



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 9, September 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 7.569



# Significant Factors Causing Construction Delay of Roads in the Niger Delta Region of Nigeria

Ogbeide, F. N; Ehiorobo, J. O<sup>2</sup>; Osuji, S. O<sup>3</sup>

Ph.D Student, Dept. of Civil Engineering, Faculty of Engineering, University of Benin, Nigeria<sup>1</sup>

Professor, Dept. of Surveying and Geoinformatics, Faculty of Environmental Technology,

University of Benin, Nigeria<sup>2</sup>

Professor, Dept. of Civil Engineering, Faculty of Engineering, University of Benin, Nigeria<sup>3</sup>

**ABSTRACT:** This research focus on the study of causes of construction delay of road projects awarded by the Niger Delta Development Commission in the Niger Delta Region of Nigeria. The Cronbach Alpha Collection (CAC) was employed to test the questionnaires used for data collection and they were found to be statistically significant. The reliability analysis employed the use of interclass correlation of coefficients, multivariate analysis of variants (MANOVA) and the box test (Covariance Matrix). Out of the sixty-three (63) delay causing factors examined, Explorative Factor Analysis confirmed twenty - One (21) as significant from client's perspective from owner-, contractor-, consultant-, project-, material-, and external-related factors.

## I. INTRODUCTION

The Niger Delta Development Commission (NDDC) budget annually averages above Seven Billion Dollars (USD 7B) on infrastructures and about 75% of this budgetary estimate is deployed for road projects. In the course of its existence since year 2000, Niger Delta Development Commission has constructed more than 3300 roads in the Niger Delta Region of Nigeria as part of the National road network (Ekere, 2017).

The Nigerian economy is almost exclusively dependent on oil revenue from the Niger Delta Region of Nigeria (NDRMP, 2006), and oil exploration activities has negatively affected the region due to degradation of the eco-system resulting in loss of mainstream local economy such as agriculture and aquaculture. The NDDC was thus established by an act of parliament in the year 2000 as an interventionist agency to bridge the prevalent infrastructural and human capacity gap with a mission "to facilitate the rapid, even, sustainable development of the Niger Delta Region of Nigeria into a region that is socially stable, economically prosperous, ecologically regenerative and politically peaceful" (NDRDMP, 2006). However, there have been knocks, jabs, negative comments, as well as unfavourable assessments and evaluation from stakeholders including end-users. Complaints range from poor quality of executed road projects to high cost and long-time overrun (Sunjka and Jacobs, 2013; Ogbeide (2021); Ogbeide et al, 2021b). And to a large extent, the observed poor performance of the Commission's significantly impacts on available national resources, thus affecting the country's construction industry and in turn, the national economic growth. Thus, in this study, client's opinion on the causes of road construction projects awarded by NDDC is in focus wherein, project managers and directors managing road projects in the Commission represent the client. The benefit from this study would be a catalyst on the potential increased attractiveness of the region as a location for investment in new plants and projects, resulting in improvement in the local economy and standard of living of the inhabitants of the Niger Delta Region of Nigeria. This study will also be useful to all parties involved in road construction projects, especially in the Niger Delta Region of Nigeria. Additionally, the identification of the significant factors causing road construction delay would enhance optimized investment decisions in deploying resources to achieving effective mitigation strategies.

## II. LITERATURE REVIEW

A construction project can either be a new project; a part of an ongoing project, program or portfolio; an upgrade of an existing project; a service to achieve a result; and, construction research activities (Ogunfidodo, 2014). Honrao and Desai (2015) categorised six causes of delay to include causes related to contractor, causes related to owner, causes related to consultant, causes related to service and utilities, causes related to government regulations, and causes related to external environmental factors. But Aibinu&Jagboro (2002); Assaf and Al-Hejji (2006); Sambasivan and Soon (2007); Wei (2010); Ibironke et al (2013) and Dinesh (2016) instead recognised eight causative factors of time overruns



to include: client -, contractor -, consultant -, material -, and project – related factors. Others are equipment, labour and external factors.

Construction delay in Nigeria has been a subject of investigation by many researchers (for example: Emeka, 2016; Abisuga et al, 2014; Mohammed and Isah, 2012; Ubani, et al, 2012; Ibiro, et al, 2013; Aibinu and Jagboro, 2002). Mohammed and Isah (2012) studied the causes of delay in Nigeria Construction industry by the use of 150 questionnaires. Only 127 were returned for ranking delay analysis. The authors found that design errors, inadequate planning and use of unqualified professionals were the significant factors causing delay of construction projects in Nigeria. Owolabi et al (2014) investigated the causes and effect on project construction delivery time. Using random sampling technique, 150 questionnaires were distributed of which 93 were returned. The factors causing delay as identified in their study include: lack of fund to finance the project to completion, change in drawings, lack of effective communication among parties involved, lack of adequate information from Consultants, slow decision making, Contractors insolvency, variations, project management problems, mistake and discrepancies in contract document, equipment availability and failure, mistake during construction, bad weather, fluctuation in price of building materials, inappropriate overall organisational structure linking delay to the project and labour. In another study, Abisuga et al (2014) investigated the perception of indigenous and multinational construction firms as it concerns construction delay in Nigeria. With the study conducted in Lagos, their findings revealed five top influencing factors causing construction delays to include: cash flow problem, shortage of construction materials, clients financial difficulties, inadequate consultant experiences, and incompetent project team. Sunjka and Jacobs (2013) studied the causes and effect of construction delays in the Niger Delta Region of Nigeria (NDR) and identified significant causative factors. They include: youth unrest, militancy and communal crises, inadequate planning by the contractors, delay or non-payment of compensation to the communities, wrong choice of consultants and contractors by the clients, weather condition, poor contract management by the consultants, late identification and resolution of drawings and specification errors and omissions by the consultants, lack of community buy-in, poor contract management by the consultants, inappropriate design by the consultants, unrealistic contract duration by the clients and poor coordination of subcontractors by the contractors. However, the study suffers from some weaknesses which included the fact that captured data and its analysis did not cover the entire Niger Delta Region as the study was domiciled in Port Harcourt, Nigeria. Secondly, not all part of the NDR was accessible for the study due to youth restiveness and militancy. Also, the small sample size used in their study may not permit the deductions of reliable conclusions as alluded to by the authors.

Construction delay is also a research area universally. In a study conducted in Bahrain, Hasan et al (2014) covered 47 causes of delay. The study concluded that improper planning and inexperienced manpower were the major delay causing factors among construction industry practitioners whereas, the project owners were found to be mainly deficient in impactful decision making. In Pakistan, Haseeb et al (2014) obtained questionnaire inputs from Government Agencies, Service suppliers and Contractors. All three parties identified insufficient funds, change orders and contractor capability as significant delay causing factors. While Mullah and Waghmare (2015) identified two main reasons for construction delay attributable to contractors as poor site management and poor planning, Motalab and Kishk (2010) confirmed at least five delay causing factors to include change orders, slow decision making by client, lack of capability by client representative, construction financial difficulties, and late delivery of materials, This study is therefore justified by the need to fill the gaps created in the above referenced studies, including that of Sunjka and Jacobs (2013), and to derive updates to the period covered by this research.

### III. RESEARCH METHODOLOGY

The research was implemented according to the flow chart given in Figure 1 as adapted from Aziz (2013). A quantitative systematic literature methodology as proposed by Pickering and Jason (2014) was employed. This involved identifying keywords related to the study and systematically running electronic searches using the keywords. Filtering of the results were carried out to ensure their relevance to the subject (Emam et al, 2015). The coverage of the questionnaire includes selected latent and indication factors of causes of road construction delay, and the questionnaires were distributed to project managers and project directors in the Commission as client representatives. All respondents had a substantial knowledge and experience in road management and construction projects of the Commission since they have been involved with supervision and monitoring of road projects at both operational and strategic levels in the organisation, hence had a fair knowledge of issues bedeviling road projects awarded by the Commission. The questions on a Likert rating scale involved recording the contribution of each variable to delay on a scale of 1 (not significant) to 5 (extremely significant) used by respondents in rating the impact of the road construction delay indicators. The questionnaires were collected from the participants within a period of 1-6 months after distribution. This approach removed any undue pressure from the respondents and gave them the freedom to fill-in the



questionnaires as truthfully as possible. The valid data were analysed by the Statistical Package for Social Science (SPSS) software. This involved data processing and analysis and exploratory factor analysis (EFA). A total of 200 questionnaires were distributed to the client's representatives out of which 162 were returned.

Table 1 shows the latent constructs of causes of construction delay while Figure 2 shows the measurement models for causes of delay. In Figures 2, the path arrows show the hypothetical relationship among the dependent variables and the independent variables (measured indicators). The rectangular shapes indicate the observed variables that are the individual items on the questionnaire survey.

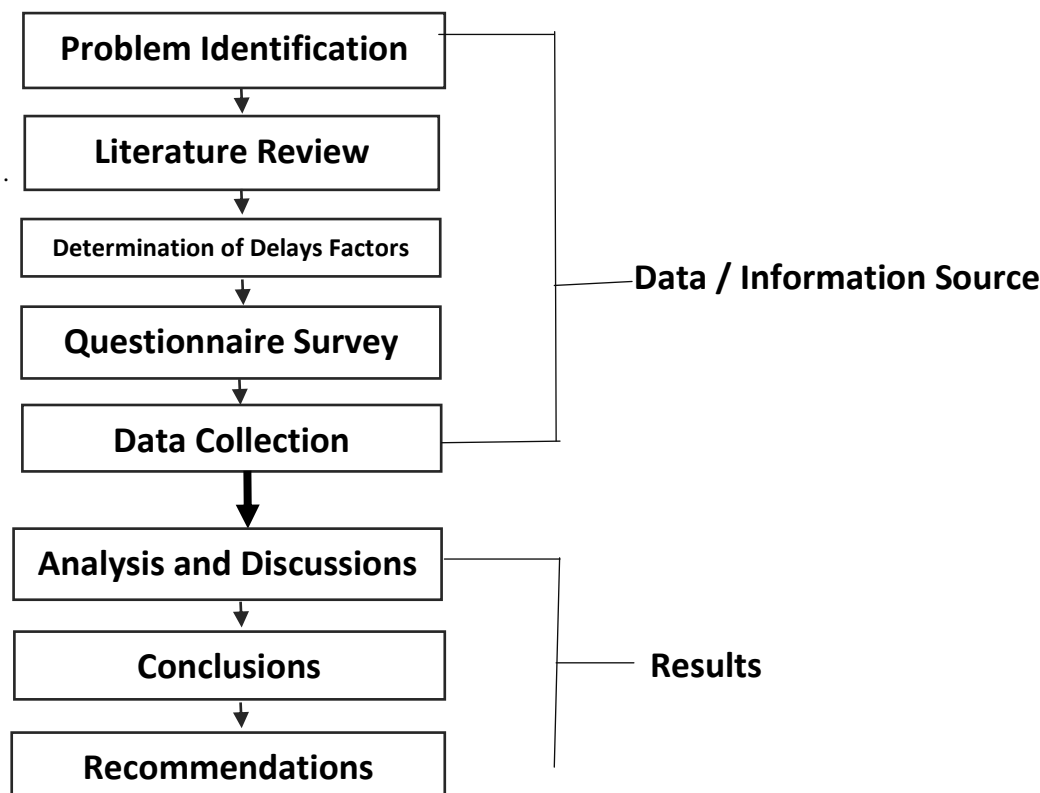


Figure 1: Main Research Activities and Methodology (adapted from Aziz 2013)

Table 1: Latent Constructs for road construction delay causing factors

Latent Constructs	Code	Indicators	Source
<b>OWNER CONTRIBUTED FACTORS</b>	A1	Delay in progress payments for certified works	Mutalab&Kishk (2010), Omoregie& Radford (2006), Omoregie& Radford (2006), Mutalab&Kishk (2010), Haseeb et al (2014)
	A2		
	A3	Change orders by owner during construction	
	A4	Late in revising and approving design documents	Enshassi et al (2009)
	A5	Delay in approving drawing and sample materials	Sambasivan& Soon (2007)
	A6		Haseeb et al (2014), Lye& Jah (2006),
	A7	Poor communication and coordination between Owner and other parties	Mutalab&Kishk (2010), Hasan et al (2014),
	A8	Slowness in decision-making process	Abedi et al (2011b), Doloi et al (2012)
	A9	Bureaucracy in client's organization	Sohu et al (2017)
	A10	Type of project bidding and award (negotiation, lowest bidder, etc.)	Omoregie& Radford (2006), Mutalab&Kishk (2010), Sunjka& Jacobs (2013)
	A11	Delay in project site hand-over	

	A12 A13	Poor site monitoring & contract management Project relocation Wrong choice of consultant/contractors Ineffective delay penalties (OWN-13)	Sohu et al (2017) Pickavance (2010), Chapman et al (2016).
<b>CONTRACT OR CONTRIBUTED FACTORS</b>	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10	Difficulties in financing project Delay in mobilizing to site Conflicts in sub-contractor's schedule in execution of Project Rework due to errors during construction Inadequate Planning/scheduling of works Conflicts between contractor and other parties due to non-excusable delays Poor site management and supervision Wrong Choice of bankers Improper construction methods and equipment Inadequate contractor's experience	Haseeb et al (2014), Enshassi et al (2008) Omoriegic& Radford (2006), Haseeb et al (2014) Omoriegic& Radford (2006), Sunjka& Jacobs (2013), Chaudhry et al (2014) Sunjka& Jacobs (2013), Hasan et al (2014) Lyer& Jah (2006) Sunjka& Jacobs (2013), Hasan et al (2014) Mutalab&Kishk (2010) Mutalab&Kishk (2010), Enshassi et al (2008) Haseeb et al (2014), Lyer& Jah (2006)
<b>CONSULTANT CONTRIBUTED FACTORS</b>	C1 C2 C3 C4 C5 C6 C7 C8 C9	Delay in approving major changes in the scope of work Unclear and incomplete drawings and specifications Inadequate experience of consultant Mistakes and discrepancies (due to errors and omissions) in design documents Delays in producing design documents Insufficient data collection and survey before design Late in performing inspection and testing Defective BEME Poor site supervision & associated Project management Problems	Sunjka& Jacobs (2013), Sambasivan& Soon (2007), Mohamid (2011) Omoriegic& Radford (2006) Pourrostan& Ismail (2011), Sunjka& Jacobs (2013) Omoriegic& Radford (2006) Omoriegic& Radford (2006), Sambasivan& Soon (2007) Enshassi et al (2008), Wong and Vimonsatit (2012) Mohamid (2011) Chileshe&Fianko (2012), Hasan et al (2014)
<b>PROJECT RELATED FACTORS</b>	D1 D2 D3 D4 D5 D6	Legal disputes between various parties Ineffective penalties for inexcusable delays Delay or non-payment of Right-of-Way (ROW) Compensation payment to owners of properties No budgetary provision / removal from budget Unrealistic project construction duration as specified in the Contract Deficiency in BEME (PRJ-6)	Pickavance (2010) Pickavance (2010) Sunjka& Jacobs (2013) Alaghbari et al (2007) Assaf& Al-Hejji (2006) Mohamid (2011)
<b>MATERIAL CONTRIBUTED FACTORS</b>	E1 E2 E3 E4 E5	Shortage of construction materials in market (bitumen, cement and steel) Changes in material types during construction and Specifications Inadequate procurement planning of materials Quality problem with procured material Fluctuation in price of construction materials (MTR-5)	Mutalab&Kishk (2010), Assaf& Al-Hejji (2006) Wu et al (2017), Mitikie et al (2017), Nagaraju et al (2012) Manavazhia&Adhikarib (2002) Enshassi et al (2008), Assaf& Al-Hejji (2006) Omoriegic& Radford (2006), Haseeb et al (2014)
<b>EQUIPMENT CONTRIBUTED FACTORS</b>	F1 F2 F3	Equipment breakdowns Shortage of equipment Low level of equipment-operator's skill	Haseeb et al (2014) Manavazhia&Adhikarib (2002) Nagaraju et al (2012)



<b>ED FACTORS</b>	F4	Low productivity and efficiency of equipment	Sambasivan& Soon (2007)
	F5	Difficulty in transporting equipment	Manavazhia&Adhikarib (2002)
	F6	Unavailability of special equipment	Mutalab&Kishk (2010), Enshassi et al (2008)
<b>LABOUR CONTRIBUTED FACTORS</b>	G1	Shortage of labour	Mutalab&Kishk (2010), Haseeb et al (2014).
	G2	Unqualified work Force	Haseeb et al (2014), Hasan et al (2014) Nagaraju et al (2012)
	G3	Low productivity level of labour (LBR-3)	Pourrostam& Ismail (2011), Enshassi et al (2008)
<b>EXTERNAL FACTORS</b>	H1	Different or unexpected geo-technical conditions during construction	Mutalab&Kishk (2010),
	H2	Delay in obtaining permits from municipality	Omorieg& Radford (2006), Mohamid (2011)
	H3H4	Effect of rain on construction activities	Sunjka& Jacobs (2013), Lyer& Jah (2006)
	H5H6	Changes in Government/Governing Board regulations and laws	Sambasivan& Soon (2007), Assaf& Al-Hejji (2006)
	H7H8	Delay in performing Milestone inspection & certification	Oribuyaku (2016), Sohu et al (2017)
	H9H10	Fraudulent practices and corruption	Enshassi et al (2008)
	H11	Labour unrest and public strikes	Sunjka& Jacobs (2013), Assaf& Al-Hejji (2006)
		Youth unrest, communal crisis, militancy	Sunjka& Jacobs (2013)
		Lack of community buy-in	Mutalab&Kishk (2010).
		Lack of periodic meetings among client, contractor and Consultant	Sunjka& Jacobs (2013)
		Political interference (EXT-11)	

#### IV. ANALYSIS OF RESULTS

##### EXPLORATORY FACTOR ANALYSIS

Exploratory factor analysis is a statistical technique that is used to reduce data to a smaller set of summary variables and to explore the underlining theoretical structure of the phenomena. It is used to identify the structure of the relationship between the variables and the respondents. In this case, exploratory factor analysis was employed to explain the opinions of the client with regards to causes of construction delay of road projects awarded by NDDC in the Niger Delta Region of Nigeria

##### INFERENTIAL STATISTICS FOR CAUSES OF CONSTRUCTION DELAY

This was used to test the co-linearity of the selected delay causing factors. The selected causes of construction delay were used as the independent variable while the respondent views were used as the dependent variable. The null and alternate hypothesis of inferential statistics were formulated as: **H0**: No significant difference in the selected causes of construction delay according to client's opinion, and **H1**: Significant difference exists in the selected causes of construction delay according to client's opinion. The analysis was performed at 95% confidence interval. Thus, for  $p < 0.05$ , the null hypothesis is accepted and it is concluded that no significant difference exists among the selected causes of construction delay. But for  $p > 0.05$ , the null hypothesis is rejected and it is concluded that significant difference exists among the selected causes of construction delay. Descriptive statistics of the selected causes of construction delay based on inferential statistics is presented in Table 2a and 2b respectively

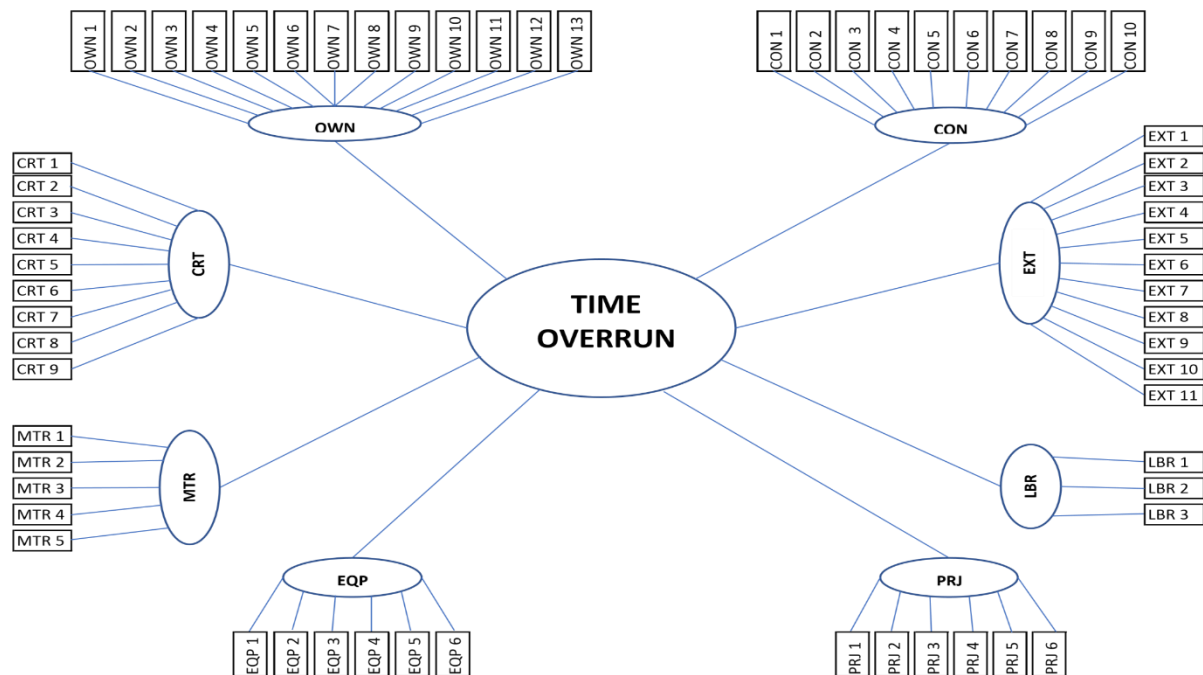


Figure 2: Initial Measurement model for causes of road construction delay

The difference in the computed mean and standard deviation as observed in Table 2a-b revealed the difference strength of the selected causes of construction delay from the view of the client. The levene test as presented in Table 3 was employed to test for equal variance or homogeneity of variance.

With a p-value of 0.691 ( $p > 0.05$ ), the null hypothesis was rejected and it was concluded that significant difference exists among the selected causes of construction delay according to the client view. On whether to finally accept or reject the null hypothesis, analysis of variance (ANOVA) table was generated and presented in Table 4

From the result of the analysis of variance, it was observed that the p-value is  $> 0.05$  ( $p = 1.000$ ). For  $p > 0.05$ , the null hypothesis was rejected and the alternate hypothesis was finally accepted and it was concluded that significant difference exists among the selected causes of construction delay according to the client view.

#### SIGNIFICANT DELAY CAUSING FACTORS

To select the significant cause of construction delay according to the view point of the client, the mean plot of performance was generated and presented in Figure 3.

From the client view as observed in Figure 3, owners contributed factors, contractor contributed factors, consultant contributed factors, project related factors, material contributed factors and external factors were the major factors that mostly cause delay in construction of road projects awarded by NDDC. A breakdown of the significant causes of construction delay is presented in Table 5.

Table 2a: Descriptive statistics of client's view of the causes of construction delay.

CLIENT'S VIEW								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
A1	5	15.60	15.274	6.831	-3.37	34.57	3	36
A2	5	13.20	9.094	4.067	1.91	24.49	0	21
A3	5	15.60	15.274	6.831	-3.37	34.57	3	36
A4	5	13.20	8.167	3.652	3.06	23.34	0	20
A5	5	13.20	12.911	5.774	-2.83	29.23	0	27
A6	5	11.60	13.795	6.169	-5.53	28.73	0	35
A7	5	13.20	13.312	5.953	-3.33	29.73	0	30
A8	5	13.20	10.545	4.716	.11	26.29	0	24
A9	5	14.40	11.718	5.240	-.15	28.95	0	30
A10	5	13.80	11.541	5.161	-.53	28.13	0	30
A11	5	13.20	9.576	4.283	1.31	25.09	0	26
A12	5	15.60	15.274	6.831	-3.37	34.57	3	36
A13	5	13.80	4.817	2.154	7.82	19.78	10	22
B1	5	15.60	15.274	6.831	-3.37	34.57	3	36
B2	5	13.80	9.391	4.200	2.14	25.46	0	22
B3	5	14.40	15.694	7.019	-5.09	33.89	0	31
B4	5	13.20	11.777	5.267	-1.42	27.82	1	29
B5	5	15.60	15.274	6.831	-3.37	34.57	3	36
B6	5	13.80	13.480	6.028	-2.94	30.54	0	34
B7	5	13.80	15.336	6.859	-5.24	32.84	0	31
B8	5	13.20	10.756	4.810	-.16	26.56	0	25
B9	5	11.80	14.429	6.453	-6.12	29.72	0	34
B10	5	12.00	14.071	6.293	-5.47	29.47	0	36
C1	5	15.60	15.274	6.831	-3.37	34.57	3	36
C2	5	12.80	7.596	3.397	3.37	22.23	0	19
C3	5	12.60	9.343	4.179	1.00	24.20	3	28
C4	5	15.60	15.274	6.831	-3.37	34.57	3	36
C5	5	13.20	9.011	4.030	2.01	24.39	0	25
C6	5	11.60	7.537	3.370	2.24	20.96	0	19
C7	5	13.60	10.597	4.739	.44	26.76	2	25



Table 2b: Descriptive statistics client's view of the causes of construction delay continue

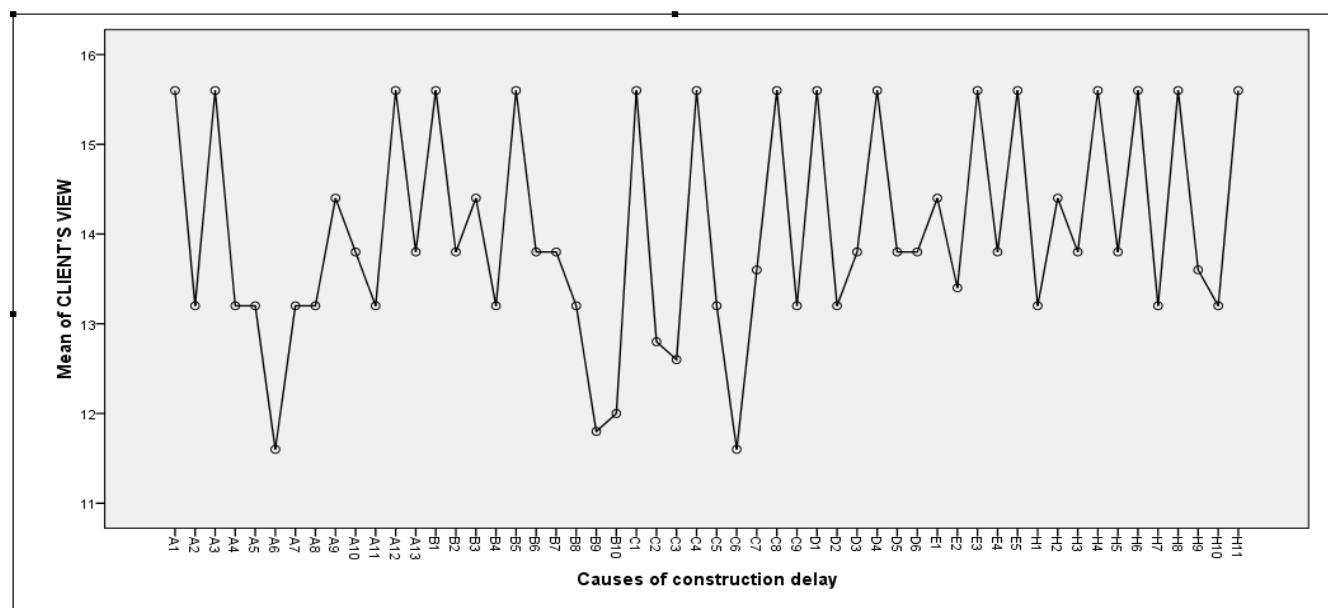
C8	5	15.60	15.274	6.831	-3.37	34.57	3	36
C9	5	13.20	7.950	3.555	3.33	23.07	0	21
D1	5	15.60	15.274	6.831	-3.37	34.57	3	36
D2	5	13.20	2.775	1.241	9.75	16.65	11	18
D3	5	13.80	5.541	2.478	6.92	20.68	7	21
D4	5	15.60	15.274	6.831	-3.37	34.57	3	36
D5	5	13.80	18.171	8.126	-8.76	36.36	0	44
D6	5	13.80	9.365	4.188	2.17	25.43	0	23
E1	5	14.40	11.718	5.240	-.15	28.95	0	30
E2	5	13.40	18.050	8.072	-9.01	35.81	0	44
E3	5	15.60	15.274	6.831	-3.37	34.57	3	36
E4	5	13.80	11.054	4.944	.07	27.53	2	28
E5	5	15.60	15.274	6.831	-3.37	34.57	3	36
H1	5	13.20	19.058	8.523	-10.46	36.86	0	46
H2	5	14.40	10.359	4.632	1.54	27.26	0	26
H3	5	13.80	13.646	6.102	-3.14	30.74	0	32
H4	5	15.60	15.274	6.831	-3.37	34.57	3	36
H5	5	13.80	12.194	5.453	-1.34	28.94	0	31
H6	5	15.60	15.274	6.831	-3.37	34.57	3	36
H7	5	13.20	10.183	4.554	.56	25.84	0	25
H8	5	15.60	15.274	6.831	-3.37	34.57	3	36
H9	5	13.60	12.033	5.381	-1.34	28.54	3	33
H10	5	13.20	10.710	4.790	-.10	26.50	0	26
H11	5	15.60	15.274	6.831	-3.37	34.57	3	36
Total	270	14.01	11.625	.707	12.62	15.41	0	46

Table 3: Levene test statistics of client's view for causes of construction delay

Test of Homogeneity of Variances			
CLIENT'S VIEW			
Levene Statistic	df1	df2	Sig.
.715	9	37	.691

Table 4: Analysis of variance parameters of client's view for causes of construction delay

ANOVA					
CLIENT'S VIEW					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	168.311	62	2.715	.017	1.000
Within Groups	39239.200	252	155.711		
Total	39407.511	314			





execution of works, rework due to errors during construction, inadequate planning/scheduling of works; *Consultant contributed factors*: delay in approving major changes in the scope of work, mistakes and discrepancies (due to errors and omissions) in design documents, late in performing inspection and testing, defective Bill of Engineering Measurement & Evaluation; *Project contributed factors*: legal disputes between various parties, no budgetary provision /removal from budget and delay/non-payment of compensation to owners encumbered; *External factors contribution*: changes in government/governing board regulations and laws, Political Interference, fraudulent practices and corruption (fund diversion and misappropriation), youth & communal unrest and militancy; and *Materials contributed factors* are: inadequate procurement planning of material, Shortage of construction materials in market (bitumen, cement and steel) and, fluctuation in price of construction materials.

Though Sunjka and Jacobs (2013) had earlier confirmed some of the above delay causing factors as significant for road projects executed in the Niger Delta Region of Nigeria, this research work however identified other delay causing factors not captured in their study that relates especially to the timely completion of road projects. They include: change orders by owners during construction, no budgetary provision /removal from budget, changes in successive government/governing board regulations and laws, fraudulent practices and corruption (fund diversion and misappropriation), inadequate procurement planning of material and, fluctuation in price of construction materials.

## VI. RECOMMENDATION

Confirmatory Factor Analysis should be carried out to determine the critical factors causing construction delay of road projects awarded by the Commission in the Niger Delta Region. This will enable an efficient deployment of resources to reducing and/or mitigating road construction delay in the region.

## REFERENCES

1. Abedi, M; Faith, M.S. and Mohammed, M. F.(2011), *Major causes of construction delays under client category and contractor category*, The First Iranian Students Scientific Conference in Malaysia, April 9-10, 2011; UPM, Malaysia.
2. Abisuga, A. O; Amusu, O. R.O. and Salvador, K.A. (2014), "Construction delay in Nigeria: A perception of indigenous and multinational construction firms", *Journal of Emerging Trends in Economy and Management Sciences* Vol. 3, (5), pp 371 – 378.
3. Aibinu, A.A. and Jagboro, G.O. (2002); "The effects of construction delays on project delivery in Nigerian Construction industry", *International Journal of Project Management*, Vol 20, pp 593-599.
4. Alaghbari, W; Kadir, M.R.A; Salim, A and Ernawati G (2007), "The significant factors causing delay of building construction projects in Malaysia", *Journal of Engineering Construction and Architectural Management*, Vol.14 (2), pp.192-206.
5. Assaf, S.A and Al-Hejji, M. S (2006), "Causes of delay in large construction projects", *International Journal of Project Management*, Vol 24, pp 349-357
6. Aziz, R. F. (2013), "Ranking of delay factors in construction projects after Egyptian revolution", *Alexandria Engineering Journal*, Vol. 52, Pp. 387-406.
7. Chaudhry, S. S., Forst, F. G., and Zydiak, J. L. (1993), Vendor selection with price breaks, *European Journal of Operational Research*, 70, pp. 52-66
8. Dineshi, K. R. (2016), "Causes and effects of delays in Indian construction projects", *International research Journal of Engineering and Technology*, Vol 3 (4), pp. 1831-1857
9. Doloi, H; Sawhney, A; Lyster, K.C; and Rentala, S. (2012), Analyzing factors affecting delays in Indian construction projects, *International Journal of Project Management*, Vol. 30, Pp. 479-489; <http://dx.doi.org/10.1016/j.ijproman.2011.10.004>.
10. Ekere, I (2017); *We must have standards below which we cannot go*, An address by the MD/CEO of NDDC to NDDC Consultants and Contractors on September 28, 2017, Presidential Hotel, Port Harcourt.
11. Emam, H; Farrell, P, and M. Abdelaal (2015), *Causes of delay on infrastructure projects in Qatar*; in: Raiden, A.B and Aboagye – Nimo, E (Eds). *Procs 31<sup>st</sup> Annual Conference of Association of Researchers in Construction Management* Sept. 7 – 9 (2015), Lincoln, UK, Pg. 773 – 782.
12. Emeka, O. J (2016), *Causes of delay in large building construction project in Nigeria*, M. Sc. Dissertation, University of Central Lancashire
13. Enshassi, A; Al-Najjar, J and Kumaraswamy, M (2009), "Delays and cost overruns in the construction projects in the Gaza Strip", *Journal of financial and management construction*, Vol 14(2), pp126-151
14. Hasan, R; Suliman, S and Malki, Y. (2014), An investigation into the delays in road projects in Bahrain", *International Journal of Research in Engineering and Science*, Vol. 2(2), Pp. 38-47.



15. Haseeb, M; L. Xinhai; A. Bibi. Q. G. Reqeel (2014), "Importance of delay causes in construction projects in Pakistan", Asian Journal of Business and management sciences, Vol 1 (10), pp 94 – 10
16. Honrao, Y and Desai, D. B (2015), "Study of delay in execution of Infrastructure Projects-Highway Construction", International Journal of Scientific and Research Publications, Vol. 5, 2015.
17. Ibironke, O.T; Oladinrin, T O; Adeniyi, O; and Eboreime, I. V (2013), "Analysis of excusable factors, influencing contractors performance in Lagos State", Nigeria, Journal of construction in Developing countries, Vol 18 (1), pp 55-72.
18. Lyer, K C and Jha, K.N (2006), "Factors affecting cost performance: evidence from Indian construction projects", International Journal of project management, vol. 23, Number 4, Pg. 283 – 295.
19. Manavazhi, M. R. and Adhikarib, D. K. (2002), "Material and equipment procurement delays in highway projects in Nepal", International Journal of Project Management, Vol. 20, No. 8, Pg. 627-632.
20. Mitikie, B. B., Lee, J and Lee, T. S. (2017), The impact of risk in Ethiopian construction project performance, OpenAccess Library Journal, 4(1), 1-7
21. Mohamid, I. (2011), Risk matrix for factors affecting time delay in road construction projects: Owner's perspective, Journal of Engineering, Construction and Architectural Management, Vol. 18 (6), Pp. 609-617, <http://dx.doi.org/10.1108/0969998111180917>.
22. Mohammed, K.A.A. and Isah, A.D. (2012), "Causes of delay in Nigeria construction industry", Interdisciplinary Journal of contemporary research in Business, Volume 4, No. 2, Pg. 785 – 794.
23. Motaleb, O. and Kishk, M. (2010), An investigation into causes and effects of construction delays in UAE, Robert Gordon University.
24. Nagaraju, S., Reddy, B. S. and Chauduri, A. R. (2012), Resource management in construction projects-A case study, Engineering Science and Technology: An International Journal, 2 (4), 660-665.
25. NDDC (2006), Niger Delta Regional Development Master Plan (NDRDMP)
26. Ogbeide F. N; Ehiorobo J. O; Izinyon O. C. and Ilaboya I. R. (2021a), "A Qualitative Study of Time Overrun of Completed Roads Awarded by the Niger Delta Development Commission in the Niger Delta Region of Nigeria, Nigerian Journal of Environmental Sciences and Technology (NIJEST), Vol 5 No. 1
27. Ogbeide F. N. (2021), "Construction delay of road projects in the Niger Delta Region of Nigeria: Causes. Effects and Remedial Measures", Paper delivered at the 7<sup>th</sup> Engr. Enoch George Annual Lecture Series held at the Nigerian Society of Engineers Secretariat, Port Harcourt, Nigeria, August 17, 2021.
28. Ogunfidodo, A.A. (2014), Overview of Project Management and Value Management, Proceedings of the 2014 Annual Conference of Registered Quantity Surveyors in Nigeria, Sept. 18-19, 2010 Abuja, Pg. 100-114.
29. Omoregie, A. and Radford, D. (2006), *Infrastructure delay and cost escalation: Causes and effects in Nigeria*, Paper presented at the Proceeding of sixth International Postgraduate Research Conference.
30. Oribuyaku, T (2016), *Claims Management in highway construction and maintenance contracts*, A Paper Presented under the auspices of Techgrade Consulting at a Workshop with the Theme: Understanding the conditions of contract and the procedures for managing road projects, held at NSE Headquarters, Abuja, February, 22<sup>nd</sup> – 24<sup>th</sup> 2016
31. Owolabi J. D; Amusan, L.M.; Oloke, C.O.; Tunji- Olayemi, P.; Owolabi, D.; Peter, J. and Omuh, I. (2014), "Causes and effect of delay of project construction delivery time", International Journal of Education and research, Vol. 2, No. 4 April 2014, Pg. 197 – 208
32. Pickavance, k (2010), Delay and disruption in construction contracts, 4<sup>th</sup> Edition, Sweet & Mawell, London, UK
33. Pickering, C. and Jason, B. (2014), "The benefits of publishing systematic quantitative literature reviews for PhD candidates and other early-career researchers", Journal of higher Education Research and Development, Vol. 33(3), Pp. 534-548.
34. Pourrostan, T and Ismal, A (2011), "Significant factors causing and effects of delays in Iranian Construction Projects", Australian Journal of Basic and Applied Science, 5(7), Pg. 450 – 456
35. Sambasivan, M and Soon, Y.W. (2007), "Causes and effects of delays in Malaysian construction industry", International Journal of Project Management, 25 (2007) Pg. 517 – 526.
36. Sohu, S., Halid, A., Fattah, A., Latif, I. and Ullah, K (2017), Causative factors of cost overrun in Highway projects of Sindh Province of Pakistan, IOP Conference Series: Material Science and Engineering 271, (2017), 012036
37. Sunjka, B.P. and Jacob, U. (2013), Significant causes and effects of project delays in the Niger Delta Region of Nigeria, SAIIE25, proceedings Stellenbosch, South Africa, 2013 SAIIE.
38. Ubani, E.C; Okorochoa, K.A and Emeribe, S. C. (2012), "Analysis of factors influencing time and cost overruns on construction projects in South Eastern Nigeria", International Journal on Management Sciences and Business Research Vol 2, No. 2, Pg. 73-84.
39. Wei, S.K (2010), Causes, effects and methods of minimizing delays in construction projects, University Teknologi, Skudua, Malaysia.
40. Wu, Z., Nisar, T., Kapletia, G. and Prabhakar, G. (2017), Risks factors for project success in the Chinese construction industry, Journal of Manufacturing Technology Management, 28(7), 850-866.





**Impact Factor:  
7.569**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details