

Adherence with the Processes of Time Management in Construction Project Delivery in Nigeria

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Abstract

The management of time is a necessity of life. Project time management includes the processes required to manage the timely completion of the project. However, in the construction sector such as in Nigeria, poor delivery of project especially completion within schedule has remained an issue, despite established processes of time management. The crux of this study is to investigate adherence with the processes of time management in construction project delivery in Nigeria and the objectives are: to assess the level of adherence with the processes of time management, and to determine the effect of adherence with the processes of time management on construction project timely completion. The study was conducted in Gombe State, Nigeria. Stratified random sampling technique was used to administer 88 questionnaires to professionals such as: the Architects, Builders, Quantity surveyors, Engineers and Project managers who were personnel working for the client, consultants and contractors in various projects locations in the study area. The data collected was analyzed with SPSS software using weighted mean score, one sample t-test and regression. Findings revealed that the most adhered processes of time management are: monitoring and controlling the project schedule, estimating resource requirement for activities and developing schedule of the project. Adherence with the processes of time management will lead to 15.4% caused effect increase on timely completion of project. As such, it is recommended that construction stakeholders should collaborate and adhered strictly with all the established processes of time management as a guide in order to ensure successful completion of construction project within schedule in Nigeria.

Keywords: Adherence, Construction Project Delivery, Processes, Time management

Introduction

The management of time is a necessity of life. In the construction industry stakeholders are unanimous that time along with cost and quality are the major deliverables upon which project are said to be a success or failure. Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements and is accomplished through the appropriate application and integration of the project management processes identified for the project (Project management institute [PMI], 2013). The project management process begins with identification of the user requirement, project constraints, resource needs, and establishment of realistic objectives to meet the strategic goals (Federal Transit

Administration [FTA], 2012). Hence, Project Management Processes: are set of interrelated actions and activities performed to achieve a pre-specified product, system, result, or service (FTA, 2012). Each process is characterized by its inputs, the tools, and techniques that can be applied and the resulting outputs (PMI, 2013). In addition, the Project management processes are grouped into five categories: initiating, planning, executing, monitoring and controlling, and closing group (PMI, 2013). Basically, they are used throughout the life cycle of a project. Construction has been facing numerous issues and one of them is time management issues which have caused delayed completion of a project (Chin & Abdulhamid, 2015). Lack of time management can and probably will result in failure of a project PMI (2017). A research conducted by the Chartered Institute of Building (CIOB) in 2008 has indicated that the quality of time-management on construction projects is generally poor (Chin & Abdulhamid, 2015).

However, in the construction sector such as in Nigeria, poor delivery of project especially completion within schedule has remained an issue causing disharmony among construction stakeholders despite the existence of established processes of time management. Although, Hussain (2014) in his studies reviewed the main tools and techniques that are used in implementing the processes of time management. However, none of the studies reviewed within and outside Nigeria has deliberated on the level of adherence with the processes of time management. Therefore, this study is a solution oriented towards adhering with established processes that will influence construction project and reduced delay. As such, this study filled the gap by investigating adherence with processes of time management in construction project delivery in Nigeria and the objectives are: to assess the level of adherence with the processes of time management and ranked in order of importance, and to determine the effect of adherence with the processes of time management on construction project timely completion.

Literature Review

The Concept of Project Time Management

Time management is basically a set of principles, practices, skills, tools and system that helps one to use one's time to accomplish what one wants. Project time management includes the processes required to manage the timely completion of the project (PMI, 2013). In addition, the better time is managed the more efficient a project will be, assuming all others processes remain the same PMI (2017). The project management institute has done a great deal in clarifying the processes required in project time management. According to PMI (2013), there are seven (7) project time management processes, which include: (a) Plan Schedule Management (b) Define Activities (c) Sequence Activities (d) Estimate Activity Resources (e) Estimate Activity Durations (f) Develop Schedule (g) Control Schedule. The processes of time management also include all the necessary inputs, tools and techniques, outputs and activities involved Hussain (2014), (PMI, 2013), and Passenheim (2009). Table 1 depict an elaborate processes involved in project time management.

Table 1: An Elaborate Processes of Project Time Management

Factors	Activities Involve
1. Plan Schedule Management	▪ The process of establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.

- | | |
|--------------------------------|--|
| 2. Define Activities | ▪ The process of identifying and documenting the specific actions to be performed to produce the project deliverables. |
| 3. Sequence Activities | ▪ The process of identifying and documenting relationships among the project activities. |
| 4. Estimate Activity Resources | ▪ The process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity. |
| 5. Estimate Activity Durations | ▪ The process of estimating the number of work periods needed to complete individual activities with the estimated resources. |
| 6. Develop Schedule | ▪ The process of analyzing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model for project execution and monitoring and controlling. |
| 7. Control Schedule | ▪ The process of monitoring the status of the project to update the project schedule and manage changes to the schedule baseline. |

Source: Adapted Hussain (2014), (PMI, 2013), and Passenheim (2009)

The Concept of Construction Project Delivery

Construction deliverables are the ultimate aim of any project and they formed the benchmark upon which the success or failure of a project are appraised by stakeholders in the construction sector. Chan and Kumaraswamy (2002) state that timely completion of construction projects within anticipated cost and to the level of quality standards settled by the owner is an index of successful project delivery. Ibrionke and Elamah (2011) on their part opined that, client when engaging professionals for the purpose of procuring a building or other infrastructure are primarily concerned about quality, time and cost. In addition, Ibrahim (2020) and Hao, Shen, Neelamkavil and Thomas (2008) reports that more than a third of major clients are dissatisfied with contractors' performance in keeping to the quoted price and to time, resolving defects, and delivering a final product of the required quality. Abdulkadir, Muhammad, Gidado and Nuruddeen (2017) in their studies of cost and time overrun of building projects in Nigeria, also reported poor time performance rate of (21-40) % of projects executed. In addition, John, Abdullateef and Abdulganiyu (2015), in their studies of time and cost relationship of private building projects in Abuja, Nigeria report an average time overrun of 34% project duration. According to Murithi, Makokha and Otieno (2017), timely project completion is the projected completion time as in the contract for the construction of the project.

Theoretical Framework

Time management is not actually managing time per se, but how one manages his own behaviour and activities in relation to time. As such this study was guided by the theories of management and behaviour.

Management theories were concerned with the formal relations among organization's departments, tasks and processes and the promotion of greater efficiency and productivity among workers (Kwok, 2014). In addition, these theories which include bureaucratic, administrative and scientific management all emerged around the same period around the late 1890s to early 1990s (Kwok, 2014). This study adopts the administrative and scientific management theories as against the bureaucratic which is a rigid approach to management. According to Kwok (2014), Administrative management is more concerned with how an organization is run and the distinction of basic managerial functions. Henri Fayol (1841–1925), a French industrialist, was the first person to group management functions that today are

summarized as planning, organizing, leading, coordinating, controlling and staffing. According to Kwok (2014), the scientific management theory focused primarily on production, management, organization, technology and science and is probably the most well-known among the traditional theories, and comprises of four basic objectives, as follows: (i) The development of a science for each element of a man's work to replace the old rule-of thumb methods (ii) The scientific selection, training and development of workers instead of allowing them to choose their own tasks and train themselves as best they could (iii) The development of a spirit of hearty cooperation between workers and management to ensure that work could be carried out in accordance with scientifically devised procedures and (iv) The division of work between workers and the management in almost equal shares, each group taking over the work for which it is best fitted instead of the former condition in which responsibility largely rested with the workers. Kwok (2014), state that, major contributors to scientific management theories are: Frederick Winslow Taylor (1856-1915), Henry Gantt (1861-1919), Frank Gilbreths (1868–1924) etc.

According to Kwok (2014), the behavioural theories which emerged in 1920's stress the importance of group dynamics, complex human motivations and the manager's leadership style. The theory also emphasizes on the employee's social and economic needs and the influence of the organization's social setting on the quantity and quality of work produced, and its focuses on two competencies- communication and teamwork. Kwok (2014), list Elton Mayo (1880–1949), Abraham Maslow (1908-1970), Douglas McGregor (1906-1964), Frederick Herzberg (1923-2000), David McClelland (1917–1998) etc. as major contributors to behavioural theories.

As adapted for this study, both the management and behavioural theories has stressed the importance of adhering with certain principles, processes and practices that will ensure effective and efficient project operation with the resultant success in project delivery. The management and behavioural theory are in consonance with Ugwu and Attah (2016) they identified economic policy, political consideration, management style and motivation of workers as relevant in construction management. As such, to ensure successful construction project delivery there is need for a holistic approach in terms of managing ourselves towards time "Behavioural" and managing construction activities "administratively and scientifically".

Conceptual Framework

Figure 1 presents the conceptual framework for the study. It has two major components. Which are: The Independent Variable (IV) - Adherence with the processes of time management and Dependent Variable DV) - Construction project delivery. The frame work postulates that the "IV" will ensure effective and efficient project operation which will directly affects the "DV" i.e. timely completion of construction project. However, this relationship is not immune to external factors which may affect its smooth operation.

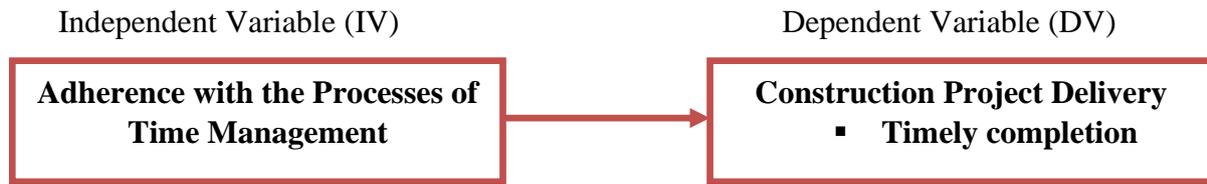


Figure 1: Conceptual Framework of the Study

Source: Author

Methodology

This study adopted a quantitative research approach, using questionnaire as an instrument for data collection. Literature review was carried out to obtain information on the processes of time management and construction project delivery which were presented in the questionnaire. The questionnaire seeks to gather information regarding the level of adherence with processes of time management in construction project delivery in Nigeria. A 6-point likert scale (1-6) of non-adherence to adherence was used to give participants more equal freedom as well as to avoid the use of “medium/neutral” which might be subjective for this type of study. Also, Low: 1-30%, Medium: 31-60% and High: 61-100% was used to remark the respondents' level of agreement. Stratified random sampling technique was adopted to understand the perception of 88 professionals such as: The Architects, Builders, Quantity surveyors, Engineers, Project managers working as personnel for the client, consultant and contractors involved in handling construction projects in Federal University Kashere (FUK= 30 No.), Federal College of Education Technical (FCET=23 No.) and other firms of consultants and contractors (35 No.) all situated in Gombe state, North Eastern Nigeria. The questionnaire attains 70% response rate equivalent to 62 number correctly completed and returned. The participants were surveyed regarding their level of adherence or willingness to adhere with the processes of time management. The data obtained was analyzed using statistical package for social science (SPSS) software using descriptive statistics, Mean scores and t-test to establish the level of importance of the sample factors and ranked according to their importance index. Regression was used to determine the factors effects on timely completion of construction project. The factors with the highest mean scores values are considered the most adhered processes of time management in construction project delivery in Nigeria.

Results and Findings

Table 2, shows that a total of 88 questionnaires were distributed of which 62 questionnaires were retrieved which represent 70.45% response rate which was used for data analysis of the study. This excellent response rate above average was achieved as a result of the face-to-face method of questionnaire administration used, simplicity of language and distributing the questionnaires to the right respondents. The result further revealed that, 26 questionnaires were either spoiled or not returned representing 29.55%. This response rate for this type of survey is higher than other studies carried out in the construction industry. Such as: Abdulkadir et al. (2017) 56% response rate; Ayodeji, Eseho, Opeyemi, Ebenezer, Amusan and Abisola (2017) 64% response rate; Olawale and Sun (2010) 44% response rate and Amade, Ubani, Omajeh and Njoku, (2015) recorded 61% response rate.

Table 2: Questionnaire Response Rate

Respondents	Distribution (No)	Distribution (%)	Returned (No)	Returned (%)
FCET	23	26.1	18	78.3
FUK	30	34.1	26	86.7
Firms	35	39.8	18	51.4
Total	88	100	62	

Source: Author

“Response rate= No. of questionnaires returned ÷ No. of questionnaires distributed x 100”

Reliability and Validity Test

The use of Cronbach's α , allows negative construct to be detected and positive to be accepted ranging from a scale of 0 to 1.0 (Ogwueleka, 2011 cited in Inuwa, 2014). The minimum acceptable value for Cronbach's alpha is ranges from 0.5 to 0.6 (Inuwa, 2014). In addition, < 0.5 indicates Poor reliability; 0.5-0.7 sufficient reliability and > 0.7 indicates good reliability. Therefore, Cronbach's α scale is used to measure the study questionnaire construct consistency (reliability) and level of random error emanating thereof.

Validity test was conducted on the research questionnaire through the panel of four professional judges with relevant years of working experience in construction project, with two academicians and two construction field experts. The observations and remarks made, has contributed immensely towards ensuring the questionnaire is valid enough to get the necessary data from the study respondents.

Table 3, the Cronbach's α measure recorded for this study revealed that the reliability of the questionnaires' constructs are very high, 0.88 exceeding the cut off score of 0.70, which is the standard used by most researchers for high efficiency. This indicates that the questionnaires are highly reliable (consistent) as well as free from random error.

Table 3: Cronbach's α and Reliability Status

S/N	Factor category	No. of Items	Cronbach's α	Status
1	Processes of time management	7	0.88	Good

Source: Author

Table 4, presents the background information of the respondents. Findings revealed that majority of the respondents 61.3% have Degree/HND; 30.6% have Masters/PGD; as such virtually all the respondents have the requisite academic qualification. Hence, their assessment is valid. On the area of specialization, virtually all the relevant professions were adequately represented with Engineering and Quantity surveying having 22.6% each, Architecture 19.4%, Building 14.4%, while Project management and other relevant professionals account for 21%. On the years of working experience, all the respondents have the requisite years of experience in the construction industry with 37.10% having 6-10years, 25.80% having 11-15years while 12.9% have more than 15years working experience. As such by virtue of experience, the respondents' are competent enough to have participated in the survey and therefore, has ensured high reliability of the results. On the category of working organization, 39% are working for the client; 29% for the consultants and 32% works for the contractors. As such, all the major players in a typical construction project are equally represented which has reduced biasness of any sort. On the extension of time, all the participants have experienced delay with 41.94% reporting 1-6months, 37.10% 6-12months delayed and 11.29% reported more than

18months delayed in project completion time. As such, time overrun is still a major issue affecting construction projects delivery in Nigeria.

Table 4: Background Information of the Respondents

Characteristics	Frequency (No)	Percentage (%)
Area of specialization		
Architecture	12	19.4
Engineering	14	22.6
Quantity surveying	14	22.6
Building	9	14.4
Project Management/others	13	21%
Total	62	100
Highest qualification obtained		
NCE / ND	2	3.2
Degree/HND	38	61.3
Masters/PGD	19	30.6
PhD	3	4.8
Total	62	100
Years of working experience		
0-5 years	15	24.2
6-10 years	23	37.1
11-15 years	16	25.8
More than 15 years	8	12.9
Total	62	100
Category of working organization		
Client	24	38.7
Consultant	18	29
Contractors	20	32.3
Total	62	100
Experienced time overrun		
Yes	62	100
Total	62	100
Length of time extension		
0 months	1	1.6
1-6 months	26	41.9
6-12 months	23	37.1
12-18 months	5	8.1
more than 18 months	7	11.3
Total	62	100

Source: Author

Table 5, is the representation of the respondents' ratings on the level of adherence with the processes of time management in percentages. The study reveals that 84.81% of the respondents claimed to be adhering or willing to adhere with the processes of time management as against 15.19% who are unwilling to adhere with the processes. The results further revealed that, virtually all the seven factors constituting the processes of time management have a high score of more than 70% rate in terms of agreement by the respondents.

Table 5: Respondents levels of Adherence with the Processes of Time Management

Processes of time management	Non-Adherence (%)				Adherence (%)				Total	Remark
	1	2	3	Sum	4	5	6	Sum		
Plan schedule management		4.8	14.5	19.3	25.8	32.3	22.6	80.7	100	High
Define activities to be undertaken	1.6	3.2	11.3	16.1	38.7	32.3	12.9	83.9	100	High
Sequencing of activities		9.3	13.1	22.4	25.8	33.9	17.9	77.6	100	High
Estimating resource requirement for activities		6.5	3.2	9.7	29.0	38.7	22.6	90.3	100	High
Estimating duration of activities		6.5	11.3	17.8	27.3	32.3	22.6	82.2	100	High
Developing schedule for the project	1.6	1.6	6.5	9.7	25.8	51.6	12.9	90.3	100	High
Monitoring and controlling schedule		1.6	9.7	11.3	29.0	32.3	27.4	88.7	100	high
Total				15.19				84.81	100	

-Never Adhere =1, Very Rarely =2, Rarely =3, Occasionally =4, Frequently =5, Very Frequently = 6

- Remark "Level of Agreement": Low: 1-30%, Medium: 31-60% and for High: 61-100%

Source: Author

Table 6, is a representation of the mean scores and rankings on the processes of time management. Findings revealed that, Monitoring and controlling schedule of the project, with (Mean 4.74 & Standard Deviation "SD" 1.023) was ranked "first". Estimating resource requirement for activities, with (Mean 4.68 & SD 1.023) was ranked "second". Developing schedule for the project, with (Mean 4.63 & SD 0.92) was ranked "third". Estimating duration of activities, with (Mean 4.53 & SD 1.155) was ranked "fourth". Plan schedule management, with (Mean 4.53 & SD 1.141) was ranked "fifth". Sequencing of activities, with (Mean 4.35 & SD 1.243) was ranked "sixth" and Define activities to be undertaken, with (Mean 4.35 & SD 1.057) was the least important and was ranked "seventh". An independent samples t-test was also used to generate the t-value and the p-value (significance) in order to ascertain the degree of discrepancies with respect to each variable in the responses of respondents. Using a test value of 4.00, the one sample t-test statistics was carried out in order to investigate the significance attached to the level of adherence with the processes of time management by the respondents. Findings revealed that at $p < 0.05$, all the 7 factors constituting the processes of time management shows significant importance as all their p-values are less than the recommended 0.05 value.

Submitted: 18 May 2020

Accepted: 2 June 2020

Published: 30 June 2020

Table 6: Mean Scores and Ranking on the Processes of Time Management

Factors	Mean	Std. Dev.	Rank	T	Mean diff (test value=4)	Sig
▪ Monitoring and controlling schedule	4.74	1.023	1	5.71	0.74	.000
▪ Estimating resource requirement for activities	4.68	1.068	2	5.15	0.63	.000
▪ Developing schedule for the project	4.63	0.962	3	5.00	0.68	.000
▪ Estimating duration of activities	4.53	1.155	4	3.67	0.53	.001
▪ Plan schedule management	4.53	1.141	5	3.63	0.53	.001
▪ Sequencing of activities	4.35	1.243	6	2.64	0.35	.010
▪ Define activities to be undertaken	4.35	1.057	7	2.25	0.35	.028
Grand mean =	4.54					

Source: Author

Table 7, is the regression model summary of the independent variable i.e. processes of time management. It shows R-Value of 0.423 and R-Square value of 0.179 which explains 17.9% of the variance (0.179 x 100%). The implication of this model is that adherence with the processes of time management alone accounts for only 17.9% while other factors not covered in this study will account for the remaining variables.

Table 7: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.423	0.179	0.072	1.04183

Source: Author

Table 8, is the regression coefficient of the independent variable i.e. processes of time management and dependent variable i.e. construction project timely completion. Findings revealed that a unit increase in the level of adherence with the processes of time management will lead to 15.4% cause effect increase in timely completion of construction projects i.e. having a β (Beta) of 0.154 and $t = 1.207$, even though is not significant.

Table 8: Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.339	0.76		5.708	0.000
Processes of time management	0.028	0.023	0.154	1.207	0.232

a. Dependent Variable: Construction project delivery (Timely Completion)

Source: Author

Discussion of Results

Data analysis and questionnaire responses from the respondents revealed that 84.81% of the respondents are adhering or willing to adhere while 15.19% were unwilling or not adhering

with the processes of time management. 79% of the respondents experienced delay of 1-12 months in project completion time.

However, monitoring and controlling schedule of the project; estimating resource requirement for activities and developing schedule for the project were the three most adhered processes of time management. In this study monitoring and controlling schedule of a project was ranked as the foremost adhered process of time management. The essential of monitoring and controlling project schedule has been echoed by PMI (2013), reporting that controlling schedule is the process of monitoring the status of project activities to update project progress and manage changes to the schedule baseline to achieve the plan, and the key benefit of this process is that it provides the means to recognize deviation from the plan and take corrective and preventive actions and thus minimize risk. Also, Murithi et al. (2017), in their studies of time management in Kenya, also echoed the importance of effective monitoring of project. Estimating resource requirement for activities was ranked as the second most adhered processes of time management in this study. The importance of determining the quality and quantity of various resources required to complete project on schedule has been echoed by PMI (2013) by reporting that, Estimate activity resources is the process of estimating the type and quantities of material, human resources, equipment, or supplies required to perform each activity. They further state that the key benefit of this process is that it identifies the type, quantity, and characteristics of resources required to complete the activity which allows more accurate cost and duration estimates. Mgeleka (2015) and Hussain (2014), also stressed the importance of effective resource requirement in their various studies respectively. Developing schedule for the project was ranked as the third most adhered processes of time management. PMI (2013) states that the key benefit of this process is that by entering schedule activities, durations, resources, resource availabilities, and logical relationships into the scheduling tool, it generates a schedule model with planned dates for completing project activities. The findings on the importance of developing schedule was in consonance with Sunke (2009), in his studies, assert that project schedule is not just a valuable instrument in communication and coordination of processes. It also serves both the planning of project activities and a related resource assignment to each activity considering some measure of performance as well as the planning of external activities.

The implication of these results is that adherence with the processes of time management most especially monitoring and controlling the project schedule, estimating resource requirement for the project activities and developing schedule of the project, with a combine mean scores of 14.05 equivalent to 44.17% overall total will lead to 15.4% caused effect increase on timely completion of construction project in Gombe state, Nigeria.

Conclusion and Recommendation

Timely delivery of construction project should be the business of every construction stakeholders - client, consultants and contractors per se. Investigating the level of adherence with the processes of time management and its effect on timely completion of construction project is the crux of this study. Adherence with the processes of time management most especially monitoring and controlling project schedule, estimating resource requirement for activities and developing schedule of the project are crucial for effective construction project

delivery. As such, the higher the level adherence with the processes of time management the more the possibility of completing construction project within schedule provided there is less interference from external influence. Based on the findings of this study, it is recommended that construction stakeholders should collaborate and adhered strictly with all the established processes of time management in order to ensure successful completion of construction project within schedule in Nigeria.

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