Cost Assessment of Delayed Projects in Public Universities in South East of Nigeria

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ABSTRACT: The main objective of this study is to assess the cost of delayed projects in Public Universities in South East of Nigeria. To achieve the aim of this study, the specific objectives focused on the effect of reviewed costs on proposed costs of contract; effect of reviewed floor area on proposed floor area; effect of reviewed period of contract on proposed period; and effect of reviewed period on proposed cost of contracts. The study adopted the ex-post facto research design and secondary data on proposed and reviewed costs, floor area, and period of contracts were collected from the sampled public Universities in South East Nigeria. The data were analysed using SPSS v. 20 with particular emphasis on the simple regression model, and it was found that: Reviewed cost of construction has significant effect on proposed cost of building and delays in Public Universities of South East Nigeria; reviewed floor area has significant effect on proposed cost of building projects and delays in Public Universities of South East Nigeria; reviewed contract period has significant effect on proposed period of constructing building projects and delays in Public Universities of South East Nigeria; and reviewed period of contract has significant effect on the cost of delayed buildings of Public Universities in South East Nigeria. The study recommends among other things that: Management of Public Universities in South East Nigeria should adopt better methods of cost estimation that would accommodate increases in proposed building contracts, and Government should avoid delays in proposed contracts as well as keep contracts in check with respect to the size of areas and floors by doing them in phases.
KEYWORDS: Delayed-Projects,Universities, Southeast, Nigeria, Cost, Estimation, Contracts, SPSS V. 20,Simple-Regression-Model.

I.   INTRODUCTION

The construction industry is one of the main sectors that provide important ingredient for the development of an economy. However, many projects experience extensive delays and thereby exceed initial time and cost estimates. The construction industry is an essential component in socioeconomic development of any nation. Construction projects are characterized by poor performance in terms of projects pre- planned objectives (Ajayi, Ogunsanmi, Salako & Mafimidiwo, 2012). The complications and challenges that lead to delay occur during the project implementation phase. Assaf and Al-Hejji (2006) defines delay as time overruns either beyond the completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project. (Majid, 2006) describes delay as time loss. Delay in construction project can occur through many sources or means such as characteristics of the project, internal and external factors affecting the construction organization, social, economic and cultural issues and so on. These issues can be associated with the project stakeholders, namely: clients, contractors, subcontractors, consultants and external factors (such as statutory agencies). Aibinu and Jagboro (2002) attest that the major criticism facing Nigerian construction industry is the growing rate of delays in project delivery.

Construction delay can be referred to as a prolonged construction period beyond that which was estimated previously. The various risks associated with projects delay are cost related where delay will generally lead to an overall increase in the cost of the project. Various studies carried out by (Cohen and Palmer, 2004, Baloi and Price, 2003, Milner and Lessard, 2001) have found sources of and categories of construction risks that needs to be managed as part of the project management process. Delays are integral part of modern construction processes (Yates and Epstein, 2006). They stated that project delay starts from the inception phase of the project itself. In addition (Scott et al, 2004) mentioned that there is a tendency for construction projects to suffer from

delays and such delays poses potential loses for all stake holders.

II. REVIEW LITERATURE (CONSTRUCTION DELAY)

Construction delay is recognized as the most widely known, expensive and hazardous issue experienced in any construction project. Building projects are usually exposed to substantial threat on the time delay. Such threat situations lead to expansion of time and expense. Delay in construction projects may be brought on by one or a mix of a few reasons. It may begin with a basic reason and led to a generous arrangement of an interrelated complex question in contract understanding. A large portion of delay are brought about by variables, for example, implausible contract length of time and expense, contrasting site conditions, change requests, effect and gradually expanding influences of postponements, assessment of the quality and amount of works, client outfitted things, difference in the elucidation of plans and designs, unfulfilled obligations, speeding up, wastefulness and interruption (Na Ayudhya 2011).

Tawilet al. (2014), Afshariet al. (2011) and Acharyaet al. (2006) defined construction delay as a situation when the client and contractor collectively contribute to the late execution of the project within the contract completion date as agreed in the contract terms. Abdullah et al. (2010) further defined construction delay as the time overrun or the extension of time to finish the task. Subsequently, a delay is a circumstance when the genuine advancement of a building project is slower than the arranged plan or late finish of the activities. El-razeket al. (2009) and Motaleb and Kishk (2010) was of the view that project delay is then characterized as "the extension of project schedule date of completion indicated in an agreement, or past the date that the pasties settled upon for conveyance of a task." However, delays in building project can lead to contract termination, lost productivity, increased costs, acceleration and late completion of project (Suresh and Kanchana 2015).Fugar and Agyakwah-Baah (2010) in their research on delay in building construction project in Ghana enumerated numerous causes of delay and then classified them into nine distinct categories analyzed them and concluded that the major causes of time overrun are delay in getting permission from council, poor estimation of project cost, underrating the complications of a projects, bank transaction challenges, inconsistency in price of materials and poor site supervision.

III. THE STUDY AREA

The research work focuses on the assessment effect of delay of public universities buildings in South East of Nigeria and the ways of mitigating or eliminating the adverse effect of delay in construction work. For this research: a critical analysis of the effect of delay of some of public universities buildings will be considered. Also, the client related delay, contractors' related delay, consultants' related delay and others factor of delay will be looked into.

The total numbers of eleven projects were selected from difference public universities in the South East. The problems are as follows

i.   Delay in issuing advance payment guarantee (APG)
ii.   Poor design
iii. Change in government
iv.   Delayed in payment of certificate
v.   Poor knowledge of construction work by the contractors
vi.   Increase in price of materials
vii. Corruption on the part of construction team
viii. Subletting of project to the subcontractor.
ix.   Non adherence to specifications.
x.   Disagreement by construction team.

Some selected projects in South East of Nigeria are as follows:
a.   Construction of lecture auditorium of the institute of maritime Studies, university of Nigeria, Enugu campus Contractor-Accurist Marine & Dredging Ltd. Stage of the work ground floor lintel.
b.   Construction of central administrative block. Contractor-Landsford Property & Technologies Ltd. Stages of work ground floor lintel (UNN Enugu Campus)
c.   Construction of academic block. Coontractor-Multiplus Investment Ltd. Stage of work casting of first floor slab. (UNN Enugu Campus)
d.   Construction of academic block 2. Contractor-Keygate Ltd. State of working ground floor lintel. (UNN Enugu Campus)
e.   Construction of lecturer theatre. Constractor-Key DoubraNig Ltd. Stage of work first floor block wall (UNN Enugu Campus)
f.   Construction of auditorium & offices for Futo women association (FUTUWN). Construction-PavilgNig Ltd (FUTO, Imo State)
g.   Construction of Bioprocess Physiology Complex. Contractor-Akiota Works Ltd. State of work completed (UNN Nsukka, Enugu Campus)

h. Construction of New Academic Block phase 1, Michael Okparauniversity of agriculture UmudikeAbia State. Contractor-GabconEnt. Nig. Ltd. State of work completed.
i. Construction of College of Agricultural, Rural sociology and extension complex at Michael Okpara University of agriculture, UmudikeAbia State.
j. Construction of Faculty building for College of Health Science, Nnewi Campus, NnamdiAzikiwe, Anambra State.
k. Construction of Faculty Building for Ebonyi State Universities Permanent Site EzzamgboAbakiliki, Ebonyi State.

IV. RESEARCH METHODOLOGY

This chapter encompasses the method of research, sampling design, method of data collection, study area, population of the study and method of data analysis.

4.1 Method of Research

Survey research design was adopted in this research study to assess the appropriate cost of elements of building projects and effective of control in projects management. The choice for the survey design become importance because it is economical in the sense that as study of representative sample with permit inference from and generalization of the population that would be used for the study.

4.2 The Sampling Design

The study used the probability sampling and it is further categorized into simple random sampling as the study variables have the equal chances of being selected. Sampling size of this study is fourteen (14) sampling is based on the construction firms both public and private which also include consultant quantity surveyors.

4.3 Method of Data Collection

The primary and secondary data was used in this study. The primary sources of data deals with collecting data which are still in unprocessed form. The data was collected through personal interviews and observations. While the secondary source of data was gathered from reports, textbooks, journals, published and republished articles and other research papers.

4.4 The Study Area

The research was used as case study of projects of registered contractors with public universities in South East of Nigeria, with its relevance was to look for statistical information that could provide some useful guideline to estimators/contractors for the mitigation of cost effect of abandon project in public universities in South East of Nigeria.

4.5 The Population of the Study

The population of this study comprises of fourteen building projects with fourteen building elements.

4.6 Method of Data Analysis

Statistical package for the Social Sciences (SPSS) version 20 was usedin the analysis of the research. The analysis includes univariate analysis which deals with one variable at a time, bi-variate analysis which deals with analysis of two variables at a time and trend analysis.

The models for these analyses are expressed as follows:

$$PCOST_i = \beta_0 + \beta_i(REVCOST_I) + \mu \dots\dots\dots (1)$$
$$PAREA_i = \beta_0 + \beta_i(REVAREA_i) + \mu \dots\dots\dots(2)$$
$$PPERIOD_i = \beta_0 + \beta_i(REVPERIOD_i) + \mu \dots\dots\dots(3)$$
$$PCOST_i = \beta_0 + \beta_i(REVPERIOD_i) + \mu \dots\dots\dots(4)$$

Where PCOST is the proposed cost
   PAREA is the proposed area
   PPERIOD is the proposed period of contract
   REVCOST is the reviewed cost
   REVAREA is the reviewed area
   REVPERIOD is the reviewed period of contract

V. PRESENTATION AND ANALYSIS OF DATA

5.1 PRESENTATION OF DATA

S/N	NAME OF PROJECTS	PROPOSED CONTRACT PER FLOOR AREA (M^2)	REVIEWED CONTRACT PER FLOOR AREA (M^2)	PROPOSED CONTRACT AMOUNT	REVIEWED CONTRACT AMOUNT	PROPOSEDCONTRACT PERIOD	REVIEWED CONTRACT PERIOD

				(N)	(N)	(Weeks)	(Weeks)
1	Construction of lecture auditorium of the institute of maritime studies, University of Nigeria, Enugu Campus	70550.01	82,999.98	250,650,500	325,845,650	45	77
2.	Construction of central Administrative block, University of Nigeria Enugu campus	93500.07	110,000.08	420,660,100	546,858,130	75	120
3	Construction of academic block 1, University of Nigeria Enugu campus	93500.27	110,000.32	340,300,300	442,390,390	60	125
4	Construction of academic block 2, University of Nigeria Enugu campus	85424.95	100,499.83	294,000,200	367,500,250	49	98
5	Construction of lecturer theatre University of Nigeria Enugu Campus	93499.82	109,999.79	310,000,320	387,500,400	62	110
6	Construction of Bioprocess Physiology complex University of Nigeria Nsukka campus	85203.52	100,239.44	365,640,400	438,768,480	72	108
7	Construction of New Academic Block Phase 1, Michael Okpara University of Agriculture Umudike Abia State	83725.15	98,500.18	280,300,800	310,330,880	76	84
8	Construction of Auditorium & Office for FUTO association	85000.03	100,000.04	350,900,140	428,098,170.80	70	100

	(FUTUWN), federal university of technology Owerri					
9	Construction of College of Agricultural, Rural Sociology and Extension Complex, Michael Okpara University of Agriculture Umudike, Abia State	75649.95	88,999.94	289,600,450	318,560,495	58	66
10	Construction of Faculty Building for Ebonyi State University	93499.87	109,999.85	450,000,600.45	549,210,732.50	89	112
11	Construction of Faculty building for College of health science, Nandi Azikiwe University, Nnewi Campus	98600.23	116,000.03	480,899,002.05	671,904,266.25	82	164
12	Construction of school of post studies (ESUT) Enugu State University of Science and Technology	60504.94	71,182.28	120,587,778.50	128,950,430	45	69
13	Faculty of Art, Nnamdi Azikiwe University Main Campus Awka	95175.51	111,971.19	413,110,990	516,388,737.50	79	99
14	Administrative building of Chukwuemeka Udumegwu Ojukwu University Igbariam, Anambra State	82077.76	96,562.07	360,450,760	439,749,927.20	72	88

Source: Compilation by the Researcher, 2019 (Extracted from the Appendices)

Fig. 1: Comparison between proposed and reviewed cost of buildings

The figure shows that the reviewed cost ₦1,396,954.92 representing 56% of the University buildings cost far exceeds the proposed amount, ₦1,102,412.25 representing 44%. This is an obvious situation especially becausethere are attendant effects of inflation, rising cost of construction and global economic meltdown during the period under review.
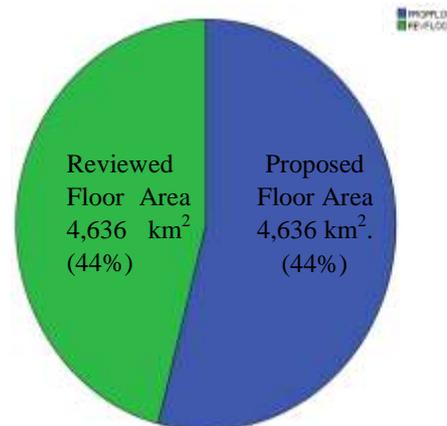

Fig. 2: Comparison between proposed and reviewed floor of buildings

The figure appears to display a sharp contrast between the proposed and reviewed floor areas of the University buildings. The proposed area 5,594 km^2 (55%) surmounted the reviewed area 4,636 km^2 and it is obvious or rather expected that a contract floor area could be reviewed downward to cut cost and time involved in the execution of the work. This is expected especially when the review is intended to avoid what is called abandonment of projects (which also causes white elephant projects) in the long run.
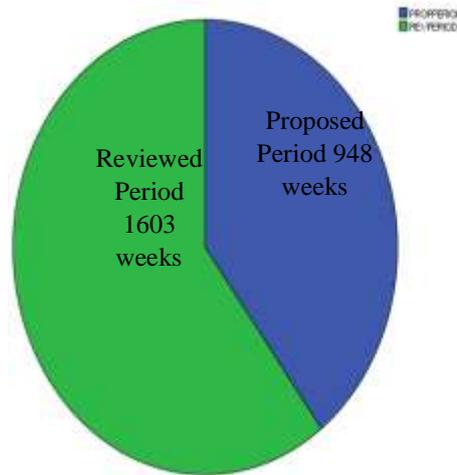
Fig. 3: Comparison between proposed and reviewed period of building

The figure shows that the proposed period for the execution of the building contract appeared longer than the reviewed period (63%) while the reviewed period had a shorter period of time (37%). It could be inferred therefore that the longer the period of contract execution, the higher the cost might be also due to unexpected rise in inflation, cost of materials, labour and other unforeseen circumstances. Contracts that take longer periods are prone to failure due to the aforementioned reasons.

5.2 ANALYSIS OF DATA
5.2.1 Analysis on Hypothesis 1
Restatement of the Hypothesis
H_0: Reviewed cost of construction does not have significant effect on proposed cost of building and delays in PublicUniversities of South East Nigeria.
Decision Rule: Accept H_0 if p-value > 0.05, otherwise reject.

Table 4.2: Correlation Analysis on Hypothesis 1
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000[a]	1.000	1.000	.05867

a. Predictors: (Constant), REVCOST

The analysis in table 4.2 shows that r = 1.00 while the coefficient of determination is also R^2 = 1.000. This reveals a perfect positive correlation between reviewed cost of construction and proposed cost of construction.

Table 4.3: Test of Hypothesis 1
ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	P-value.
1	Regression	1481631491.630	1	1481631491.630	430492723533.428	.000[b]
	Residual	.041	12	.003		
	Total	1481631491.671	13			

a. Dependent Variable: PCOST
b. Predictors: (Constant), REVCOST

Table 4.3 shows that p-value = 0.000. Since p-value < 0.05, we reject H_0 and conclude that reviewed cost of construction has significant effect on proposed cost of building and delays in Public Universities of South East Nigeria. This is a confirmation that the proposed cost of building

contract is predominantly affected by review of the   cost of building.
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Table 4.4: Regression of Proposed Cost on Reviewed Cost of Building
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	P-value
		B	Std. Error	Beta		
1	(Constant)	-.104	.131		-.794	.443
	REVCOST	.850	.000	1.000	656119.443	.000

a. Dependent Variable: PCOST

5.2.2 Analysis on Hypothesis 2
Restatement of the Hypothesis
H_0:   Reviewed floor area does not have significant effect on proposed cost of building projects and delays in Public Universities of South East Nigeria.

Decision Rule: Accept H_0 if p-value > 0.05, otherwise reject.

Table 4.5: Correlation Analysis on Hypothesis 2
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.983[a]	.966	.963	17671858.92074

a. Predictors: (Constant), REVAREA

The correlation coefficient in table 4.5 is r = 0.983 while R^2 = 0.966. The outcome of this analysis is that floor area has a strong and positive correlation with proposed floor area of the building's projects and delays.

Table 4.6: Test of Hypothesis 2
ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	P-value
1	Regression	106418784842215776.000	1	106418784842215776.000	340.764	.000[b]
	Residual	3747535172576489.000	12	312294597714707.440		
	Total	110166320014792272.000	13			

a. Dependent Variable: PAREA
b. Predictors: (Constant), REVAREA

The F-test statistic in table 4.6 has a p-value of 0.000. Therefore, we do not accept H_0 but we conclude that reviewed floor area has significant effect on proposed cost of building projects and delays in Public Universities of South East Nigeria.

Table 4.7: Regression of Proposed Area on Reviewed Area of Construction
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	P-value.
		B	Std. Error	Beta		
1	(Constant)	50178661.150	16273296.581		3.083	.009
	REVAREA	.685	.037	.983	18.460	.000

a. Dependent Variable: PAREA

The regression model for this relationship makes use of the coefficients in table 4.7 and is expressed as follows:

$PAREA_i = 50178661.150 + 0.685(REVAREA_i) + 0.037$

The model shows that there was a positive constant contribution by reviewed cost of area of buildings to proposed cost of an area. It contributed a whooping ₦50,178,661,150 to proposed area of Public Universities in Nigeria. The marginal increase on annual basis is 0.685 and the error of estimation was only 0.037 or 3.7 percent. This supports the test result that reviewed floor area has significant effect on proposed cost of building projects and delays in Public Universities of South East Nigeria.

5.2.3 Analysis on Hypothesis 3
Restatement of the Hypothesis
H_0: Reviewed contract period does not have significant effect on proposed period of constructing building projects and delays in Public Universities of South East Nigeria.
Decision Rule: Accept H_0 if p-value > 0.05, otherwise reject

Table 4.8: Correlation Analysis on Hypothesis 3
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.548[a]	.300	.242	12.084

a. Predictors: (Constant), REVPERIOD

Table 4.8 shows a correlation coefficient (r) of 0.548 and a coefficient of determination (R^2) of 0.300. It implies that reviewed contract period has a high correlation with proposed contract period. However, reviewed period could only determine the changes in proposed period up to 30 percent and as such reviewed period is not a very strong determinant of the variations in proposed contract period.

Table 4.9: Test of Hypothesis 3
ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	P-value
1	Regression	750.633	1	750.633	5.141	.043[b]
	Residual	1752.224	12	146.019		
	Total	2502.857	13			

a. Dependent Variable: PPERIOD
b. Predictors: (Constant), REVPERIOD

Table 4.10: Regression of Reviewed Period on Proposed Period of Construction
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	P-value
		B	Std. Error	Beta		
1	(Constant)	36.486	13.718		2.660	.021
	REVPERIOD	.298	.131	.548	2.267	.043

a. Dependent Variable: PPERIOD

5.2.4 Analysis on Hypothesis 4
Restatement of the Hypothesis
H_0: Reviewed period of contract has no significant effect on the cost of delayed buildings of Public Universities in South East Nigeria.

Decision Rule: Accept H_0 if p-value > 0.05, otherwise reject

Table 4.11: Correlation Analysis on Hypothesis 4
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.816[a]	.666	.638	6424.82096

a. predictors: (constant), REVCONTRACT

Table 4.11 is the model summary of the relationship between reviewed contract period and the cost of reviewed (delayed) construction of buildings in Public Universities in South East Nigeria. The analysis reveals that there is a very high correlation between the dependent variable (PCOST) and the independent variable (REVCONTRACT) of South East Nigeria.

Table 4.12: Test of Hypothesis on Hypothesis 4
ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	P-value
1	Regression	986291598.982	1	986291598.982	23.894	.000[b]
	Residual	495339892.689	12	41278324.391		
	Total	1481631491.671	13			

a. Dependent Variable: PCOST
b. Predictors: (Constant), REVPERIOD

The test of hypothesis in table 4.12 shows that the p-value = 0.000. Since p-value < 0.05, we conclude that reviewed period of contract has significant effect on the cost of delayed buildings of Public Universities in South East Nigeria.

Table 4.13: Regression of Reviewed Period of Contract on Proposed Cost of Construction
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	P-value
		B	Std. Error	Beta		
1	(Constant)	50772.716	7293.540		6.961	.000
	REVPERIOD	341.616	69.887	.816	4.888	.000

a.   Dependent Variable: PCOST

The coefficients in table 4.13 are hereby fitted in the regression model as follows:
$PCOST_i = 50772.716 + 341.616(REVPERIOD_i) + 0.816$

VI. SUMMARY, CONCLUSION ANDRECOMMENDATION
6.1 Summary of Findings
The outcome of the study is summarised as follows:
i) Reviewed cost of construction has significant effect on proposed cost of building and delays in Public Universities of South East Nigeria.
ii) Reviewed floor area has significant effect on proposed cost of building projects and delays in Public Universities of South East Nigeria.

The analysis reveals that both the constant and the variable reviewed period of contract had significant effect on the changes recorded in proposed cost of delayed buildings of Public Universities in South East Nigeria.
iii) Reviewed contract period has significant effect on proposed period of constructing building projects and delays in Public Universities of South East Nigeria.
iv) Reviewed period of contract has significant effect on the cost of delayed buildings of Public Universities in South East Nigeria.

6.2 Conclusion
The costs of proposed projects have always been a huge source of concern to all government and public institutions that award contracts in Nigeria. The Universities in the South

East of Nigeria are having a fair share of this persistent challenge. The study has been able to assess the effect of contract review on the cost of proposed contracts. The study considered reviewed costs, reviewed floor areas, reviewed period and the associated proposed costs to analyse the effect of contract delays on Public Universities in the South East of Nigeria. The answers to the specific objectives of the study have been in the affirmative and have satisfied the expectation of the researcher. It confirms the belief that reviewed contracts do have significant effects on proposed costs of buildings; hence there are usually delays in contracts with particular reference to the Public Universities in South East Nigeria.

6.3 Recommendations
The study provides a few recommendations in line with the findings and specific objectives as follows:

i) Management of Public Universities in South East Nigeria should adopt better methods of cost estimation that would accommodate or create room for anticipated increases in proposed building contracts.
ii) Government should avoid delays in proposed contracts as well as keep contracts in check with respect to the sizes of areas and floors by doing them in phases.
iii) Universities in the South East should have deliberate policies that would make building projects to be covered at shorter times. This would ensure quick completion of the projects as well as reducing the associated cost of contract reviews.
iv) Management of the Public Universities should cut down on proposed costs of projects which they can carry rather than engaging in over budgeting and inflation of contracts and other forms of corrupt practices.

REFERENCES
[1]. A.W., P. D., Dhawale and S. N. Bhardwaj (2015). "Identification of Factor which Causes Cost Overrun and Delays in Infrastructure Projects." International Journal of Engineering Technology, Management and Applied Sciences Volume 3(Issue 5).
[2]. Aibinu and Jagboro (2002). "The effects of construction delays on project delivery in Nigerian construction industry (s)." International Journal of Project Management
[3]. Al-Gahtani, K. S. and S. B. Mohan (2011). "Delay Analysis Techniques Comparison." Journal of Civil Engineering and Architecture, ISSN 1934-7359, USA
[4]. Ambituuni, A. (2011). "Five Causes of Project Delay and Cost Overrun, and Their MitigationMeasures." The Robert Gordon University .
[5]. Apolot, R., H. Alinaitwe and D. Tindiwensi An Investigation into the Causes of Delay and Cost Overrun in Uganda's Public Sector Construction Projects. Second International Conference on Advances in Engineering and Technology.
[6]. Assaf, S. A. and S. Al-Hejji (2006). "Causes of delay in large construction projects." INTERNATIONAL JOURNAL OF PROJECT MANAGEMENT.
[7]. Ayudhya, B. I. N. (2011). "Evaluation of Common Delay Causes of Construction Projects in Singapore." Journal of Civil Engineering and Architecture, ISSN 1934-7359, USA Volume 5, No. 11 (Serial No. 48), pp. 1027-1034 (Nov. 2011).
[8]. Aziz, R. F. (2013). "Ranking of delay factors in construct ion projects after Egyptian revolution." Alexendria Engineering Journal(52): 20.
[9]. Bramble, B. B. a. Callahan and M. T. (1987). Construction Delay Claims. USA Wiley Law Publications.
[10]. Fugar, F. D. K. and A. B. Agyakwah-Baah (2010). "Delays in Building Construction Projects in Ghana." Australasian Journal of Construction Economics and Building
[11]. Haq, S., Y. Rashid and M. S. Aslam (2014). "Effects of Delay in construction Projects of Punjab-Pakistan: An Empirical Study." Journal of Basic and Applied Scientific Research and Essays.
[12]. Haseeb, M., Xinhai-Lu, A. Bibi, Maloof-ud-Dyian and W. Rabbani (2011). "Causes and Effects of Delays in Large Construction Projects of Pakistan." Kuwait Chapter of Arabian Journal of Business and Management Review Vol. 1, No.4(December 2011).
[13]. Jacob, B. P. S. a. U. (2013). Significant Causes And Effects Of Project Delays In The Niger Delta Region, Nigeria. SAIIE25 Proceedings, Stellenbosch, South Africa.
[14]. Mydin, M. A. O., N. M. Sani, N. A. A. Salim and N. M. Alias (2014) "Assessment of Influential Causes of Construction Project Delay in Malaysian Private Housing from Developer's Viewpoint." E3S Web of Conferences 03 (2014)

[15]. Pablo González, V. G., Keith Molenaar and Francisco Orozco. "Analysis of Causes of Delay and Time Performance in Construction Projects (search).": 10.1061/(ASCE)CO.1943-7862.0000721. © 2013 American Society of Civil Engineers.

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