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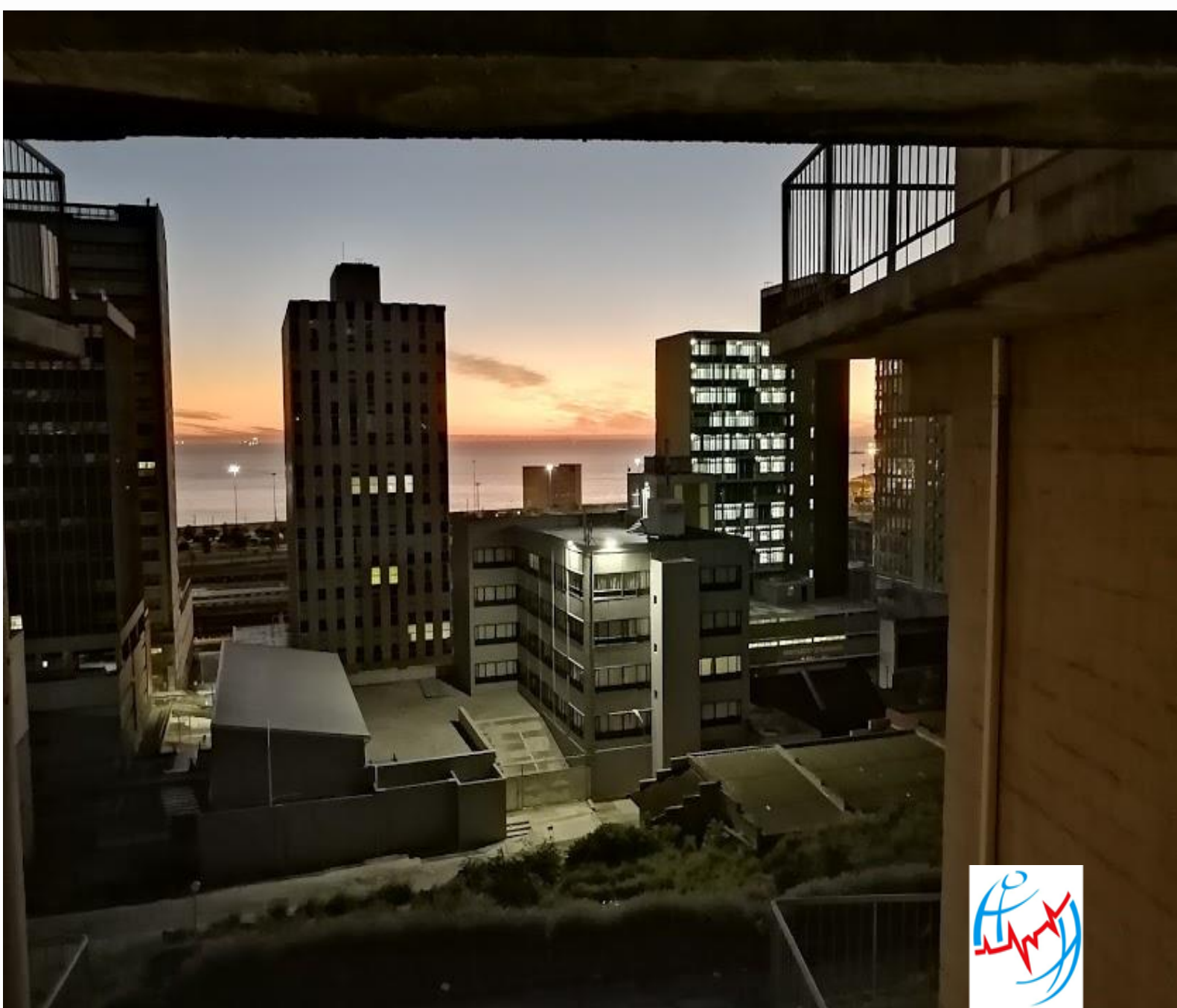
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CHSMJournal

Construction and Human Settlements Management Journal

Maiden edition

Volume 1 Issue 1 2021

ISSN 978-1-928472-28-5

Appraisal of planning, monitoring, and controlling tools and techniques on time schedule performance of construction projects in Nigeria.

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Abstract

The need for Project Management tools in developing countries is ever increasing in the face of modern project complexities and clients' expectations. This study investigates how professionals adapt the use of project management tools and techniques of planning, monitoring and control (PM&C) within the context of Nigerian construction industry to manage schedule performance for positive project outcome. A cross-sectional research design was adopted, and a survey was conducted among 122 construction professionals for this investigation. Analysis of the data collected was achieved by using IBM SPSS Statistics (Version 26) predictive analytic software. Findings reveal four and three top contemporary tools/techniques used in engineering

and building projects for both planning and monitoring respectively, and their impact on schedule performance of construction projects. While there was a significant positive correlation between tools and techniques used for planning and monitoring with schedule performance, the study did not find a correlation between the control tools/techniques with schedule performance. It was recommended that construction managers could use these findings as checklist for good practice and to improve schedule performance while mitigating construction time overrun.

Keywords: Schedule performance, time overrun, project management, time control, construction management.

1. Introduction

The management of time for large projects is usually quite complicated and therefore challenging for many construction clients and contractors. Depending on how time overrun risks are shared, financial risks and commercial viability in construction can span between two extremes for both clients and contractors; it could either be very profitable and other times it may be the albatross if proper planning, monitoring, and controlling are neglected (Alshanbari, 2010). Construction managers' ability to

predict likely problems, plan, monitor and control them have great influence on both construction project's success and profitability. Consequently, avoiding construction related problems on site is linked to the amount of planning carried out prior to the commencement of the project as well as the interrelated activities of construction activities during execution (Ncwadi *et al.*, 2005).

The complexity and interconnectedness of construction activities is usually a bane for optimal and efficient planning, monitoring and control process (Sharifi *et al.*,

2007). The challenges associated with optimal and efficient control are diverse and are not minimized simply because a similar project has been executed in the past. Some of the challenges may include regional or global restriction of movement of both men and materials, political instability, occupational accidents, change in weather conditions, level of supervision, level of workmanship, availability of material, storage facility, wastages including rework and damages, etc. Appropriately documenting and managing the different activities during a construction is indeed demanding (Stanitsas *et al.*, 2021). These complexities have had their toll on Nigerian construction industry. As a developing country with huge investments in construction projects, the growing rate of delays in project delivery has been identified by some researchers as a major problem facing the Nigerian construction industry is (Aibinu *et al.*, 2002). Past studies have also shown (Ogunlana *et al.*, 2006; Haron *et al.*, 2018) that most clients are dissatisfied with the outcome of construction projects, especially because their project expectations in terms of time are usually not met. The absence of a well-established effective system for PM&C projects' time schedule has caused failures of many construction projects in the construction industry. In acknowledging this conundrum and as part of an effort to address it, the Nigerian Bureau of Public Procurement (BPE) recently advertised for the re-evaluation and re-designing of the extant tendering template for procuring construction contracts in Nigeria (Nigeria Federal

Ministry of Culture and Information, 2020).

Project outcomes are generally viewed and described in terms of unit cost, construction speed, delivery speed, cost growth, schedule growth, and several quality measures (Idoro, 2012b). Several authors like Chen (1998) and Ling *et al.*, (2008) have added their opinions to this list. User expectation, participants' satisfaction, environmental performance, health and safety, and commercial value are additional criteria suggested by Chen (1998). Additionally, Ling *et al.*, (2008) suggest that owners' satisfaction and owners' administrative burden should also be measures of project outcomes. However, to achieve the desired project outcome, Idoro (2012) contends that effective and efficient planning, monitoring, and controlling (PM&C) must be ensured before and during the construction phases of projects. Faniran *et al.*, (1998) argue that the main "*objective of project planning is to complete a project within a fixed time, at a previously estimated cost and to a specified standard of quality*". This assertion implies that the effectiveness of project planning is measured by the project outcome (Parchami *et al.*, 2015). Authors like Ling *et al.*, (2008) and Xiao *et al.*, (2003) also regard project outcome as the basis of evaluating the effectiveness of project planning.

PM&C is increasingly becoming an important issue in project success outcome. Tsiga *et al.*, (2016) claim that planning is a key activity required for a successful construction project outcome by all stakeholders. Likewise,

monitoring and control are very important management functions to ensure that planned project objectives are fully achieved (Idoro, 2012a). The relationship between PM&C is described succinctly by Abbasi *et al.*, (2000). According to Abbasi *et al.*, planning defines the strategies, tactics, and methods for achieving project objectives, while monitoring and control provide the required checks and balances for ensuring that the plans and overall project objectives are achieved.

Evidences from both literature and personal experience show that clients and professionals in the Nigerian construction industry engage bespoke strategies, tactics and methods in many PM&C activities involving local projects. Bernardes *et al.*, (2002) argue that the performance of construction projects depends largely on their control structures as well as their production planning. Researchers have shown that efficient, timely and responsive PM&C activities in managing construction projects should mitigate negative project outcomes. In a study, Koskela (1992) identifies and attributes major construction project failures to inefficient or deficient planning and slow response or lack of flexibility to adjust to changes in project environment. Abbasi & Al-Mharmah (2000) argue that PM&C tools and techniques in developing countries are not prominent in project management as obtained in developed countries. They claimed that the use of these tools and techniques usually reflect the social, economic, and political values upheld by the stakeholders (ibid).

Despite the many studies on project PM&C management, the problem of time overrun persists in the Nigerian construction industry (Aibinu *et al.*, 2002). Coupled with the fact that most literature on this matter are dated and not solely focused on in depth evaluation of project success vis a vis construction time schedule performance, it has also been argued that previous studies have focused on causes of time overrun and factors militating against effective control of projects by construction managers in charge (Olawale *et al.*, 2010). It is against this backdrop that this study is inspired to investigate the relationship between PM&C and project time schedule performance.

The first stage of this study is designed to provide answers to the following research questions using the quantitative research design methodology, viz: (1) What are the planning, monitoring and control tools and techniques used on Nigerian construction projects to mitigate negative project outcomes? (2) How frequently do Nigerian construction stakeholders use the planning, monitoring and control techniques on construction projects to avert negative project outcomes? In addition, it is hypothesized that planning, monitoring and control techniques and tools used in the Nigerian construction industry do not have any significant effect on cost performance of construction projects.

The purpose of this study is therefore to assess the importance of project management tools for PM&C construction time schedule among construction stakeholders within the Nigerian construction

industry. The next section of this paper describes the research methodology followed by the findings of the study. Thereafter, the findings are discussed in the discussion section before conclusions are made in the last section.

2. Research Methodology

This study was approached through the realist ontology and objectivist epistemological philosophical lens which assumes that the PM&C tools and techniques exist and their implementation (or lack of it) directly bears on the construction contracts duration without further consideration to other extraneous factors. This world view also suggests that all we can know of causation are the observable regularities in associations of events, and which rejected any reference to unobservable entities and mechanisms (King *et al.*, 2010). Using quantitative method, a survey research design was adopted to provide answers to the research questions and hypothesis of this study. The study survey was conducted within three cosmopolitan cities, representing three geo-political zones in Nigeria to have a balanced view across the nation. These cities (Lagos, Federal Capital Territory and Kano states) were selected because of their commercial relevance and prominence in construction activities. Apart from the respondents from consultancy outfits and the state ministries associated with construction activities in each state (e.g., Ministry of works, Ministry of Housing) the contracting organizations where respondents were sampled are those

that were registered with each states' tenders board. The research instrument was prepared and administered to professionals working at different levels within contracting, consulting, and client organizations in a way that the study can get adequate information relating to the effect of planning, monitoring and control on project time schedule performance in the construction industry. The structured questionnaire was developed to collect data through a non-probability purposive sampling (both via online google form and personal contact) from managing directors, managing partners/senior partners, project managers, head of department and other key personnel involved in the construction process that were best suited to offer project specific information required for this study. Thus, eligibility criteria required individuals to come from states earlier mentioned, should have received a formal education and be a member of any of the professional associations in the architectural, engineering and construction (AEC) sector. Purposive sampling permitted sampling for this study due to the absence of a reliable sampling frame in the study population. Data for the study was processed and analysed using the IBM SPSS Statistics (Version 26) predictive analytic software. Descriptive statistics (such as frequency, percentages, relative important index (RII)); and inferential statistics like regression and one-way analysis of variance (ANOVA) were used as tools in summarizing the findings. The levels of significance of identified factors

were determined by the magnitude of their mean scores, with the greatest mean representing the most significant factor.

3. Findings

122 copies of research questionnaires were sent out to the respondents, but 81 were returned. The returned copies were examined to address issues relating to inconsistencies, omissions, completeness, and errors. Out of the returned questionnaires 76 were deemed usable, representing a 69% response rate, for this analysis.

3.1 General characteristics of the respondents

The survey on academic qualification of the respondents shows that all the respondents attended a formal education setting, which confirms their eligibility for providing the required data for this study (Table 1). The table also indicated that more than half (61.8%) are HND/BSc/BTech holders, 21.1% master's degree holders, 13.2% have obtained PGD certificates, 2.6% are OND graduates and minority few (1.3) have bagged their doctorate degree (PhD).

Table 1: Summary of demographics.

Characteristics	Number of observations	Characteristics	Number of observations
Professional affiliation		Membership status	
NIA	8 (10.7%)	Student	5 (6.7%)
NIOB	8 (10.7%)	Probationer	5 (6.7%)
NSE	31(41.3%)	Graduate	24 (32%)
NIQS	28 (37.3%)	Corporate	41(54.7%)
Academic qualification		Working experience	
OND	2 (2.6%)	1-10	47 (61.8%)
HND/BSc/BTech	47 (61.8%)	11-20	17 (22.4%)
PGD	10 (13.2%)	21-30	12 (15.8%)
Master's degree	16 (21.1%)	Position in organization	
PhD	1 (1.3%)	Chief executive officer	44 (57.9%)
Professional background		Managing director	3 (3.9%)
Architecture	9 (12%)	Project manager	21 (27.6%)
Quantity surveying	28 (37.3%)	Partner/assoc. partner	4 (5.3%)
Building	8 (10.7%)	Others	4 (5.3%)
Civil engineering	22 (29.3%)	Type of organization	
Mechanical engineering	3 (4%)	Consulting	9 (11.8%)

Others	6 (6.7%)	Private client organization	5 (6.6%)
Staff strength		Public client organization	58 (76.3%)
Less than 50 workers	18 (26.5%)	Others	4 (5.3%)
51-100	22 (32.4%)		
101-300	5 (7.4%)		
Above 300	23 (33.8%)		

The categories of professional respondents are: Quantity surveyors (37.3%), Civil engineers (29.3%), Architects (12%), Builders (10%), Mechanical engineers (4%) and 6.7% was from other professionals like estate surveyors, structural engineers, and town planners (Table 1). All the respondents (construction professionals) are affiliated with the respective professional bodies; 41.3% are affiliated with Nigerian Society of Engineers (NSE), 37.3% with the Nigerian Institute of Quantity Surveyors (NIQS), and both the Nigerian Institute of Architects (NIA) and Nigerian Institute of Building (NIOB) have an equal percentage of 10.7% of the affiliated respondents. On membership status, most (54.7%) are corporate members, 32% are graduate members and 6.7% are student members and probationers. 61.8% of the total respondents have a working experience of less than 10 years, 22.4% have working experience of within 11-20 years and 15.8% have been working for 21-39 years in the construction industry. Responses were mostly from the top officials of the organizations. Hence, with the high percentage of corporate membership and many years of experience of the

respondents, their opinions about the organizations' performance and the various planning, monitoring and control techniques used by their organizations would be eligible for this study. While 57.9% of the respondents were chief executive officers of their firms, 27.6% are project managers, 5.3% are associate partners, and 5.3% have other positions like chief engineers, chief quantity surveyors and human resource manager. A very high percentage of the respondents (76.3%) are from public client organizations. Respondents from consulting firms represent 11.8% of the sample population, while about 6.6% of the respondents were primarily from private client organizations.

3.2 Planning, monitoring, and controlling techniques.

One of the objectives of this research is to investigate how frequently PM&C techniques are used and to identify their impact on construction projects duration. This section examines the frequency of use of the various PM&C techniques and their associated mean scores with the aid of relative importance index (RII).

3.2.1 Use of planning tools/technique.

The relative importance index (RII) of the planning tools and techniques (PTT) was analysed, ranked, and presented in Figure 1. A critical look at the figure shows that the respondents make use of all the planning techniques with a RII value of 0.95 to 0.55. However architectural drawing as a form of planning tool is always used by the respondents for the design of buildings/engineering projects. This probably explicates the imperativeness of design is an important construction process. Other forms of planning tools frequently used by the respondents are bills of quantities, structural drawing, and mechanical/electrical drawing. This was confirmed by the relatively high mean score shown in Figure 1.

Other planning tools with relatively low RII such as value analysis/engineering report, subcontractors list, milestone date programming technique and life cycle cost seem not to be popular

among the respondents. This suggests that construction managers/planners rarely use these tools/techniques in planning their project execution and delivery.

3.2.2 Use of monitoring tools/technique.

The ranking of the types and how frequently the various monitoring tools/techniques are used is represented in radar Figure 2. The closer the ranking is to the centre of the radar, the highly it is ranked by the respondents. The figure reveals that majority of the respondents frequently use progress report as the primary means of construction project monitoring. This is subsequently followed by site coordination meeting, site instruction book, health and safety checklist, request for information, critical path network, project tracker, line of balance, Gantt chart, change order log and risk log.

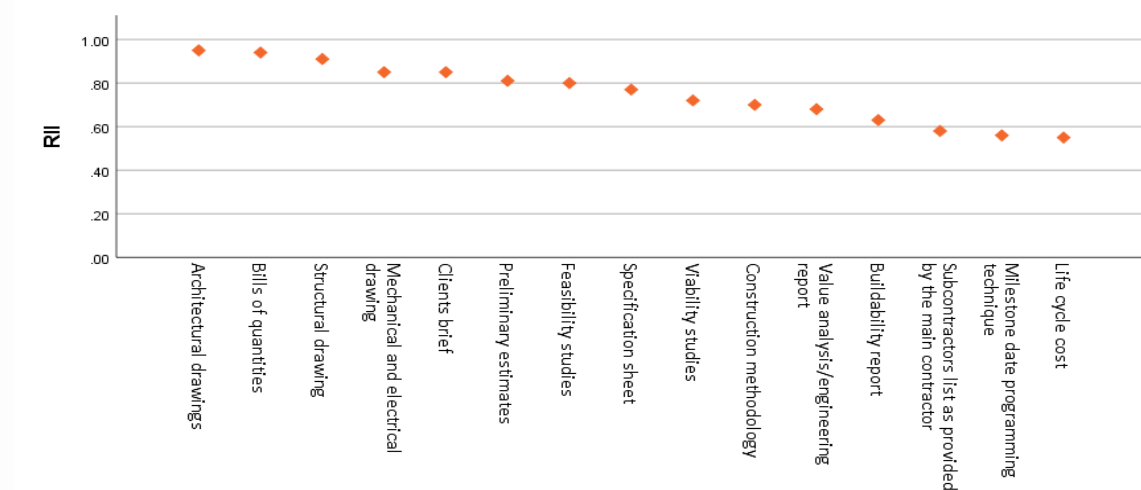


Figure 1: Use of planning tools/techniques

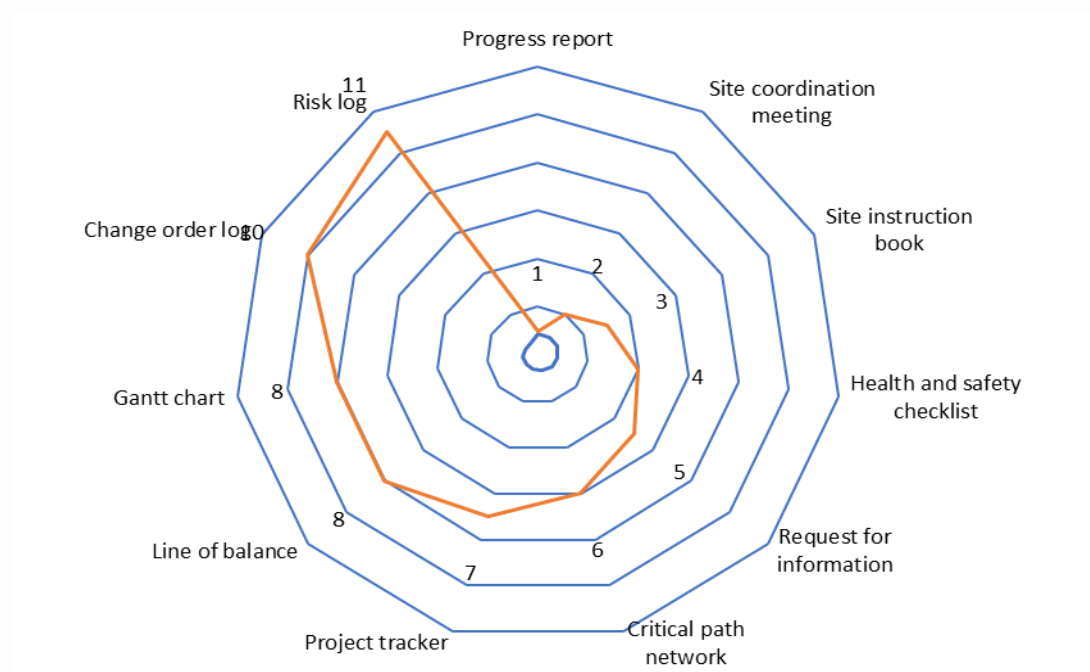


Figure 2: Use of monitoring tools/techniques.

It is suggestive that the respondents' preference for techniques like progress report, site instruction book and site coordinating meetings are means of ensuring timely completion or schedule performance amongst other project objectives. In contrast, the use of line of balance, Gantt chart, change order log and risk log are not popular monitoring collection probably because the respondents might not be familiar with their usage. It may be argued that the dominance of respondents from government-related agency in this

survey might also have influenced these observations.

3.2.3 Time control.

Table 2 shows that six techniques (progress report, line of balance, Gantt chart, project tracker, site coordination meeting and milestone date programming technique) are mostly used for time control. A closer look reveals that many of the tools under monitoring techniques are logically prevalent for general time and schedule control.

Table 2: Techniques used for time control.

Techniques	Percentage (%)	Rank
Progress report	55.3	1
Line of balance	49.3	2
Gantt chart	48.6	3
Project tracker	46.7	4
Site coordination meeting	45.2	5
Milestone date programming technique	44.4	6
Change order log	33.8	7

Health and safety checklist	31.6	8
Risk log	30.1	9
Buildability report	26.0	10
Site instruction book	25.3	11
Request for information	24.3	12
Feasibility studies	22.7	13
Construction methodology	22.7	14
Subcontractors list as provided by the main contractor	18.3	15
Value analysis/engineering report	16.4	16
Preliminary estimates	14.5	17
Actual versus forecast reconciliation	13.5	18
Interim valuation	12.7	19
Earned value analysis	11.4	20
Viability studies	9.5	21
Profit and loss on each valuation dates	7.0	22
Financial reporting	6.8	23
Financial statement	5.6	24
Specification sheet	5.5	25
Architectural drawing	4.0	26
Bills of quantities	3.9	27
Clients brief	2.7	28
Structural drawing	2.7	28
Mechanical and electrical drawing	2.7	28

It is worthy to also note that change order log, health and safety checklist, risk log, buildability report, site instruction book, request for information, feasibility studies, construction methodology and subcontractors list as provided by the main contractors are sometimes used by the respondents for time control. Also worthy of note is financial statement, specification sheet, architectural drawing, and bills of quantities, clients' briefs, structural drawing, and mechanical/electrical drawing which are rarely used by the construction professionals for time control.

3.3 Impact of planning on time schedule performance

A bivariate regression was conducted to examine how well planning tools/techniques (PTT) could predict schedule performance (SP). A scatterplot showed that the relationship between PTT was negative and linear and did not reveal any bivariate outliers. The correlation between PTT and SP was statistically significant, $r(67) = .30$, $p < .05$. The regression equation for predicting the SP from PTT was $\hat{y} = 164.74 - 2.05x$. The r^2 for this equation was .087; that is, 8.7% of the variance in SP was predictable from level of PTT. The bootstrapped 95% confidence interval for the slope to

predict SP from PTT range from -3.77 to -.44: thus, for each one unit of increase of PTT, time overrun decreases by about 0.4 to 3.8 points (Table3)

bootstrapped 95% confidence interval for the slope to predict SP from MTT range from -5.02 to -1.88: thus, for each one unit of increase of MTT, time overrun decreases by about 1.88 to 5.02 points (Table 4).

Table 3: Regression Analysis of effect of planning on schedule performance

Model	B	Std. Error	T stat	F	R	R ²	Adjusted R ²	p-value	Lower 95%	Upper 95%
Constant	164.735	46.136	3.571	*NA	*NA	*NA	*NA	.001	72.646	256.823
PTT	-2.054	.811	-2.533	6.416	.296	.087	.074	.014	-3.673	-.436

*NA = Not applicable

3.4 Impact of monitoring on time schedule performance

A second bivariate regression was carried out to examine how well monitoring tools/techniques (MTT) could predict schedule performance (SP). A scatterplot showed that the relationship between MTT was negative and linear and did not reveal any bivariate outliers. The correlation between MTT and SP was statistically significant, $r(62) = .50$, $p < .05$. The regression equation for predicting the SP from MTT was $\hat{y} = 178.21 - 3.45x$. The r^2 for this equation was .238; that is, 23.8% of the variance in SP was predictable from level of MTT. The

3.5 Impact of control on time schedule performance

A bivariate regression was also performed to examine how well controlling tools/techniques (CTT) could predict schedule performance (SP). A scatterplot showed that the relationship between CTT was negative and linear after the bivariate outliers have been removed. The correlation between CTT and SP was not statistically significant, $r(71) = .04$, $p > .05$ (Table 5)

Table 4: Regression Analysis of impact of monitoring on schedule performance

Model	B	Std. Error	T stat	F	R	R ²	Adjusted R ²	p-value	Lower 95%	Upper 95%
Constant	178.206	31.485	5.660	*NA	*NA	*NA	*NA	.001	115.269	241.143
PTT	-3.449	.785	-4.395	19.315	.487	.087	.238	.000	-5.017	-1.880

*NA = Not applicable

Table 5: Regression Analysis of effect of control on schedule performance

Model	B	Std. Error	T stat	F	R	R ²	Adjusted R ²	p-value	Lower 95%	Upper 95%
Constant	107.953	40.646	2.656	*NA	*NA	*NA	*NA	.010	26.908	188.998
PTT	-2.813	1.756	-1.602	19.315	.187	.035	.021	.114	-6.314	.689

*NA = Not applicable

4 Discussion of findings

Planning in construction projects provides the baseline by which any future monitoring and/or control is achieved (Olawale *et al.*, 2010). To keep construction projects on track and delivered within anticipated duration, this study identifies contract drawings (architectural, structural, and service drawings), bills of quantities and client's brief as the three most frequently used planning tools employed by construction professionals and practitioners in the Nigerian construction contracts. Although this finding is at variance with the findings of some previous studies such as Olawale *et al.*, (2010) and Ncwadi *et al.*, (2005), this study however included additional key metrics unlike the previous studies which probably is responsible for the disparity in the findings. For instance, Olawale *et al.*, concluded in their study that the most frequently used planning technique by indigenous contractors in Nigerian construction industry is Bar chart. Similarly, Ncwadi *et al.*, also argued that bar chart was the predominantly used planning technique by local contractors in Nigeria. Nevertheless, and in both cases, contract drawings and client's brief as planning tools were not part of the metrics considered in their studies as part of planning techniques toolbox; in managing time of construction projects

in Nigeria. Abbasi *et al.* (2000) lamented on lack of modern tools in time management of construction projects and proposed that for resources to be efficiently used toward optimal productivity, then available tools for planning must be harnessed and deployed. Apparently, based on the reports of both Ibrahim *et al.*, (2014) and Ogunde *et al.* (2013), construction stakeholders have probably focused and depended only on the use of Bar chart to manage construction contracts duration in order not to extend beyond planned programme. This notion is amplified by Memon *et al.*, (2006) who remarked that "*Bar charts or Gantt charts are a powerful communication tool and are extremely useful visual, and graphical medium in construction scheduling*"; and are also the more common types of techniques for construction scheduling followed by "*activity on the arrow, precedence network and line of balance*". Nevertheless, this study has shown that an equal attention should also be given to the evolution or changes in the client's brief and their translation into the contract documents (especially the designs and bills of quantities) as the construction project matures. This consideration is important most especially as planning has been considered an ongoing and the most rewarding process in a construction project execution (Abbasi *et*

al., 2000). According to Bon-Gang (2018), drawings and specifications belong to the client, consultant, and design team-related factors, such that if given adequate attention, could be the most important determinants of project schedule performance.

When it comes to monitoring and schedule performance, which is a logical offshoot of planning, this study shows that Progress report and Site coordination meeting are the prevalent tools used in construction projects to have a predictable and favourable project schedule outcome. There is a perceived preference for these tools when compared with Gantt chart as a monitoring tool among the study population. This is a divergence from the assertions of both Ibrahim *et al.*, (2014) and Memon *et al.*, (2006) that Gantt chart has become one of the very few monitoring techniques adopted for construction activities. Limited knowledge and understanding of construction managers have been ascribed to low use of complex and modern tools for monitoring project schedules (Dziekoński, 2017). Given the ease of deployment of site meetings/reports it becomes explicable why they trump the use of Gantt charts in this study. Furthermore, Aljohani (2019) argued that project success is perception-based depending on whose view is sought. The author claimed that what is considered a failed project by a stakeholder could be viewed differently by another even when they are in the same project team. The Aljohani's scenario might have played out among the participants in this study resulting in both progress report and site

coordination meeting as the most important monitoring tools for managing project duration. Notwithstanding Aljohani's argument, this study in alignment with findings of other authors like Idoro (2012b) has demonstrated and emphasized the importance of site meetings and visits in ensuring timely completion of construction projects in Nigeria.

This study is not without its limitations and the results should be interpreted with caution for the reasons mentioned hereafter. Although effort was made to get a representative sample for the whole country, the eventual number of samples analysed may be small for generalizability of the findings. Further studies to cover more zones and practitioners is therefore necessary in the future to validate the findings in this study. Also, this study focused on eliciting information from professionals only whereas, there might be other practitioners who may also have as much information as the professionals that were not sampled. There is also a limitation in directionality due to the cross-sectional design and correlational nature of the study.

5 Conclusion

This study set out to investigate the impact of planning, monitoring and control on construction project outcome in Nigeria with respect to schedule performance. A cross-sectional research design among construction professionals has been used to provide useful information on tools and techniques that are prevalent for schedule performance in practice in Nigeria. Issues such as the

scale of application of project planning, monitoring and control tools/techniques and their significance in schedule performance were highlighted. The top four documents frequently used in practice for planning in the execution of buildings/engineering projects to achieve positive schedule performance were revealed as architectural, structural, mechanical, and electrical drawings. Likewise, the top three most frequently used monitoring tools/techniques in construction projects that were identified in this study are progress report, site co-ordination meetings and site instruction book are considered as the. Other monitoring tools/techniques also identified as essential for controlling purposes include progress report, line of balance, Gantt chart, project tracker, site coordination meeting and milestone date programming technique. The study also clearly shows that there is a correlation between the use of planning and monitoring techniques on construction projects and project schedule performance whereas controlling tools/techniques do not have impact on schedule performance of construction projects.

This study has implications both in theory and practice. Apart from adding to the corpus of knowledge on project PM&C domain, it also reveals the dynamism of practice and the contemporary areas of planning and control that Nigerian construction managers should pay adequate attention to for positive project outcome in terms of effective schedule performance. This suggests that the application of some or all the top PM&C

tools/techniques identified in this study, for managing construction projects, will mitigate the odds of suffering time overrun on the projects and invariably improve schedule performances. Therefore, it is recommended that during construction process, design consultants should ensure the production of detailed design and give attention to the use of detailed architectural, structural, and service drawings, all in a bid to reduce variations and additional work which may affect time and cost performance of such projects. The lead consultants on the project should encourage periodic site co-ordination meetings for prompt progress review of the contract and settle alignment issues which may require the attention of the consultants. While this may seem obvious to the experienced construction managers and practitioners it is important to state that it would be handy to the novice or less experienced construction managers trying to find their feet in the construction industry. Furthermore, the study is considered the first attempt to probe critically into time performance of construction projects and developing comprehensive solutions for managing same.

At present, several questions remain unanswered and on which further study may be required, one of which the lack of understanding of the rationale behind the choice of the tools and techniques is adopted by sampled population in this study. A further qualitative study might be able to elucidate and throw some light into this issue. The other issue would also be to understand if the divergence between the

previous findings and this study is because of limited knowledge of the construction managers or whether the managers are moving towards more sophisticated modes of construction project planning, monitoring and control that is not captured within the scope of this study. Apart from all these, a much larger issue is to find out about the depth of training and competence of each construction professional in the area of PM&C and suggest the most suitable professional to manage this process; and to find out how the environmental and project specific

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