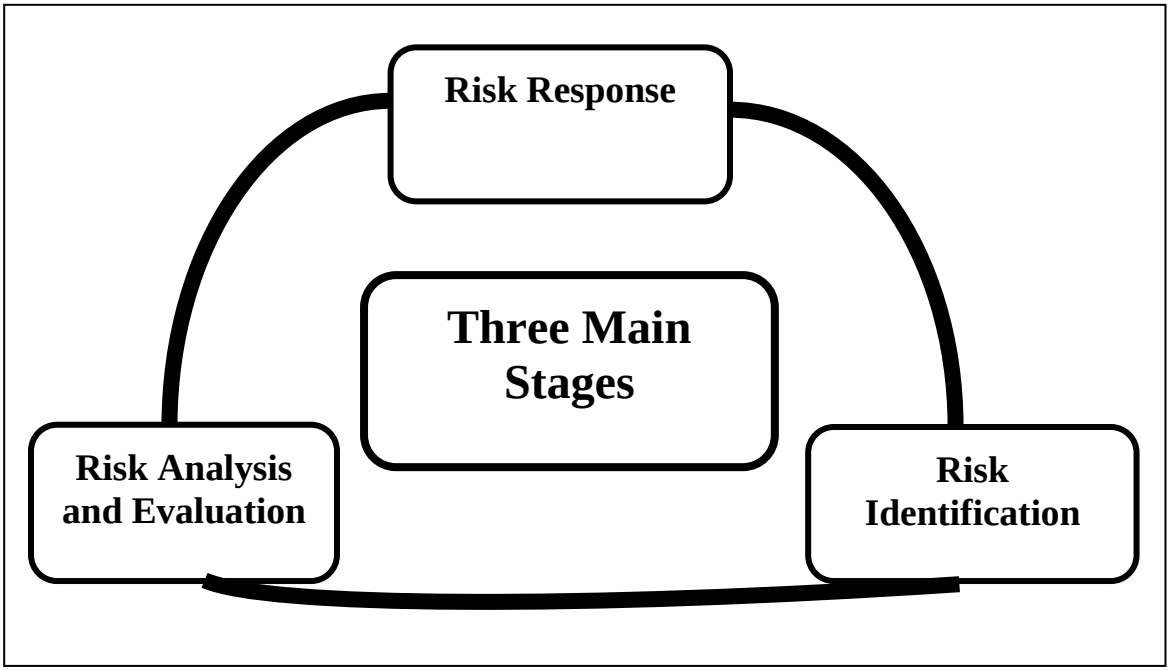

Figure 1: Stages in Risk Management

3.2 Benefits of Risk Management in Construction Projects

The benefits of adopting risk management in construction projects cannot be over-stated. This includes decreasing doubts, accomplishing construction project goals, and maximising prospects within the business environment (Okereke *et al.*, 2021). Contribution to construction project success, producing better business outcomes through more informed decision making, enhanced creative thinking, innovation, reducing overhead and time waste, and recognising uncertainty and providing forecasts of possible outcomes were identified as the major benefits of the use of risk management tools in construction projects (Belel and Mahmood, 2012). Kpodo (1989) and Oke et al. (2023) highlighted how risk management can profit a nation's economy in all ramifications.

- **Nation's Economy**
  i. The positive impact on the domestic product because of resourceful risk management will improve the country's GDP.
  ii. The mechanism (effective risk management) will prevent or mitigate wastage of resources. In principle, foreign exchange is saved.
- **Individual employee**
  i. The mechanism ensures that the employees are efficient and productive.
  ii. It ensures employees' safety by mitigating work-related injuries.
- **Business organisation**
  i. It is germane for improving the company's credit rating.
  ii. It can prevent or mitigate the effect of natural disasters such as flood, fire, earthquake, etc.

3.3 Issues Impeding Adoption and Implementation of Risk Management in Construction Projects

Aliyu (2013) affirmed that certain issues are responsible for lax risk management practices in Nigeria. Oke *et al*. (2023) found the absence of risk management knowledge, inadequate risk management motivation, inadequate professional and experience and professional persons, competition based on the lowest bid, improper designs, information flow breaks, and extensive subcontracting as the top-ranking issues impeding adoption and implementation of risk management in construction projects. Belel and Mahmood (2012) found insufficient skilled personnel, inadequate contractor experience, new technology, changes in construction project scope and requirements, subcontractors, inadequately defined roles and duties, and design errors and lapses as the top-ranking risk sources in construction projects in Nigeria. Also, Goh and Abdul-Rahman (2013) found resistance to change and contractors/developers' satisfaction with the conventional system as major contributing factors to the impending adoption and implementation of risk management in projects in developing countries. Likewise, Zilani et al. (2019) identified construction costs, tight plans, and inadequate knowledge as the major issues hindering risk management in small projects. In summary, issues impeding the adoption and implementation of risk management in construction projects are:

- Inadequate knowledge of risk management processes.
- Absence of risk management framework to link key stakeholders.
- Lax implementation of the concept.
- Inadequate experience with project personnel.
- Different acknowledgement of risk control mechanisms.
- Strict project schedule.
- Higher construction cost.
- Affect the profit margin of developers.
- Complex tools and techniques for analysis.

4.0 Tools and Techniques Used in Managing Construction Project Risk

Several tools and techniques are accessible to use for risk management. Goh and Abdul-Rahman (2013) identified Monte Carlo simulation, sensitivity analysis, risk register, brainstorming, and checklists as risk assessment tools and techniques. They found that checklists and brainstorming are the most common tools in practice.

i. **Checklists analysis**: This is one of the common techniques used in managing construction project risk. The technique ensures the creation of a risk identification checklist. It is based on documented information experienced from a previous past construction project. After the construction project, the checklists must be revised to have a better list that can be adopted on other similar construction projects.

ii. **Brainstorming:** The approach allows the facilitator to permit parties to the construction project to list possible risks that might be detrimental to the project without determining the possibility of their occurrence or effects of such risks. Also, the participants cluster and analyse the risks before transferring their outcomes into a database for more analysis.

5.0 Way Forward

This paper identifies issues impeding risk management adoption and implementation in construction projects, especially in turbulent times. Response to impending factors ranges from inadequate risk management knowledge, absence of risk management incentive, inadequate professional and experience person, competition based on the lowest bid, improper designs, information flow breaks, and extensive subcontracting. Many initiatives favour long-lasting measures to reoccurring impediments. These initiatives would increase the integration of risk management into every construction company to identify and offer a comprehensive analysis

of potential construction project impacts to mitigate increased delays, costs, and interferences, especially in turbulent times, such as the pandemic era and accelerated geometric inflation because of the naira floating and fuel subsidy removal, as experienced in Nigeria. This paper highlights the way forward to improve achieving adoption and implementation of risk management, especially in turbulent times, as follows:

1. Risk management awareness still needs to improve in the current Nigerian construction industry. A 'resistance to change factor in the industry' and contractors/developers' satisfaction with the conventional system are the key contributory issues to the low awareness. Therefore, besides construction companies taking the lead in implementing risk management practices, the government should promote risk management practices by imposing them as a pre-requirement in bidding for construction projects. The outcome would promote to prove the advantages of risk management practices in construction projects, especially in turbulent times, to mitigate consequences and cost overruns. This is because turbulent times in construction projects probable will increase risk chances.
2. Sustainable institutional framework via policies and programmes should be encouraged and embedded in the building code. This would promote risk management adoption and implementation in the industry as a company's policy.
3. Construction firms should evaluate project risks correctly and establish the most economical initiative to prevent or mitigate them. The outcome would minimise possible expenditures arising from emergencies during site construction.
4. Upskilling and reskilling of construction practitioners, especially contracting staffers, regarding knowledge and procedures on managing construction project risks in turbulent times cannot be over-stated. Training and retraining Nigerian contracting firms' staffers in all construction phases is germane to effectively implementing risk management in turbulent times.
5. The Nigerian construction industry, especially contracting firms, can do well by embracing the risk management process into their contract administration from the pre- to the post-construction phase. This approach would mitigate the likelihood of negative impacts from turbulent times, if any, during the construction project life cycle.

6.0 Summary and Conclusions

This paper provides a platform to address how stakeholders in the Nigerian construction industry can achieve more gains by taking advantage of the opportunity, mitigating risk and uncertainty in turbulent times. This would increase growth, profit, and sustainability. Discussing risk management practices in the construction industry has become pertinent because of the complex procedures involved and the unique concerns and contexts linked with each construction project. It concludes that besides the infancy stage of managing construction project risks in the industry, risks occur throughout the life cycle of a construction project but are more rampant at the construction stage. The paper agrees that managing construction project risks in turbulent times is germane for infrastructure development, especially in developing countries. This global challenge facing the construction industry in turbulent times is more pronounced in developing countries, including Nigeria. Construction risk management adoption and implementation awareness, especially in turbulent times, will further improve the awareness among construction practitioners and policymakers in Nigeria. Issues impeding the adoption and implementation of risk management, especially in turbulent times, in construction projects, are recognised as threats to sustainable development and project performance if not

curtailed. The paper concluded by identifying tools and techniques used in managing construction project risks and proffered initiatives that would increase the integration of risk management and offer a comprehensive analysis of potential construction project impacts to mitigate increased delays, costs, and interferences, especially in turbulent times.

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