e-ISSN: 3007-5297
2024: Vol 1, pp 1-16. https://doi.org/10.38140/ijms-2024.vol1.10
Interdisciplinary Journal of Management Sciences

Determinants of Poor Planning in Public Sector Construction Projects in Nigeria

Maryam Zailani Hamidu[1]
Shamsudeen A. Agboola[2*]
Mustapha Yusuf Faruq[3]
Adetola Aderinsoro Falade[4]

AFFILIATIONS

[1]Department of Quantity Surveying, Abubakar Tafawa Balewa University, Bauchi, Nigeria.
[2,3]Department of Building and Quantity Surveying, University of Abuja, FCT, Nigeria.
[4]Department of Civil Engineering, University of Benin, Edo, Nigeria.

CORRESPONDENCE

Email: shamsudeen.agboola@uniabuja.edu.ng*

EDITORIAL INFORMATION
Received: 01 May 2024
Revised: 30 June 2024
Accepted: 04 July 2024
Published: 10 July 2024

DOI: 10.38140/ijms-2024.vol1.10

Abstract: The study assessed the determinants of poor planning in public-sector construction projects in Nigeria. The paper adopted a questionnaire survey. A structured questionnaire was administered to 217 construction professionals, out of which 156, representing 71.9%, correctly filled questionnaires were analysed. The study deployed descriptive statistics such as mean and standard deviation for data analysis. Results indicated that the primary determinants of poor project planning are the need for qualified personnel, with a mean of 4.70; experience, with a mean of 4.63; and poor communication among the project teams, with a mean of 4.63. The significant factors influencing the implementation of project planning in public sector construction projects include natural occurrences, the use of computers and ICT, differing approaches of those who produce the plans and those who deliver the project, the leadership of the project team, application of planning techniques, only trained project managers should plan the project, non-availability of labour, lack of experience. The critical barriers to project planning implementation in public construction projects include lack of communication, performance problems, political influence, dissatisfied project teams, abandonment of the project, time overrun, absence of new technology and software for planning, compromised project quality, and wrong estimation. The research suggests that contractors involved in public sector construction projects in Nigeria should enhance their planning and performance through various measures. These measures include conducting financial and ethical client checks, employing dedicated project managers, utilising computerised planning systems, and improving team communication through reliable channels.

Keywords: Construction project, performance, poor planning, public sector, quality.

1. Introduction

Public projects of any nation are of immense importance to the citizens and residents of that nation as they form part of the building blocks that support national growth. The construction industry in both developed and developing countries may be viewed as the sector of the economy that transforms various resources into constructed project facilities through planning, design, construction, maintenance, and repair (Agboola et al., 2023a). Note (2015) defines a project as a series of unique and related activities with a goal that must be achieved at a set time, within its cost constraints, and per set specifications. There needs to be a clear-cut definition for poor projects, and there are differences in their acceptable definition. Construction activities also share project features because construction involves transforming raw materials, finished or semi-finished goods using management, workforce, and technology within an agreed specification of time and quality into a facility. Windapo (2013) defined construction as a series of actions undertaken by an entity that produces, modifies, or builds projects or infrastructure. The successful execution of public projects is a visible indicator of development in a country (Hanachor, 2013). Despite this, in developing

How to cite this article:
Hamidu, M. Z., Agboola, S. A., Faruq, M. Y., & Falade, A. A. (2024). Determinants of poor planning in public sector construction projects in Nigeria. *Interdisciplinary Journal of Management Sciences, 1*, 1-16. https://doi.org/10.38140/ijms-2024.vol1.10

countries such as Nigeria, most projects embarked on by the government are classified as poor-performance projects (Hanachor, 2013).

The performance of Nigerian construction firms was hindered by mismanagement (Ibrahim et al., 2014), which often resulted in inefficient planning of construction projects. According to Fabian and Amir (2011), inefficiency in construction project planning has significantly hindered the industry's productivity to a level lower than what can be seen in its multinational counterparts; this also resulted in a significant percentage of the total projects in Nigeria going to multinational contractors. The whole process of planning requires clarity and specific intentions. A proper plan should be available where there is an intention to perform a task with a specific objective. The planning project aims to identify each primary task, estimate the time and resources required, and provide a framework for management or owners to review and control its progress. Project planning is simply the development of general plans for construction (Cooke & Williams, 2013).

Construction project planning involves defining the work to be done, its objectives and constraints, the methodology to be adopted, and the technology to be used to carry out the construction (AlSehaimi, 2011). It also involves identifying key activities, their sequence, budget, timing, and any possible interconnection between activities. Construction projects share a similar life cycle with projects in other industries, but Emad (2009) indicated that construction projects are unique in their function; they produce facilities that house or serve as means of future production, deal with geographical differences, and involve assembling a team hired for a specific purpose. According to Windapo (2013), construction projects also consume a lot of physical materials and use physical tools and machinery; they involve several stakeholders, from clients to managers, and are labour-intensive. Due to their unique nature, construction projects face unique challenges; each project is executed differently and requires different planning.

According to Aibinu and Jagboro (2002), another major criticism facing the Nigerian construction industry is the growing rate of delays in construction project delivery and other associated problems, often resulting in disputes, arbitration, total abandonment, and protracted litigation by the parties. These problems, according to Okeke (2019), are associated with planning and scheduling; they are internal factors in an organisation that cause delays in construction project delivery. According to Inuwa et al. (2014), Nigerian construction firms were found to be using their central administration to plan project operations instead of using an identified project manager in the appropriate application of planning techniques. Additionally, they do not adopt computer applications and ICT in the planning of construction projects.

Planning issues frequently lead to the transformation of productive ventures into unsuccessful projects. Increased pre-project planning and a successful project management process are crucial for reducing or preventing poor planning, as they are among the most critical factors for success in construction projects (Yang et al., 2012). Therefore, the construction industry requires better project planning in order to overcome this problem and ensure the success of projects. Professional project management from design to project life cycle is essential for resolving this issue. Oladimeji and Ojo (2012) discovered that Nigerian construction firms lack the ability to efficiently and profitably deliver projects due to inadequate planning and budgetary provisions, among other factors. Consequently, there have been numerous reports of abandoned or malfunctioning facilities, projects executed at higher costs, and frequent occurrences of collapsed structures. These deficiencies generate dissatisfaction among clients, leading to the awarding of major capital-intensive projects to foreign firms that prioritise quality and completion periods.

Despite previous literature highlighting the connection between inefficient planning and adverse project outcomes, further research was required to consolidate various aspects of construction planning into a single study. Nzekwe et al. (2015) identified problems associated with construction planning and focused on specific aspects such as planning techniques, planning technology,

contractor competence, and planning workforce. This approach aimed to provide a solution to the problem of construction planning in Nigeria, but the recurring experience of the same problems over the decades shows that more needs to be done.

In Nigeria, the implementation of modern project management tools, methods, and techniques is still lacking in the public sector. Consequently, public institutions and their contractors often fail to meet budget, specification, and deadline requirements for awarded projects. Studies have identified social and political systems, cultural barriers, and insufficient financial support as obstacles to successful project planning and execution in the Nigerian public sector (Eja & Ramegowda, 2020; Akande et al., 2018; Ogunde et al., 2017; Idoro & Patunola-Ajayi, 2009). Inadequate political contributions, ineffective time management, difficulties in managing schedules, and problems related to construction materials and transportation, which often result in shortages or lack of materials on-site, are all associated with poor construction planning (Kasimu & Isah, 2012; Eze, 2020). A critical look at our environment today would reveal the ugly sights of poorly planned, uncompleted, abandoned, and even aborted projects. These projects include road construction, airports, electricity, water, schools, and hospitals (Igwe & Ude, 2018). If their costs were to be calculated, it would reveal a colossal waste of scarce resources (Eboh & Igwe, 2007).

Nigerian construction firms are associated with inefficient planning, resulting in low productivity and a growing delay rate (Ibrahim, 2015; Otairu, 2014; Ibrahim et al., 2014). They were also found to be incorrectly adopting methods and planning procedures, which have been shown to reduce the firms' profitability and cause frequent cases of contract abandonment (Obebe et al., 2020; Adebisi et al., 2018). Inefficiency in construction planning also hurts the national economy. Research in construction has identified inefficiency in planning but needs to provide a holistic approach to understanding the current methods of planning used by contractors, why those methods are inadequate, and provide solutions on how to improve construction planning methods. However, the aim of this study is to assess the determinants of poor project planning in Nigerian public construction projects. To achieve the aim of the study, the following research questions were raised to guide the study:

- What are the determinants of poor project planning in public-sector construction projects?
- What are the factors influencing the implementation of construction project planning in public sector construction projects?
- What are the barriers to project planning implementation by professionals in public sector construction projects?

2. Conceptual Review

2.1 Concept of planning

Planning is a crucial aspect of project management. It defines the scope of the project, refines objectives, and establishes the necessary actions to achieve those objectives (Guyadeen et al., 2023). Failure to plan adequately can lead to project failure (Locatelli et al., 2023). Project managers must heavily invest in planning as it is essential for project execution, control, and, ultimately, success (Chen, 2024).

Planning involves a complex thought process that encompasses understanding project activities, their sequence, resource requirements (time, money, equipment), and the various options available to realise them (Rotich, 2024). Almost every aspect of a project is subject to planning. Berliner (2023) and Dwivedi et al. (2023) emphasise that a comprehensive planning perspective should consider what needs to be done (activities), how it should be done (sequence) when it should be done (schedule), the required resources and personnel (resource), and how to ensure its successful completion (control). Silveira and Costa (2024) define planning as the process of identifying all

necessary activities to complete a job. Mustapha (2011) considers planning as the essential function of management, responsible for defining the work to be managed and how it should be carried out.

Hinton (2012) asserts that planning involves defining organisational goals, establishing an overarching strategy to achieve these goals, and creating comprehensive plans to integrate and coordinate organisational work. Planning guides the organisation, mitigates the impact of change, fosters coordinated efforts, reduces uncertainty, sets control standards, and minimises redundant and wasteful activities. Chitkara (2012) defines planning as a time-based action plan that coordinates various activities and resources to achieve specific objectives. In short, planning is the process of developing a project plan.

2.2 Project planning

Project planning is a blueprint for a desirable future that managers seek to achieve. Stoner et al. (2006) described project planning as the kind of decision-making tool that addresses the future managers desire to create in their institution. Therefore, project planning involves establishing goals and a suitable course of action for achieving those goals. Islam and Faniran (2005) defined project planning as a conscious effort and process that determines the optimal method, sequence, and timing of project activities, as well as the required resources, to maximise the chance of successful project completion. The Project Management Institute (PMI, 2013) indicated that project planning has numerous advantages. Dov et al. (2003) asserted that despite the identified benefits of planning, some project management professionals tend to overthink planning, which can reduce individual creative contributions to the project. According to these professionals, planning restricts individuals to what is already planned, making it difficult for them to introduce innovations into the project (Dov et al., 2003). This claim has led some professionals to propose the use of milestones instead of detailed activity planning.

PMI (2013) opined that there is no genuine reason to believe that a project can succeed without planning. Dov et al. (2003) observed that there is a significant relationship between the quantity and quality of effort expended in project planning. These efforts include defining the client's goals, functional requirements, and technical specifications of the products, which collectively contribute to the overall success of the project. Therefore, no effort should be spared in the initial stage of projects to properly define the project's goals and key deliverables, as well as to thoroughly understand the requirements and needs of the end-user or client.

2.3 Construction project planning

The careful and thorough construction planning process is an essential and complex task in effectively managing and carrying out construction projects. Ghorbani (2023) opined that construction project planning is similar to every other project planning because construction projects have a life cycle similar to any other project. However, due to the unique nature of construction projects, Windapo (2013) indicated that construction planning deserved to be studied separately. Parsamehr et al. (2023) identified that construction projects should be explicitly planned considering technology choice, definition of work, estimation of required resources, and durations of tasks. Construction project planning also requires the identification of any interactions among the different work tasks. The construction planning process is stimulated through the study of project documents. These documents are identified by Ejike (2023) as designs and drawings, estimation of quantities, construction method statements, project planning data, contract documents, site conditions, market survey, local resources, project environment, and the client's organisation. The planning process of construction projects also considers the strengths and weaknesses of the organisation involved in the project.

Planning gives an impression that somebody is in control; it gives a sense of direction and the likely destination for the project. Construction planning is generally concerned with completing work of

designed quality in a short period as practically as possible, which is compatible with the economy of production. The construction company's future actions regarding the intended construction method, the work program, and the type of materials, labour, plant, and equipment must be made known to the clients and their representatives (CORBON/NIOB 2014). Suppliers and subcontractors should be notified when their goods and services are required. Moreover, the construction organisation must know its future commitment to materials, staffing needs, labour, and plant and equipment. The time needed to plan a construction project varies from project to project depending on complexity, details available, the size of the individual project, and the project's location. A plan is a detailed method formulated beforehand for doing or making something (Javanmardi et al., 2023). Planning involves all the procedures required to determine what is to be done, who should do it, and how it should be done.

2.3.1 Planning Process in Construction

The American Association of Civil Engineers (AACE, 2011) offers a formal definition of project planning as the process of establishing a project's objectives, identifying the activities to be undertaken, determining the methods and resources necessary for task accomplishment, assigning responsibility and accountability, and finally, formulating an integrated plan that ensures timely project completion.

Planning is the process by which the system adjusts its resources, adapts internal conditions, and formulates a feasible framework statement for executing the work that serves as the foundation for the work (Steiner, 2010). Planning commences at an early stage of project conceptualisation and continues throughout the different phases of the project life cycle until the project closeout stage or handover. Planning is an ongoing process rather than a singular and definitive effort. Scheduling involves the delineation of distinct activities, their durations, and the interrelationships between activities, which collectively represent the chronological plan and can be effectively communicated (AACE, 2011).

3. Research Methodology

This study assesses the determinants of poor project planning in Nigerian public construction projects in Kano metropolis, Kano State. The respondents targeted were professionals involved in public construction projects within the Kano metropolis, including architects, engineers, quantity surveyors, builders, and others. Kano metropolis is singled out for this study since it is the most highly concentrated area with many ongoing public projects within the state. The study employed a primary source of data, which is the use of a questionnaire. A self-administered questionnaire was administered to professionals using a purposive sampling technique. The purposive sampling technique benefits the study by eliminating people who do not fit the requirements, and the sample is an accurate or near-to-accurate representation of the population (Mujere, 2016). A total of 217 questionnaires were administered to respondents in the study area. However, only 156 questionnaires were completed, returned, and used for analysis because they were filled out correctly. These 156 questionnaires represented a 71.9% response rate. This response rate is higher than 25.4% (Emuze, 2011) and lower than 87.1% (Agboola et al., 2023b) in the construction industry. The questionnaire consisted of two sections. Section one covered the demographic background of the respondents, while Section two asked respondents to assess the determinants of poor planning. SPSS was used to analyse the data obtained from the questionnaire responses. Descriptive statistics such as mean and standard deviation were employed. The data assessment for the determinants of poor planning in Nigerian public sector construction projects utilised a 5-point Likert scale (1= No effect, 2= Low effect, 3= Moderate Effect, 4= High effect, 5= Very High effect). In describing the data, the study presents the facts transparently and fairly. It also filters out those matters that are not relevant to the research problem.

4. Result and Discussion

Below is the presentation of results based on the research questions raised above. The presentation starts with the analysis of demographic information.

4.1 Demographic study

Table 1 below presents the profiles of the respondents. 19.2% were architects. 23.7% were builders, 28.8% were quantity surveyors, 23.7% were engineers, and 8% were others. The results show that the professionals are almost evenly represented. 34.6% have 6-10 years of experience, 23.7% have 1-5 years of experience, 20.5% have 11-15 years of experience, 14.1% have 16-20 years of experience, and 7.1% have 21 years and above experience. Also, 63.5% of the professionals hold bachelor's degrees, 19.5% hold higher national diplomas, 9.6% hold master's degrees, 5.1% hold national diploma certificates, and 1.9% hold PhD degrees. Findings from the professionals' demographic profile reveal that respondents are well-experienced and educated enough to respond to this research inquiry.

Table 1: *Respondents' Profile*

S/N	Respondents' Details	Response	Frequency	Per cent
1	Professional background	Architect	30	19.2
		Builders	37	23.7
		Quantity Surveyor	45	28.8
		Engineers	37	23.7
		Others	7	4.5
2	Year of experience	1-5 years	37	23.7
		6-10 years	54	34.6
		11-15 years	32	20.5
		16-20 years	22	14.1
		21 years and above	11	7.1
3	Highest level of education	OND	8	5.1
		HND	31	19.5
		Bsc.	99	63.5
		Msc.	15	9.6
		PhD	3	1.9

4.2 Determinants of poor project planning

Table 2 presents results on the determinants of poor project planning. The results show a lack of qualified personnel and project budget, with a relative importance index (RII) of 0.94, ranked first and second, respectively. Experience and poor communication among project teams, with an RII of 0.93, ranked third and fourth, respectively. Financial mechanism, with an RII of 0.93, ranked fifth. The credibility of contractors, with an RII of 0.92, ranked sixth. The financial integrity of the client, with an RII of 0.90, ranked seventh. Time control mechanism, with an RII of 0.89, ranked eighth. Establishing exactly what the client wants, with an RII of 0.89, ranked ninth. Quality ranked tenth, with an RII of 0.88. The size of the project, with an RII of 0.87, ranked eleventh. Disrespect to project management roles, with an RII of 0.86, ranked twelfth. Poor risk management, with an RII of 0.84, ranked thirteenth. Wrong estimation, with an RII of 0.83, ranked fourteenth. Lack of innovation, with an RII of 0.82, ranked fifteenth. Functional hierarchy, with an RII of 0.78, ranked sixteenth. Management, organisation, and ambiguity in team members' roles, all with an RII of 0.78, ranked seventeenth and eighteenth, respectively. Poor definition of the project, with an RII of 0.73, ranked nineteenth, while lack of availability of resources, with an RII of 0.68, ranked twentieth. From the results of the study, it is clear that the identified factors above are all determinants of poor project planning as they affect the project planning process.

The results show that experience, poor communication among project teams, financial mechanism, the credibility of contractors, financial integrity of the client, time control mechanism, establishing exactly what the client wants, quality, size of the project, disrespect to project management roles, poor risk management, wrong estimation, and lack of innovation are significant determinants of poor project planning. Therefore, it is clear that the identified poor project planning factors are criteria to be used in determining the poor planning of a construction project.

Table 2: *To identify the determinants of poor project planning*

Variable	W	RII	Mean	Std. D.	Rank
Poor definition of project	567	0.73	3.63	1.24	19
Establishing what exactly the client wants	691	0.89	4.43	1.00	9
Management and organisation	605	0.78	3.88	1.29	17
Lack of availability of resources	530	0.68	3.40	1.50	20
Poor communication among project team	722	0.93	4.63	0.79	4
Financial integrity of the client	705	0.90	4.52	0.93	7
Size of project	677	0.87	4.34	0.96	11
Project budget	730	0.94	4.68	0.72	2
Quality	684	0.88	4.38	1.03	10
Time control mechanism	693	0.89	4.44	0.89	8
Financial mechanism	722	0.93	4.63	0.80	5
Ambiguity in team member's role	605	0.78	3.88	1.35	18
Poor risk management	653	0.84	4.19	1.01	13
Experience	723	0.93	4.63	0.74	3
Functional hierarchy	610	0.78	3.91	1.48	16
Lack of qualified personnel	733	0.94	4.70	0.61	1
Credibility of contractors	716	0.92	4.59	0.81	6
Lack of innovations	636	0.82	4.08	1.23	15
Wrong estimate	651	0.83	4.17	1.18	14
Disregard to project management roles	667	0.86	4.28	1.25	12

4.3 Factors influencing the implementation of project planning in public sector construction project

Table 3 above shows the factors influencing project planning implementation in public sector construction projects. The results show that natural occurrences have a mean of 4.69, the use of computers and ICT has a mean of 4.63, differing approaches of those who produce the plans and those who deliver the project have a mean of 4.57, leadership of the project team has a mean of 4.52, application of planning techniques has a mean of 4.51. Furthermore, only trained project managers should plan the project with a mean of 4.45, non-availability of labour with a mean of 4.44, lack of experience with a mean of 4.32, difficulties of coordination between various parties working on the project with a mean of 4.32, making a project plan compulsory with a mean of 4.31, and complexity of the project with a mean of 4.24 are significant factors influencing the implementation of project planning in public sector construction projects. Insufficient finance, with a mean of 3.91; insufficient time/tight schedules, with a mean of 3.89; and changes in client requirements, with a mean of 3.81, all have moderate effects on factors influencing project planning implementation in public sector construction projects.

Table 3: *Factors influencing the implementation of project planning in public sector construction project*

Factors	**NE**	**LE**	**ME**	**HE**	**VHE**	**Mean**	**Std.D**	**Rank**
Insufficient finance	11	11	2	35	98	3.92	1.20	12
Changes in client requirements	9	7	7	73	61	3.81	1.32	14

Differing approaches of those who produce the plans and those who deliver the project	12	19	7	57	62	4.57	0.81	3
Difficulties of coordination between various parties working on the project	10	19	15	40	73	4.32	1.14	9
Insufficient time/tight schedule	11	4	2	31	109	3.89	1.46	13
Complexity of project	33	29	6	33	56	4.24	1.08	11
Lack of experience	9	7	30	54	57	4.32	1.08	8
Natural occurrences	30	23	3	57	44	4.69	0.81	1
Non-availability of labour	25	9	5	31	87	4.44	0.72	7
Leadership of the project team	23	35	19	32	48	4.52	0.72	4
Use of computers and ICT	27	37	17	36	40	4.63	0.65	2
Application of planning techniques	34	28	19	37	39	4.51	0.83	5
Making project plan a compulsory document	38	22	11	35	51	4.31	0.94	10
Only trained project managers should plan the project	21	17	10	47	62	4.45	0.84	6

4.4 Barriers to project planning implementation by professionals in public sector construction

Table 4 above shows the barriers to project planning implementation by professionals in public construction projects. The results show that the barriers to project planning implementation by professionals in public construction projects include lack of communication with a mean value of 4.72; performance problems with a mean value of 4.68; political influence with a mean of 4.60; a dissatisfied project team with a mean of 4.60; abandonment of the project with a mean of 4.59. All of the factors mentioned above are critical barriers to project planning implementation by professionals in public construction projects, with all of them having a very high effect. Other barriers include time overrun with a mean of 4.47, absence of new technology and software for planning with a mean of 4.46, compromised project quality with a mean value of 4.44, wrong estimation with a mean of 4.43, resource constraints with a mean of 4.40, client pressure to start work with a mean of 4.37, trivial control and reporting system between management with a mean of 4.35, poor scope control with a mean of 4.33, reduced profit with a mean of 4.31, risk of injury and hazard with a mean of 4.24, cost overrun with a mean of 4.24, and incompatibility of planning method with a mean of 4.08. These factors are critical barriers to project planning implementation by professionals in public construction projects, with all of them having a high effect. Other barriers include contractor enthusiasm with a mean of 3.99, poor management with a mean of 3.96, a dissatisfied customer with a mean of 3.57, insufficient support from project stakeholders in planning with a mean of 3.65, and poor decision-making regarding activity criticality with a mean of 3.30. All of these factors are barriers to project planning implementation by professionals in public construction projects, with all of them having a moderate effect.

The findings of the study show that the lack of communication, performance problems, political influence, a dissatisfied project team, abandonment of the project, time overrun, absence of new technology and software for planning, compromised project quality, wrong estimation, resource constraints, client pressure to start work, trivial control and reporting system between management, poor scope control, reduced profit, risk of injury and hazard, cost overrun, and incompatibility of planning method are critical barriers to project planning implementation by professionals in public construction projects in the study area. This is a strong indicator in the study as it effectively covers issues in construction project planning and reduces issues in construction project delivery.

Table 4: *Barriers to project planning implementation by professionals in public sector construction project*

Features	Mean	Std. Deviation	Level of Existence
Time overrun	4.47	0.85	High
Cost overrun	4.24	0.78	High
Poor management	3.96	1.12	Moderate
Poor scope control	4.33	0.86	High
Dissatisfied project team	4.60	0.82	Very High
Reduced profit	4.31	0.88	High
Risk of injury and hazard	4.24	1.07	High
Wrong estimation	4.43	0.96	High
Dissatisfied customer	3.57	1.41	Moderate
Compromised project quality	4.44	1.01	High
Abandonment of project	4.59	0.68	Very High
Lack of communication	4.72	0.66	Very High
Performance problem	4.68	0.72	Very High
Client pressure to start work	4.37	1.07	High
Resources constrained	4.40	1.06	High
Contractors' enthusiasm	3.99	1.18	Moderate
Incompatibility of planning methods	4.08	1.06	High
Political influence	4.60	0.77	Very High
Absence of new technology and software for planning	4.46	0.76	High
Trivial control and reporting system between management	4.35	0.93	High
Insufficient support from the project stakeholders in planning	3.65	1.38	Moderate
Poor decision-making regarding activity criticality	3.30	1.43	Moderate

5. Discussion of Result

5.1 Determinants of poor project planning

To identify the determinants of poor project planning, the results show that experience, poor communication among the project team, financial mechanisms, credibility of contractors, financial integrity of the client, time control mechanisms, establishing the client's exact requirements, quality, project size, disrespect for project management roles, poor risk management, incorrect estimates, and lack of innovation are all factors that contribute to poor planning. Based on these findings, it is evident that these factors serve as criteria for determining poor planning in construction projects. Dahiru and Mohammed (2012) conducted a study that identified incomplete documents and finances, among other factors, as negatively impacting construction project planning. However, there is a need to find ways to improve construction planning among construction companies in Nigeria in order to reduce the issue of poor construction planning. Adedokun and Egbelakin (2024) suggested that construction planning should be a team effort, and construction companies should establish mechanisms for monitoring and controlling construction planning to ensure successful implementation. There are two primary levels of planning associated with construction projects:

strategic and operational (Harris & McCaffer, 2005). The management and organisation of the construction process should adopt strategic approaches to aid in the proper planning of the construction project. Project operations involve numerous activities, and their constraints and resources are not easily visualised (Wang et al., 2015). Therefore, proper project planning is essential for achieving success (Chow, 2021). Contractors' operational planning involves developing a method statement for each activity, which provides a detailed understanding of the project's resource requirements, particularly at the strategic level (Gupta, 2010; Harris & McCaffer, 2005). Additionally, a contractor's project plan should include a construction program of works (Harris & McCaffer, 2005). The program of works outlines the sequence in which various activities should occur, along with their associated durations and resource requirements (Harris & McCaffer, 2005). The contractor's program of work and method statement conveys the contractor's intentions for executing the work. Project planning techniques are used to develop an effective and efficient method statement and program of work in construction (Illingworth, 2017). However, the inadequate technical and managerial know-how of the NICs (Newly Industrialised Countries) and their inability to utilise appropriate project planning techniques have resulted in project failures in Nigeria (Mbamali & Okotie, 2012; Aniekwu & Audu, 2010; Muazu & Bustani, 2004). Furthermore, the conditions of contracts for building projects do not specify what type of planning technique should be used for the master program and method statement for contractors (Clough, 2015).

5.2 Factors influencing implementation of project planning in public sector construction project

To assess factors influencing the implementation of project planning in public sector construction projects, the results of the analysis clearly showed that the following factors play a significant role: natural occurrences, the use of computers and ICT, differing approaches of those who produce the plans and those who deliver the project, leadership of the project team, application of planning techniques, the requirement for trained project managers to plan the project, non-availability of labour, lack of experience, difficulties in coordinating between various parties working on the project, making project planning compulsory, and the complexity of the project. This study is in line with that of Usman et al. (2012), who observed that construction planning is enhanced by the application and adoption of information and communication technology. Additionally, CORBON/NIOB (2014) documented the advantages of using computer applications and ICT in construction project planning. The involvement of project team members in planning construction projects improves communication and understanding within the team (Yang, 2020). There are many project planning techniques, and understanding how they work and their inherent advantages is paramount for contractors. The typical project planning techniques include bar charts and linked bar charts, line of balance, and the network method (Bhavikatti, 2012; Chitkara, 2012; Passenheim, 2009). Planning has a considerable influence on the outcome of projects. The results of this study validate the assertion of Dahiru and Mohammed (2012), who indicated that the inability of contractors to plan construction projects efficiently led to their inability to supplement substantial infrastructural deficits in Nigeria. There is a severe and urgent need to improve the planning process by contractors.

Certain factors often hinder the process of developing and implementing construction planning, and according to Chandra (2009), these factors include incomplete working and production drawings and documents, resource constraints, time constraints, knowledge of how to plan, and availability of technology (Agboola, 2023a; Maina, 2018; Chandra, 2009). The process of planning involves making the targets, objectives, and procedures clear to bring the project through its lifecycle to a successful end when the project's item, management, or process assumes its rightful position in the execution of project owner methodologies (Sholarin & Awange, 2016; Patanakul & Shenhar, 2012). Various specialists have explored the possibilities of proper project planning to impact anticipated project success (Zwikael et al., 2014). Planning and determining the ideal project lifecycle for the adopted project can significantly influence the project's success (Rahrovani et al., 2014). Project planning

involves deciding on the optimal strategies, arrangement, and timing of project activities and required resources to maximise the possibility of a successful project. The effectiveness of project planning can be conceptualised as the degree to which a project achieves its planned targets (Galvin et al., 2014).

Choices and processes taken during the planning procedure have been found to influence the plausible result of a project (Altshuler, 2019; Chermack, 2011; Hirschman, 2014). Project planning can be utilised to devise new items, administrations, inside operations, or organisational strategies (Meredith et al., 2017; Burke, 2013). It is generally accepted that the project is an exciting attempt, an extraordinary undertaking that has its peculiarity. However, it is tough to know precisely at the underlying planning stage the risk involved and other exercises that will show up in the process to the finishing stage of the project and their cost and length parameters. On the other hand, the influence of project planning on the project delivery process and performance is expected to be the same as other management functions. Where project planning is ineffective, the chances of monitoring, evaluation, and control being effective could be higher. Nigerian professionals' level of project planning has little influence on project performance and, as a matter of concern, needs to be taken seriously by all stakeholders. The professionals will need to improve the level of planning of their projects to achieve effective monitoring, evaluation, and control of their delivery process and improve project performance. There is still room for increased use of project conception, design, and contract plans for both public and private sector clients in Nigeria. Planning the construction process means figuring out what work must be done, who will finish this work, and when the work will be finished. In particular, project planning includes assessing exertion, time, cost, and staff assets expected to execute the project. Planning the different deliverables within the project scope and specified period and within the scope will give structure to the project. Project management success factors suggest that planning is one of the major contributors to project success (Aronson & Lechler, 2009).

5.3 Barriers to project planning implementation in public sector construction project

To determine barriers to project planning implementation by professionals in public construction projects, the analysis clearly showed that the critical barriers to project planning implementation by professionals in public construction projects are lack of communication, performance problems, political influence, dissatisfied project teams, abandonment of the project, time overrun, absence of new technology and software for planning, compromised project quality, wrong estimation, resource constraints, client pressure to start work, trivial control and reporting system between management, poor scope control, reduced profit, risk of injury and hazard, cost overrun, and incompatibility of planning methods. Studies by Ibrahim et al. (2014), Ubani et al. (2010), and Idowu et al. (2023) identified problems of project planning, such as time overrun, cost overrun, dissatisfied clients, dissatisfied project teams, and poor scope. Oladimeji and Ojo (2012) identified cost overrun as one of the problems in project planning. Chandra (2009) identified factors that can lead to construction project planning failure, including the client's financial integrity and inadequate budget for planning. Momodu et al. (2024) list the identified causes of project planning as wrong estimates and poor communication among project teams. Dahiru and Mohammed (2012) attributed the failure of a construction project to finance, communication, and client-related factors; this result further explains client-related factors that lead to the failure of construction planning, such as client ethical standards and client financial integrity. Project planning involves establishing objectives and determining the most effective means of achieving them (Meredith, 2017). Inadequate planning has been cited as the primary cause of project failure (Nzekwe, 2015). According to Agboola et al. (2023c) and Pinto (2013), project failures often result from a lack of proper planning before commencement, the use of inexperienced personnel in planning and implementation, delegation of planning tasks to unqualified staff, lack of discipline and commitment to effective planning, failure to adhere to established planning guidelines, and insufficient time allocated for planning.

6. Conclusion

The significant factors identified for determining poor project planning include experience, poor communication among the project team, financial mechanisms, credibility of contractors, financial integrity of the client, and time control mechanisms. The factors influencing the implementation of project planning in public sector construction projects include natural occurrences, use of computers and ICT, differing approaches of those who produce the plans and those who deliver the project, leadership of the project team, and application of planning techniques. The critical barriers to project planning implementation in public construction projects include lack of communication, performance problems, political influence, a dissatisfied project team, abandonment of the project, time overrun, absence of new technology and software for planning, compromised project quality, wrong estimation, resource constraints, and client pressure to start work. Generally, project planning is affected due to poor planning and implementation of construction projects. Contractors should employ the right professionals to handle project activities in terms of professionalism, who know proper construction management, quality of work, cost control, and time management. Construction companies should also be aware of clients' integrity in financial dealings and client ethical standards prior to agreeing on any proposed plan on how to execute the project. Also, project managers need to have early and continuous involvement in the project to get on-time information about their sites and to work on foreseen and unforeseen problems that may arise by adjusting plans to meet actual site conditions and other challenges faced during actual implementation. Managers of various construction firms should be encouraged to use quality management techniques to execute projects. Also, it encourages the integration of quality management practices in the early stage of the project and ensures that project planning implementation is well instituted. Future research into the framework for predicting the failure and success of project planning and implementation practices in the construction industry is needed. Further research is needed to develop a deeper understanding of the impediment factors that affect the effective implementation of project planning in practice.

7. Declarations

Authors contributions: Authors contributions: Conceptualisation (M.Z.H., S.A.A., M.Y.F. & A.A.F.); Literature review (M.Z.H., S.A.A., M.Y.F. & A.A.F.); methodology (M.Z.H., S.A.A., M.Y.F. & A.A.F.); software (M.Z.H., S.A.A.); validation (M.Y.F. & A.A.F.); formal analysis (M.Z.H., S.A.A., M.Y.F. & A.A.F.); investigation (Z.M.H., S.A.A., F.Y.M. & A.A.F.); data curation (Z.M.H., S.A.A., F.Y.M. & A.A.F.) drafting and preparation (M.Z.H., S.A.A., M.Y.F. & A.A.F.); review and editing (M.Z.H., S.A.A., M.Y.F. & A.A.F.); supervision (A.A.F.); project administration (S.A.A.); funding acquisition (N/A). All authors have read and approved the published version of the article.

Funding: This research did not receive any external funding.

Acknowledgements: No acknowledgement to make.

Conflicts of Interest: The authors declare no conflict of interest.

Data availability: The data for the study can be found in the body of the work. However, more information is available from the corresponding author upon reasonable request.

References

AACE. (2011). *Project planning applied in engineering and construction for capital projects—International Recommended Practice No. 10S-90*. Association for the Advancement of Cost Engineering

Adebisi, E. O., Ojo, S. O., & Alao, O. O. (2018). Assessment of factors influencing the failure and abandonment of multi-storey building projects in Nigeria. *International Journal of Building Pathology and Adaptation*, *36*(2), 210-231. https://doi.org/10.1108/IJBPA-10-2017-0048

Agboola, S. A., Idowu, F. A., Yusuf, F. M., & Musa, A. K. (2023a). Barriers to sustainable green building practice in Nigeria. *Journal of Sciences*, *7*(6), 157-163. https://doi.org/10.33003/fjs-2023-0706-2114

Agboola, S.A., Abbas, K.I., Sati, D.T., Zakari, A. & Sanusi, R. F. (2023b). Assessing contractor's selection criteria for improved project delivery. *FUOYE Journal of Engineering and Technology, 8* (3), 397–402.

Agboola S.A., Uzoma N.C., Sati D.T., Abdulrahmon, N. & Musa A K. (2023c). Challenges associated with contractor selection strategy in construction project delivery. *LAUTECH Journal of Civil and Environmental Studies, 11* (1), 20-23.

Akande, O. K., Olagunju, R. E., Aremu, S. C., & Ogundepo, E. A. (2018). Exploring factors influencing of project management success in public building projects in Nigeria. *YBL Journal of Built Environment*, *6*(1), 47-62.

AlSehaimi, A. (2011). *Improving construction planning practice in Saudi Arabia by means of lean construction principles and techniques* [Doctoral Thesis, University of Salford]. ProQuest Dissertations & Theses.Altshuler, A. (2019). *The city planning process: A political analysis*. Cornell University Press.

Aibinu, A. A., & Jagboro, G. O. (2002). The effects of construction delays on project delivery in Nigerian construction industry, *International Journal of Project Management*, 593–599.

Aniekwu, A. N., & Audu, H. O. (2010, July). The effects of management on productivity: A comparative study of indigenous and foreign firms in the Nigerian construction industry. In *Proceedings of West Africa Built Environment (WABER) Conference, 27* (pp. 567-578).

Aronson, Z. H., & Lechler, T. G. (2009). Contributing beyond the call of duty: Examining the role of culture in fostering citizenship behaviour and success in project-based work. *R&D Management*, 39(5), 444-460. https://doi.org/10.1111/j.1467-9310.2009.00573.x

Berliner, J. S. (2023). Planning and management. In A. Bergson & H.S. Levine (Eds), *The Soviet Economy* (pp. 350-390). Routledge.

Bhavikatti, S. S. (2012). *Building construction*. Vikas Publishing House.

Burke, R. (2013). *Project management: planning and control techniques*. John Wiley & Sons.

Chandra, P. (2009). *Project planning, analysis, selection, and review.* Tata McGraw Hill Education.

Chen, M. (2024). *Evaluation of the capacity building model for the Tremplin Santé Program: A mixed methods study* [Master's thesis, University of Waterloo].

Chermack, T. J. (2011). *Scenario planning in organisations: how to create, use, and assess scenarios*. Berrett-Koehler Publishers.

Chow, T. C., Zailani, S., Rahman, M. K., Qiannan, Z., Bhuiyan, M. A., & Patwary, A. K. (2021). Impact of sustainable project management on project plan and project success of the manufacturing firm: Structural model assessment. *Plos one*, *16*(11), e0259819. https://doi.org/10.1371/journal.pone.0259819

Chitkara, K. K. (2012). *Construction project management: Planning, scheduling and controlling*.Tata McGraw-Hill.

Clough, R. H., Sears, G. A., Sears, S. K., Segner, R. O., & Rounds, J. L. (2015). *Construction contracting: A practical guide to company management*. John Wiley & Sons.

CORBON/), (2014). *Seventh mandatory continuing professional development Programme for builders' papers.* Council for the Registration of Builders/ Nigerian Institute of Building.

Cooke, B., & Williams, P. (2013). *Construction planning, programming and control*. John Wiley & Sons.

Dahiru, A. D., & Mohammed, I. Y. (2012). The roles of researchers in the construction sector towards achieving millennium development goals. *Journal of Science and Multidisciplinary Research,* 4, 80-93.

Dov, D., Tzvi, R, & Aaron, J. S. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Management, 2*189-95.

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., ... & Wright, R. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and

implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, *71*, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Eboh, F. E., & Igwe, N. N. (2007). Analysis of environmental influences that impinge on project completion in Nigeria. *ABSU Journal of Management Sciences*, *3*(1), 11-22.

Eja, K. M., & Ramegowda, M. (2020). Government project failure in developing countries: a review with particular reference to Nigeria. *Global Journal of Social Sciences*, *19*, 35-47.

Ejike, S. C. (2023). *Cost Overruns as Correlate of Quality Control in Building Project in Aboh Mbiase Local Government Area, Imo State* [Doctoral dissertation, Federal University Of Technology Minna].

Emuze, F. A. (2011). Performance Improvement in South African Construction [Doctoral dissertation, Nelson Mandela Metropolitan University].

Eze, C. E., Awodele, I. A., Adegboyega, A. A., Onyeagam, O. P., & Guto, J. A. (2020). Assessment of the triggers of inefficient materials management practices by construction SMEs in Nigeria. *International Journal of Real Estate Studies*, *14*(1), 38-56. https://doi.org/10.11113/intrest.v14n1.134

Fabian, C., & Amir, A., (2011). The Chad- Cameroon pipeline project--assessing the World Bank's failed experiment to direct oil revenues towards the poor. *The Law and Development Review, 4*(1), 32–65. https://doi.org/10.2202/1943-3867.1099

Galvin, T., Gibbs, M., Sullivan, J., & Williams, C. (2014). Leadership competencies of project managers: An empirical study of emotional, intellectual, and managerial dimensions. *Journal of Economic Development, Management, IT, Finance, and Marketing*, *6*(1), 35-60.

Ghorbani, A. (2023). A review of successful construction project managers' competencies and leadership profile. *Journal of Rehabilitation in Civil Engineering*, *11*(1), 76–95. https://doi.org/10.22075/jrce.2022.24638.1560

Gupta, A. K. (2014). *Engineering Management*. S. Chand Publishing..

Guyadeen, D., Henstra, D., Kaup, S., & Wright, G. (2023). Evaluating the quality of municipal strategic plans. *Evaluation and Program Planning*, *96*, 102186. https://doi.org/10.1016/j.evalprogplan.2022.102186

Hanachor, M. E. (2012). Community development project abandonment in Nigeria: Causes and effects. *Journal of Education and Practice*, *3*(6), 33-36.

Harris, F., & McCaffer, R. (2005). *Modern construction management*. EPP Books Services.

Hinton, K. E. (2012). *A practical guide to strategic planning in higher education* (Vol. 7). Society for College and University Planning.

Hirschman, A. O. (2014). *Development projects observed*. Brookings Institution Press.

Ibrahim, I. I. (2015). *Project planning in construction procurement: The case of Nigerian indigenous contractors* [Doctoral dissertation, Jomo Kenyatta University of Agriculture and Technology].

Ibrahim, I. I., Saiva, A., & Alkizim, A. (2014). Investigating Nigerian Indigenous contractors project planning in construction procurement: An explanatory approach. *International Journal of Civil & Environmental Engineering,14,* (4), 16-25.

Idoro, G., & Patunola-Ajayi, J. B. (2009). Evaluating the strategies for marketing project management systems in the Nigerian construction industry. *Nordic Journal of Surveying and Real Estate Research*, *6*(2), 25-36.

Idowu, F. A., Agboola, S. A., Mustapha, Y. F., Abdulrahmon, N., & Abdulhakeem, M. K. (2023). Effect of risk factors on transnational public-private partnership performance time: A case study of Lagos State. *Academy Journal of Science and Engineering*, *17*(2), 70-90.

Igwe, N. N., & Ude, A. O. (2018). Project planning and implementation in Nigeria: Revisiting international best practices. *European Scientific Journal*, *14*(14), 152-174.

Illingworth, J. R. (2017). *Construction methods and planning*. CRC Press.

Islam, M. D. & Faniran, O.O. (2005). Structural equation model of project planning Effectiveness *Journal Of Construction Management And Economics*, *23*(2), 215-223. https://doi.org/10.1080/0144619042000301384

Javanmardi, A., He, C., Hsiang, S. M., Abbasian-Hosseini, S. A., & Liu, M. (2023). Enhancing construction project workflow reliability through observe–plan–do–check–react cycle: A bridge project case study. *Buildings*, *13*(9), 2379. https://doi.org/10.3390/buildings13092379

Kasimu, A. M., & Isah, A. D. (2012). Causes of delay in Nigeria construction industry. *Interdisciplinary Journal of Contemporary Research in Business, 4*(2), 785-794.

Locatelli, G., Paravano, A., Terenzi, M., & Trucco, P. (2023). Yes, construction cost, time and scope are important, but there is more: a new action plan for infrastructure success. *Management Decision*, *61*(13), 413-424.

Maina, P. W. (2018). *An investigation into the role of building information modelling in reducing cost and time overruns experienced in a 2-dimensional based construction survey of construction practitioners in Nairobi County* [Doctoral dissertation, University of Nairobi].

Mbamali, I. & Okotie, A. J. (2012). An Assessment of the threats and opportunities of globalisation on building practice in Nigeria *American International Journal of Contemporary Research, 4,* 143-150.

Meredith, J. R., Shafer, S. M., & Mantel Jr, S. J. (2017). *Project management: a strategic managerial approach*. John Wiley & Sons.

Muazu, D. A., & Bustani, S. A. (2004). A comparative analysis of litigation among foreign and indigenous construction firms in Nigeria. *ATBU Journal of Environmental Technology*, *3*(1), 13-16.

Mustapha, A. (2011). I*nvestigating the usage of planning techniques in improving project delivery in the Nigerian construction industry* [Undergraduate thesis. Ahmadu Bello University].

Mujere, N. (2016). Sampling in research. In *Mixed methods research for improved scientific study* (pp. 107–121). IGI Global.

Note, M., (2015). *Project management for information professionals.* Chandos Publishing.

Nzekwe, J. U., Oladejo, E. I., & Emoh, F. I. (2015). Assessment of factors responsible for successful project implementation in Anambra State, Nigeria. *Civil and Environmental Research*, *7*(8), 39-58.

Obebe, S. B., Kolo, A., Enagi, I. S., & Adamu, A. A. (2020). Failure in contracts in Nigerian construction projects: Causes and proffered possible solutions. *International Journal of Applied Science and Technology*, *5*, 679-692.

Ogunde, A. O., Olaolu, O., Afolabi, A., Owolabi, J., & Ojelabi, R. (2017). Challenges confronting construction project management system for sustainable construction in developing countries: Professionals perspectives (A case study of Nigeria). *Journal of Building Performance*, *8*(1), 1-11.

Okeke, A. A. (2019). *Alternative dispute resolution (ADR) as a means to improve access to timely justice and a pathway to economic growth in Nigeria* [Master's thesis, University of Nevada].

Oladimeji, O., & Ojo, G. K. (2012, July). An appraisal of indigenous limited liability construction company in South-Western Nigeria. In *Proceedings of the 4th WABER Conference* (pp. 1095-1109).Otairu, A., Umar, A. A., Zawawi, N. A. W. A., Sodangi, M., & Hammad, D. B. (2014). Slow adoption of PPPs in developing countries: A survey of Nigerian construction professionals. *Procedia Engineering*, *77*, 188-195. https://doi.org/10.1016/j.proeng.2014.07.014

Parsamehr, M., Perera, U. S., Dodanwala, T. C., Perera, P., & Ruparathna, R. (2023). A review of construction management challenges and BIM-based solutions: Perspectives from the schedule, cost, quality, and safety management. *Asian Journal of Civil Engineering*, *24*(1), 353-389. https://doi.org/10.1007/s42107-022-00501-4

Passenheim, O. (2009) Project Management. Book Boon Publishers, USA. Pawel, W. (2013). Challenges of project planning in the probabilistic approach using PERT, GERT, and Monte Carlo. *Journal of management and marketing, 1*(1), 1-8.

Patanakul, P., & Shenhar, A. J. (2012). What project strategy is: The fundamental building block in strategic project management. *Project Management Journal*, *43*(1), 4-20. https://doi.org/10.1002/pmj.20282

Pinto, J. K. (2013). Lies, damned lies, and project plans: Recurring human errors that can ruin the project planning process. *Business Horizons*, *56*(5), 643–653. https://doi.org/10.1016/j.bushor.2013.05.006

Project Management Institute, (2013). *The Project Management Institute Pulse Studies 2003*. Project Management Institute, United States of America.

Rahrovani, Y., Chan, Y. E., & Pinsonneault, A. (2014). Determinants of IS planning comprehensiveness. *Communications of the Association for Information Systems*, *34*(1), 59. https://doi.org/10.17705/1CAIS.03459

Rotich, E. C. (2024). *Project Planning and Implementation of Water Construction Projects in Bomet County, Kenya* [Doctoral dissertation, Jomo Kenyatta University of Agriculture and Technology].

Sholarin, E. A., & Awange, J. L. (2016). *Environmental project management: principles, methodology, and processes*. Springer.

Silveira, B. F., & Costa, D. B. (2024). Method for automating the processes of generating and using 4D BIM models integrated with location-based planning and Last Planner® System. *Construction Innovation*, *24*(4), 1005-1025. http://dx.doi.org/10.1108/CI-02-2022-0030

Steiner, G. A. (2010). *Strategic planning*. Simon and Schuster.

Stoner, J., Freeman, R., & Gilbert, J.D.R (2006). Management, 6th Edition. Prentice Hall, New Delhi, India.

Ubani, E. C, Nwachukwu, C. C, & Nwokonkwo, O. C. (2010). Variation factors of project plan and their contributions to project failure in Nigeria. *American Journal of Social and Management Sciences, 1*(2), 141–149.

Usman, N. A., Inuwa I. I, Iro A. I. Dantong J. S (2012). Training of contractors craftsmen for productivity improvement in the Nigerian construction industry. *Journal of Engineering and Applied Sciences 4,* 1-12.

Wang, R., Zhong, D., Zhang, Y., Yu, J., & Li, M. (2015). A multidimensional information model for managing construction information. *Journal of Industrial & Management Optimization*, *11*(4), 1285–1300. http://dx.doi.org/10.3934/jimo.2015.11.1285

Windapo, A. (2013). Fundamentals of construction management. *Delhi: Open E-Book*.

Yang, L. R., Chen, J. H. & Huang, C. F. (2012). Definition of requirements and management practice to improve project outcomes. *Journal of Civil Engineering and Management*, *18*(1), 114-124. https://doi.org/10.3846/13923730.2012.657340

Yang, X., Yu, M., & Zhu, F. (2020). Impact of project planning on knowledge integration in construction projects. *Journal of construction engineering and management*, *146*(7), 04020066. https://doi.org/10.1061/(ASCE)CO.1943-7862.0001852

Zwikael, O., Pathak, R. D., Singh, G., & Ahmed, S. (2014). The moderating effect of risk on the relationship between planning and success. *International Journal of Project Management*, *32*(3), 435–441. https://doi.org/10.1016/j.ijproman.2013.07.002