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FACTORS INFLUENCING CONSTRUCTION PROJECT PLANNING AND IMPLEMENTATION: LESSONS FROM SOUTH WESTERN NIGERIA

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ABSTRACT

Project planning is an integral content in the management and execution of construction projects. However, it is challenging to implement and properly keep these plans to work. The study evaluates the factors influencing construction project planning and implementation on construction sites. It takes logical attempts and procedure to analyse the perceptions of respondents on these factors. This study adopted questionnaire survey to gather factors influencing construction project planning and implementation from professionals working in construction firms in south western Nigeria. A total of 108 respondents selected through random sampling techniques participated in the survey. Ranking analysis of the major factors using Relative Importance Index showed that type of client and type of project were the top two factors influencing project planning while insufficient finance and changes in client requirements were the top two factors influencing implementation of project plans. The study also revealed statistically significant difference in the perceptions of the respondents to some of the factors when classified into different groups. The study concludes that the knowledge of the identified factors influencing project planning and

implementation will assist construction stakeholders in re-evaluating their project planning endeavors and methods in order to enhance them and in this manner enhancing the performance of construction projects.

Keywords: Construction project, Implementation, Professionals, Project planning, Southwestern Nigeria.

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1. INTRODUCTION

Successful projects delivery are products of constructive construction planning and schedules put in place ahead of time. [1], reported that planning remained one of the major duty of project management. Recently, there was a grown concern that construction schedules are irrelevant to the daily running of construction projects. The major task of management is on project planning, but it is more challenging to implement and properly keep these plans to work.

Poor planning implementation leads to a requirement to make up lost time by an unplanned compression of the schedule, which happens in the majority of projects. Construction project necessitate proper planning to successfully manage both the human and material resources. In view of this, [2] maintained that there are various tasks, duration and cost restraints associated with construction project which need necessary attention and careful planning ahead of building production process.

The significance of these conceptualization and planning are comparatively eminent in relation with the remaining stages of the project development; they in turn momentously impact successful delivery of a project [3, 4, 5]. Regrettably , [6] confirmed that there is clear indication that projects are frequently carried out without any formal planning, thus such projects are confronted with different kinds of problems, ranging from exorbitant changes, spending beyond the financial plan, inability to finish the work according to schedule, low (or no) profits and the likes. In spite of the benefits that could be derived by the construction industry stakeholders, still the aspect of planning cannot be said with all confidence that it is practiced in most construction sites in Nigeria when compared to what is obtainable in the developed countries.

It has been noted that some building projects in Nigeria are completed without appropriate planning put in place. Such disorganization prompt the occurrence of issues such as project delays, spending more than the allocated cost, misuse of materials and a lot more [7-8]. Meanwhile [9], opined that in the delivery of construction project, private client commit more resources and effort to project planning than public clients. This is evidence in [10], who discovered that out of 28 causes of delay itemized, contractors improper planning ranked 1st. In the same manner, [11] discovered that among a total of 290 causes of delay in construction identified through literature review, ineffective planning ranked 15th. Also [12] find out that poor planning of project makes such project prone to failure. Poor planning and scheduling also emerged as the number one causes of variation in project cost and time in a study conducted by [13]. This problem demands urgent attention if construction project performance is to be improved.

Amazingly, there was a clear indication that many researches has been conducted in line to establish the importance of planning as well as its impact on construction project performance but there exist dearth of studies regarding the factors influencing planning and its ultimate

implementation. It is against this background that this research is set out to critically evaluate the factors influencing project planning and implementation.

This study is expected to intimate construction stakeholders with the difficulties associated with planning and implementation of construction project with a view to enhancing construction projects planning, implementation and performance. Looking at the impacts of research on project performance management, this study aimed to achieve these stated objectives:

i. To assess the perception of selected construction professionals about the factors influencing project planning and implementation on construction sites.
ii. To assess if the perception of these factors vary among categories of:
   a. construction professionals,
   b. their sizes of firms, and
   c. Professionals' years of industrial experience.

2. LITERATURE REVIEW

2.1. Classification of Project Planning

Various researchers have attempted to classify project planning using different terminologies as depicted in Table 1 below. These will bring to limelight professionals awareness of the planning processes thereby educating them about the processes.

Table 1 Various classification of project planning

Author	Classification	Term Used
[14]	Pre-construction planning; Construction planning	Classification of planning
[15-17]	Strategic planning, Operational planning	Levels of planning
[18]	End-user level (Project conception planning); Project management level (Contract planning); Technical level (Project design planning)	Levels of planning
[19]	Physical planning; Financial planning	Categories of Planning
[20]	Pre-tender; Tender; Pre-contract; Contract; Pre-construction; Construction; Commissioning; Post-construction.	Milestones
[21]	Conception; Design; Tendering; Construction; Closeout	Categories of Planning

2.2. Factors Influencing Construction Project Planning and Implementation

Different factors were considered mitigating construction project planning and its implementation thereby making stakeholders always confronted with difficulties to perform according to clients' requirements. [22] Developed simple linear regression model and artificial neural network (ANN) models to foretell the project performance (Cost and Schedule Growth individually) using Project Definition Rating Index (PDRI) score. The research outcome noted that projects with proper pre-project planning are most likely to performance far better at completion. [23] Tested framework on sensitivity, accuracy and specificity in foretelling both the cost and schedule performance of green building projects. The findings showed that the cost and schedule performance such projects majorly depend on the level of specifications included in planning at pre-project stage.

In the vein, [24] assessed the degree at which stakeholder contribute amid the project planning process of building project. It was noted that the construction/project management and owner/developer are more involved than the designer. However, it was discovered that site

operatives have least level of commitment within early project phases. [25] argued that pre-construction planning tend to have positive impact on project performance if consistently implemented. But in most cases inadequate time for PCP and non-involvement of the key practitioner at early stages remain the major setback that effect implementation of PCP practices in the study area.

2.3. Documented Research on Construction Project Planning and Implementation

[26] Studied Front-End Planning (FEP) on project in the Singapore. The outcome of the study revealed that 40 % of the firms and projects studied carried out FEP. It was uncovered that budget and size of the project significantly impact the implementation decision of FEP. This outcome concur that small project size and extra expenses were the two important impediments recognized as preventing FEP usage. However, construction firms concurred that FEP is of great significance and powerful for enhancing project execution. In this condition, good planning is not a deluxe but rather a basic requirement.

[27] conducted a study on first planning in construction and the potential for improvement. The term 'first planning' as used in the research depicts the initial construction planning which happens amid the pre-construction period. The study adopted qualitative, attitudinal survey with the use of semi-structured interviews with different construction experts engaged construction planning that are site-conceived, office-based pre-construction planning and client-employed project management, construction project management that are site-conceived.

It was discovered in [27] study that there is a gap in research with regards to the effectiveness of itemized front end construction planning (first planning) and its utilization on key cases. Different points of view of office and site-based workers upon the precision of project durations were discovered couple with their unique techniques for programme improvement that favoured first planning subtle element level. The research submitted that one of the main factors precluding effective planning is the varying methodologies of the individuals who create first plans and individuals that convey the project. Because of different opinion in communication by office-based pre-construction planners and site-based construction project managers

In [28] work, major factors militating projects, project planning and implementation processes and project outcomes using information contained in the cross-sectional investigation of 68 main project studied. Factor analysis was adopted to determine important factors related with the context, process and outcomes. Followed by regression analysis that tested the impacts of context on process and context and also the impact of process on outcomes. The results demonstrated that various contextual variables emphatically impact parts of the project planning and implementation process, and indirectly impact project results through the planning and implementation process. Furthermore, contextual and the process variables influence results specifically. [29] reported that to attain successful projects delivery, effective supervision must collaborate with project planning.

[30] Presented Fuzzy Enabled Hybrid Genetic Algorithm–Particle Swarm Optimization (GA-PSO) Approach to solve Time-Cost-Resource Optimisation (TCRO) Problems in project planning. The research methods utilized fuzzy set theory to describe instability of information (i.e., cost, time, and resources needed for each task). The intending fuzzy-enabled hybrid GA–PSO method was deployed to address two optimization issues which were discovered in the project planning literatures reviewed. The objective was to produce an optimization method which is better than the previous optimization algorithms to discover better project plan solutions that could reduce overall expenses, ensure reduction in overall project spans and reduced aggregate changes in resource allocation. The outcomes shows that, the proposed

method is faster than previous one in time processing when tackling complex TCRO problems in project planning.

3. RESEARCH METHODS

This study adopted cross-sectional survey via questionnaire to collate data on the factors influencing project planning and implementation. The targeted population comprised professionals working in construction firms of all categories (large, medium and small) in south western Nigeria. Lagos State (Nigeria's commercial nerve centre) and Abuja (The Federal Capital Territory), were considered for this study based on [31] recommendation that there are more concentration of activities in this study area. The study focuses on construction stakeholders that are involved building production including those that involve in project planning within the construction firms. In order to arrive at precise sample size, random sampling method was adopted. From the 108 copies administered questionnaire, 102 were completed and returned amount to 94% response rate. However, 94 questionnaires were found to be adequately completed and thus used for this study. The level of significance of the factors influencing project planning and implementation were tested on a five-point scale (1= Insignificant, 2= slightly significant, 3= moderately significant, 4= significant, and 5= highly significant). The data obtained from the returned questionnaires were analysed with the aid of descriptive and inferential statistics using Statistical Packages for Social Sciences (SPSS 22.0) software.

4. DATA ANALYSIS AND DISCUSSION

4.1. Background information of Respondents

Table 2 shows demographic characteristics of the respondents. 36 (38.3%) of the respondents had educational background in Quantity Surveying followed by Architecture and Structural Engineering with 22 (23.4%), then Building with 14 (14.9%). Majority 90 (95.7%) of the respondents were affiliated to their various professional bodies. While 60% of the total respondents have more than 10 years working experience. About 77% of the respondents were Managing Directors, Project /Construction Managers and Site Supervisor/Managers. Others fill the position of Procurement Manager, Commercial Managers etc. An adequate level of accuracy in the information gathered was guaranteed since all the respondents occupied position at management level or higher. Furthermore, medium firms constitute 57 (60.6%), small firms constitute 20 (21.3%) while large firms constitute only 17 (18.1%) of the respondents; this supports the assertion that Nigerian building firms are made up of large percentage of small firms than large firms. This demographic information pertaining to the respondents justify the proposed assumption that respondents are knowledgeable to exercise right judgement. Thus, their response to the questions could be trusted as valid for this research.

Table 2 Background information of respondents

Personal characteristics of respondents	Frq	Percentage
Educational background		
Architecture	22	23.4
Building	14	14.9
Structural Engineering	22	23.4
Quantity surveying	36	38.3
Highest academic qualification attained		
OND/HND	15	16.0
BSc/B.Tech	28	29.8

Personal characteristics of respondents	Frq	Percentage
MSc/MBA/MPM	51	543
Professional qualification		
NIA	22	23.4
NIOB	14	14.9
NSE	22	23.4
NIQS	32	34.0
NONE	4	4.3
Grade of membership of the professional body		
Probationer	9	9.6
Graduate	16	17.0
Associate	22	23.4
Corporate	41	43.6
Fellow	2	2.1
None	4	4.3
Industrial experience of the respondent		
Less than 5yrs	12	12.8
5-10yrs	24	25.5
10-20yrs	39	41.5
20-30yrs	8	8.5
Above 30 yrs	11	11.7
Respondents' designation		
Managing Director	20	21.3
Head planning/procurement	4	4.3
Project/construction manager	26	27.7
Commercial manager	4	4.3
Site supervisor/manager	26	27.7
Others	14	14.9
Size of organization		
Small	20	21.3
Medium	57	60.6
Large	17	18.1

4.2. Factors Influencing Project Planning

Part of the specific goal of this research is to capture the perception of various building professionals concerning the factors influencing project planning and implementation on construction sites in Nigeria. For this purpose, seven factors influencing project planning and ten factors influencing implementation of project plans on construction sites were evaluated.

Participants were requested to show the degree of significance of the factors influencing project planning and implementation on a 5-point scale (1= Insignificant, 2= slightly significant, 3= moderately significant, 4= significant, and 5= highly significant). The Relative Importance Index of these factors were analysed as shown in Table 3 and 4 respectively.

According to the analysis in Table 3, type of client (public or private) (0.92) is found to result in the highest factor influencing project planning. A total of about 63% of the respondents rated type of client as highly significant factor influencing project planning. This is closely followed by type of project (0.91), which about 59% of the respondents confirmed to have high

significant influence on project planning. Time availability, procurement method and project budget (0.90) are found to equally influence project planning. While 63% of the respondent rated procurement method and project budget as having high significant impact on project planning, time availability was rated as having high significant impact on project planning by 69% of the respondents. In the same manner, size of the project and professional expertise are found to influences project planning equally (0.89). The most important thing noted in this analysis is that respondents' responses on these factors concentrate on highly significant side. This implies that such factors should be given maximum consideration to guarantee proper project management.

Top ranked factors influencing project planning are 'client type', 'type of project', 'procurement method', 'time availability' and 'project budget'. As revealed in the study, client type (public or private) is a major factor influencing project planning because the importance attached to project planning varies between the clients. This confirms the findings of [9], which found that in the delivery of construction project, private client commit more resources and effort to project planning than public clients.

Table 3 Factors influencing project planning

	percentage of respondents scoring						
Factors influencing planning	**1 Insignificant**	**2 Slightly Significant**	**3 Moderately Significant**	**4 Significant**	**5 Highly Significant**	**RII**	**Rank**
Type of client	0.0	0.0	4.3	33.0	62.8	0.92	1
Type of the project	0.0	0.0	2.1	39.4	58.5	0.91	2
Time availability	0.0	0.0	18.1	12.8	69.1	0.90	3
Procurement method	0.0	5.3	2.1	29.8	62.8	0.90	3
Project Budget	2	0.0	8.5	26.6	62.8	0.90	3
Size of the project	0.0	2.1	4.3	40.4	53.2	0.89	6
Professional expertise	0.0	2.1	10.6	28.7	58.5	0.89	6

4.3. Factors Influencing Implementation of Project Plans on Construction Sites

According to the analysis in Table 4, insufficient finance (0.94) is found to be the highest factor influencing implementation of project plans on construction site. A sum of 72% of the participants rated insufficient finance as highly significant factor influencing implementation of project plans. This is followed by changes in client requirements (0.91), which about 65% of the respondents confirmed to have high significant influence implementation of project plans. Difficulties of coordination between various parties working on the project (0.90) closely followed changes in client requirement in the ranking of factors influencing implementation of project plans. About 62% of the respondents affirm this to be highly significant. Insufficient time/schedule, size of the project and lack of experience (0.85) has received the same relative importance index in this study. Other factors influencing implementation of project plans in order of their importance include different methods of the people that design the drawings and the people that construct the project (0.84), natural occurrence (0.82), additional cost to be incurred (0.80) and non-availability of labour (0.71).

Top ranked factors influencing implementation of project plans on site are 'insufficient finance', 'changes in clients requirement', 'difficulties of coordination between various parties working on the project' and 'insufficient time/tight schedule'. It is not surprising that finance ranks highest among the factors examined because construction works itself is capital intensive and once this is affected, every aspect of the project won't go as planned. It was emphasized in [8] that client financial difficulties is a major causes of delay in construction as such, to mitigate the effect there should be proper payment from client. This finding is also in agreement with

[11], who discovered that size of the project and financial budget positively influence the decision on whether or not to implement FEP. Also once the requirement of any project changes, it affects finance, time and other resources required for the successful completion of any project. Further, if the parties working on a project cannot be coordinated, then there will be problems in communication (the life-line of a business) of vital information pertaining to the project.

Table 4 Factors influencing implementation of project plans on construction sites

	percentage of respondents scoring						
Factors influencing Implementation	**1 Insignificant**	**2 Slightly Significant**	**3 Moderately Significant**	**4 Significant**	**5 Highly Significant**	**RII**	**Rank**
Insufficient finance	0.0	0.0	4.3	23.4	72.3	0.94	1
Changes in client requirements	0.0	0.0	8.5	26.6	64.9	0.91	2
Difficulties of coordination between various parties working on the project	0.0	0.0	13.8	24.5	61.7	0.90	3
Insufficient time/tight schedule	0.0	2.1	9.6	47.9	40.4	0.85	4
Size of the project	0	0.0	19.1	35.1	45.7	0.85	4
Lack of experience	2.1	2.1	21.3	17.0	57.4	0.85	4
Different methods of the people that design the drawings and the people that construct the project	0.0	4.3	11.7	41.5	42.6	0.84	7
Natural occurrences	0.0	9.6	9.6	41.5	39.4	0.82	8
Additional costs to be incurred	2.1	6.4	10.6	50.0	30.9	0.80	9
Non-availability of labour	5.3	20.2	17	29.8	27.7	0.71	10

4.4. Test of Analysis of Variance (ANOVA)

Internal reliability analysis produced a Cronbach's alpha value of 0.83 justifying high reliability of analysed data.

ANOVA test was conducted to ascertain if there is general agreement within the various groups of respondent:

- Professionals educational background,
- The different Size of firms, and
- Various levels of professionals' years of industrial experience.

The results of the test for factors influencing planning and factors influencing implementation of the project plans on construction sites are presented in table 5 and 6 respectively.

The outcome of ANOVA at 95% confidence level in Table 5 shows, there exist significant difference in ranking perception for procurement method (F (4, 89) = 2.564, p = .044), size of project (F (4, 89) = 6.751, p = .000) , type of project (F(4, 89) = 4.902, p = .001), time availability (F(4, 89) = 3.115, p = .019) and Professional expertise (F (4, 89) = 5.075, p = .001). However, no mathematically relevant disparity is noticed in opinion of the participants for type of client (F (4, 89) = 2.131, p = .084) and project budget (F (4, 89) = 2.133, p = .083) when they were tested for professionals educational background.

With regards to professionals years of industrial experience, the in Table 6 connote there exist statistically significant difference in rating perception for size of project *(F* (4, 89) = 3.600, *p* = .009), type of project (*F*(4, 89) = 5.297, *p* = .001), time availability (*F*(4, 89) = 23.171, *p* = .000) and Professional expertise *(F* (4, 89) = 19.801, *p* = .000). However, no mathematically relevant disparity is noticed in opinion of the participants for procurement method *(F* (4, 89) = 1.708, p = .155), type of client (*F* (4, 89) =.669, *p* = .615) and project budget (*F* (4, 89) = 2.313, *p* = .064). There are no significant difference in their opinion on factors influencing planning according to 'size of firms' except for 'project budget'(*F*(4,89) = 4.737, *p* = .011) and time availability (*F*(4, 89) = 3.578, *p* = .032).

Table 5 ANOVA for different sub-classification of respondents on factors influencing project planning

Factors influencing Project Planning	**Educational background**		**Years of industrial experience**		**Size of firm**	
	F	Sig.	F	Sig.	F	Sig.
Procurement method	2.564	.044**	1.708	.155	.976	.381
Type of client	2.131	.084	.669	.615	2.892	.061
Size of the project	6.751	.000**	3.600	.009**	.637	.531
Type of the project	4.902	.001**	5.297	.001**	.721	.489
Project Budget	2.133	.083	2.313	.064	4.737	.011**
Time availability	3.115	.019**	23.171	.000**	3.578	.032**
Professional expertise	5.075	.001**	19.801	.000**	.926	.400

**p<.05

In Table 6, respondents have no significant difference in their opinion on factors influencing implementation of project plans on site at confidence level of 95%, when they are tested for 'size of firms' except for 'natural occurrences' (*F*(4,89) = 6.656, *p* = .002) and changes in client requirement (*F*(4,89) = 4.005, *p* = .022).

However, significant difference was observed in rating perception for 'natural occurrence' (*F* (4,89) = 2.710, *p* = .035), 'insufficient finance' (*F* (4,89) = 4.247, *p* = .003), 'changes in client requirements' (*F*(4,89) = 3.166, *p* = .018) and 'additional cost to be incurred'(*F*(4,89) = 3.329, *p* = .014) when 'educational background' is controlled.

The result also show that notable difference in rating perceptions is observed at confidence level of 95%, for 'natural occurrence' (*F* (4,89) = 3.779, *p* = .007), 'changes in clients requirement' (*F* (4,89) = 3.786, *p* = .007), 'differing approach of those who produce the plans and those who deliver the project' (*F* (4,89) = 5.296, *p* = .001), 'difficulties of coordination between various parties working on the project' (*F*(4,89) = 4.859, *p* = .001), 'additional cost to be incurred'(*F*(4,89) = 4.783, *p* = .002) and 'insufficient time/tight schedule (*F* (4,89) = 3.605, *p* = .009), when 'years of industrial experience' of respondents is controlled.

Table 6 ANOVA for different sub-classification of respondents on factors influencing implementation of project plans on construction sites

Factors influencing implementation	Educational background		Years of industrial experience		Size of firm	
	F	Sig.	F	Sig.	F	Sig.
Natural occurrences	2.710	.035**	3.779	.007**	6.656	.002**
Insufficient finance	4.247	.003**	1.806	.135	.585	.559
Changes in client requirements	3.166	.018**	3.786	.007**	4.005	.022**
Differing approaches of those who produce the plans and those who deliver the project	2.122	.085	5.296	.001**	1.326	.271
Difficulties of coordination between various parties working on the project	2.481	.050	4.859	.001**	.359	.699
Lack of experience	1.346	.259	2.011	.100	3.026	.053
Non-availability of labour	1.513	.205	2.094	.088	1.024	.363
Additional costs to be incurred	3.329	.014**	4.783	.002*	2.019	.139
Size of the project	1.825	.131	2.008	.100	.749	.476
Insufficient time/tight schedule	1.075	.374	3.605	.009**	1.230	.297

*p<.05

5. CONCLUSION

Construction process involves engagement of different parties and as part of project planning, communication channels among various professionals must be established during the planning stage for the project to succeed. Because any problem that have to do with communication could results into several misunderstanding thereby disrupt smote running construction projects. Below are conclusions were drawn out from the results:

i. The finding of this study reveal that the perception of some factors influencing project planning and implementation clearly differ within construction professionals.

ii. It was also reveal that the level of experience of the respondents differs in their perception of some factors influencing project planning and implementation.

iii. This finding is expected because as the saying goes ‘experience is the best teacher’. However, the perception of the professionals do not differ significantly about some factors influencing project planning and implementation across the different firm sizes.

iv. Admittedly, planning is one of the functions of management. Planning process starts the initiation of management process and is hence a requirement to the commencement of different control features which includes monitoring, assessment and control.

v. Proper planning is not an extravagance but rather a basic need, but it is not enough to plan, implementation of the plans is the key to ensure project success.

vi. Therefore, factors influencing project planning and its implementation have been identified in this study, the knowledge of these factors will assist construction

stakeholders in re-evaluating their project planning endeavours and methods in order to enhance them and in this manner enhance the performance of their construction projects.

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