



## **ASSESSMENT OF DELAY AND COST-OVERRUN IN FEDERAL ROAD CONSTRUCTION PROJECT IN ABUJA**

*Ashem Emmanuel Egila*

*School of Entrepreneurship and Management Technology, Federal*

*University of Technology, Nigeria*

*E-mail: egilashem@futminna.edu.ng*

*Oluwaseun Abdulakeem Balogun*

*School of Entrepreneurship and Management Technology, Federal*

*University of Technology, Nigeria*

*E-mail: balogun.m1301754@st.futminna.edu.ng*

*Saheed Olanrewaji Yusuf*

*School of Entrepreneurship and Management Technology, Federal*

*University of Technology, Nigeria*

*E-mail: so.yusuf@futminna.edu.ng*

*Submission: 7/15/2019*

*Revision: 9/18/2019*

*Accept: 10/2/2019*

### **ABSTRACT**

Poor road infrastructure in Nigeria is a significant challenge, just like poverty, insecurity, and unemployment. The construction of road in the country is characterized by numerous challenges throughout the project life cycle. Some of these challenges are project delay and cost overrun, corruption and fraud, faulty contractual process among others. Objectives of this study are to identify factors influencing delays and cost overruns in road construction project, to rank these factors base on their impacts and importance, and to suggest conservative ways to address the future challenges that can result from delays and cost overruns of future road construction projects. The research instruments include in-depth literature review, fieldwork, questionnaire administration, and interview. Inferential statistics such as Relative importance index (RII) and Mean Value techniques were used to analyze collected data.



The result of the study identified factors influencing delays and cost overruns in road construction projects as; man related, money-related, machine-related, material related, environmental-related, and method related factors. Analysis using RII and MV ranked man and money related as the highest factors for delay and cost overrun respectively. Hence, the research recommends that the Government should create an enabling environment, making suitable policy for the construction company to operate.

**Keywords:** Costoverun, Construction industry, Delay, Road construction

## 1. INTRODUCTION

Construction industry is generally known to contribute enormously to national development around the world, and it also impacts significantly on the GDP and employment rate in developing countries (OLAWALE, 2010). Thus, the construction industry is considered to have a significant connection and plays a critical role in the economic development or reactivation of any country (RAJ, 2016). According to Adindu *et al.* (2019), the construction industry all over the world is continually growing due to its dynamic nature and high socio-economic impact on the economy of nations.

The construction of good road network eases movement and connects various places across the country. Despite the high importance and expectation of road construction, it suffers challenges such as corruption, fraud, under-design, over-design, delays, and cost overrun (SOHAIL; CAVILL 2008). This paper, therefore, seeks to assess the factors influencing the delay and cost overrun of road construction. This delay is also known as time overrun either beyond the contract date or beyond the agreed date between the contractor and the owner upon delivery of the project (MARZOUK; EL-RASA, 2012).

Delays in road construction projects are continually occurring and could cause a significant impact on economic development. In construction, it is one of the common difficulties that disturbs the construction companies regarding competitiveness and long-term sustainability in the global market. Cost overruns, which are said to be the deviations between the actual cost incurred during the construction phase and estimated initial cost is more common in infrastructure projects especially, road construction activities.

The impacts of cost overruns are very high in developing countries compared to developed countries (RAJAKUMAR, 2016). 55% of 137 analyzed projects in Nigeria had been found to have suffered Overruns (PONZ-TIENDA; GÓMEZ-CABRERA, 2017). Therefore,

where cost and time are not adequately planned and utilized, a project cannot be accomplished and will cause failure to the entire project.

It is essential to find out various critical factors which are mostly influencing the delay and cost overruns in road construction. Besides, the origin, causes, and difficulties related must be addressed. Therefore, finding out the causes and rectification will be very useful to accomplish the goals, scope of the project, and help to maximize the return on investment, in order to complete the project within actual budgeted cost and to deliver on time. Based on those as mentioned earlier, this study provides an in-

Depth light about the actual causes of delay and cost overrun of road construction in Abuja, FCT Nigeria.

### **1.1. Research objectives**

Objectives of this study are to;

- 1) Identify factors influencing delays and cost overruns in road construction project;
- 2) Rank these factors base on their impacts and importance;
- 3) Suggest conservative ways to address the future challenges that can result from delays and cost overruns of future road construction projects.

### **1.2. Statement of the problem**

In Nigeria, road constructions are faced with numerous challenges throughout the project life cycle. These challenges includes but not limited to the following; delay and cost overrun, over-design, under-design, corruption, fraud, technical know-how. The construction of road widely involves high risk due to the varying nature of its construction activities, and the success of any road construction projects is dependent on the accomplishment of fundamental project constraint such as cost, time, and quality.

The Federal Government of Nigeria has appropriated about N1.4 trillion for road construction between 1999 and 2012 (OLATUNJI; DIUGWU, 2013) and allocated about N620 billion between 2017 and 2018 (HASSAN; BAYAGBON, 2017). Despite the vast financial sum involved, the issue of road construction in Nigeria has not been appropriately addressed which has led to poor project delivery.

This study, therefore, considered the delay and cost overrun issues in Abuja, by stating out the critical factors leading to delays and cost overruns and thereby facilitating the

establishment of an effective plan that would help to minimize the problems arising from road construction.

### **1.3. Delays and cost overrun in construction projects**

Delays in construction projects can be referred to as lateness in the actual completion of works compared to the baseline construction schedule or contract schedule. Most project delays occurs during the construction phase, where numerous unforeseen factors are always involved (SAFRI, 2009). According to Braimah (2008), the term 'delay' in construction contract has no precise technical meaning. It can be used in a different sense to mean different conditions in project execution. However, the term is seldom used in its primary sense to mean any occurrences or events that extend the duration or delay is the start or finish activity of any given project.

Bartholomew (2008) also explained the delay in a construction project as slowing down the rate of work without altogether stopping it. It is different from suspension, which means stoppage of works entirely through the directives of the contractor or the client. Delay can also be described as a situation when the contractor and the project owner jointly or severally contribute to the non-completion of the project within the stipulated initially or agreed contract period (AIBINU; JAGBORO, 2002). As interpreted by Abbas (2006), the delay is a loss of time. 'Time' refers to the duration for completing a construction project. When the project is delayed, it means the project cannot be completed within the originally scheduled time.

According to Avots (1983), cost overrun means a situation where the project objectives are not achieved within the estimated budget. Rajakumar (2016) also explained cost overrun as the difference or deviation between the actual estimated cost during the design stage and the actual cost incurred during the construction phase. Cost overrun is the excess of actual cost over budget. Cost overrun is the ratio of contract amount to the original contract award amount. This calculation is converted to a percentage for the case of comparison (JACKSON, 1990)

### **1.4. Factors affecting project delay and cost overrun in construction project**

To identify the reasons for overruns, an extensive survey was carried out by Diakwa and Culpin (1990), in a typical developing country, Nigeria. An interim report was presented on the survey, suggesting that the major problems were lack of prompt payment by agencies to contractors and fluctuation in material, labor and plant costs. Based on the study carried out by Mansfield, Ugwu, and Doran, (1994), attributes overruns to many reasons such as finance and

payment arrangements, poor contract management, materials shortages, inaccurate estimating and overall price fluctuation.

Furthermore, a study by Kamming, Olomolaiye, Harris, and Holt, (1997), conducted on thirty-one high rise projects in Indonesia, which revealed that cost overrun is more likely to occur than time overrun, which means that the issue of cost is more important and prevalent than a project delay. It was also found that most of the problem causing cost overrun is due to the increase in material prices and inflation, whereas delay in time is due to inaccurate estimate, design changes: poor labor productivity, inadequate planning, and a shortage of necessary resources.

Similarly, a survey was also conducted by Assaf and Al-Hejji, (2006), which revealed a total of fifty-six main risk factors, which were more likely to cause project delays. These delay factors were grouped into nine significant factors concerning their level of importance to different parties. They also went further to find out that any changes made by the client during the construction period would positively affect the in-progress payment by clients.

Other causes are improper planning and scheduling of projects by contractors, poor site management and supervision by the contractor, shortage of labor, difficulties in financing project by contractors. This shows that changes made by clients while construction is already in progress will not only slow the progress but also affect everything that the contractor has already put in place regarding materials delivery schedule or any activities that were due to finish on time. Such changes made by the client could stop work and increase project cost and delay the delivery schedule. Besides, it was suggested that the actual estimated cost of project rises by 30% by the time the project is ready to be completed even in most developing countries (AL-MOMANI, 1996).

Equally studies by Noulmance, *et al.*, (1999), in Thailand showed that the causes of delay in highway construction were caused by the entire parties involved in the project; some of the main reason was due to inefficiency of sub-contractors, organization not providing required resources, unclear drawing and lack of communication between consultants and contractors. The study suggests that delay could be minimized by better understanding and involvement of the entire parties in the project with excellent communication between them.

Similarly, a survey was conducted in Lebanon by Mehzer and Tawil (1998), and it was found out that the owners were warier of their financial issues, contractors were not very keen about their relationship with other parties, and there was a lack of trust in guaranteeing and



complying with the agreement. However, poor management of the consultant was the critical reason for the delay. There were three leading causes of cost overrun identified by Koushiki, Al-Rashid, and Kartam (2005) in a study in Kuwait, which include contractor related problem, material related problem, and owners' lack of experience.

Ellis and Thomas (2002) investigated the actual causes of delay in highway construction projects. The study was divided into two parts: excusable and non-excusable delay, which was found to occur on an average of 31% to 55%, and all highways experienced a delay of 44% extra from the original period. Moreover, it also highlighted that delay mainly occurs more frequently in urban areas.

Moreover, a significant number of researchers have been involved in identifying causes behind the delay in the construction projects, and much work has been carried out to reduce such problematic issues occurring in almost every project in every country worldwide. Six outcomes of delay were identified by Sambasivan and Soon (2007), which comprises time overruns, cost overruns, disputes, arbitration, litigation, and total abandonment. In many occasions, the delay happens due to human errors and careless attention to facts from either client or other team members of staff.

Sibayama (2012) suggested that the difficulty of establishing the fair and expeditious settlement of claims depended on early notification, poor record-keeping, inadequate legal and factual justifications, and poor presentation. It is imperative for contractors to thoroughly understand the client's requirement and be fully committed to providing services accordingly.

Chan (2004) identified other reasons causing cost overrun and classified them into three aspects, such as owner's control, consultant's control, and beyond the control. Whereas, Bramble and Callahan (2010) classified major delay factors into four categories: excusable or non-excusable delay, compensable or non-compensable delay, critical or non-critical delay, and concurrent or non-concurrent delay.

Nonetheless, Yates and Epstein (2006) suggested that non-compensable delay occurs due to acts of God where the fault is not from any parties, and therefore, the contractor was entitled only to the extension of time but no additional cost.

## **2. RESEARCH METHODOLOGY**

A simple random sampling procedure was used to select the participants involved in road construction work in the study area. Descriptive statistics such as percentage frequencies, relative importance index (RII), mean-value method (MV), was used to analyze the data



collected for this research. The essence of sample size is to survey the ideal number of households, which gives the most statistically representative result (YUSUF, 2003).

Neuman (1991), as cited in Yusuf (2003), opines that “larger populations permit smaller sampling ratio for an equally good sample because as the population size grows, the returns inaccuracy for sample size shrink.” Researchers justified that 60% sample size can be considered adequate, also based on the similarity in demography and socio-economic characteristics of the respondents which include: income class and occupation. It is against this background that 60 % of the six hundred and eighty (680) populations of staff were sampled for this research work. Therefore, the sample size for this research is four hundred and eight (408) staff of the federal ministry of works and transport Abuja.

### **2.1. Method of Data Collection**

After the pilot testing and all necessary modification, the questionnaire was administered directly to the chosen sample of the study. A total of four hundred and eight (408) copies of the questionnaire were given out successfully, but three hundred and forty (340) were filled and returned.

The number of a questionnaire distributed and retrieved from the staff shows that 102 questionnaires were distributed to contractors, consultants, project manager, and other staff, respectively. While a total number of 100 questionnaires were retrieved out of the 100 distributed to the contractors, this was closely followed by 90 questionnaires retrieved from other categories of staff. Moreover, only 76 and 74 questionnaires were retrieved from the consultants and project manager out the 115 distributed to each category, respectively.

### **3. RESULT AND DISCUSSION**

This section gives detailed analysis of data collected with the use of questionnaire administration. The various factors affecting delay and cost overrun of road construction projects were collected from the literature study. Furthermore, opinions were obtained from various (government authorities, private companies, contractors, consultants, project managers, and others). Finally, thirty-six factors were selected in total (eighteen each for delay factors and cost overrun factors), which were considered for the questionnaire survey. Recall that a total 408 questionnaires were administered during the fieldwork why only 340 questionnaires were well filled, retrieved, and analysed.

Table 1.0 below presents the demographic features of respondents.

		Percentage% N=340
Gender	Male	83
	Female	17
Qualifications	O Level	13
	OND	9
	HND	25
	B.Sc.	43
	M.Sc.	9
	Ph.D.	1
Working Experience	< 5years	17.6
	5-10years	41.2
	10-20years	28.8
	20-30years	10.0
	>30years	2.4
Professional	Contractors	29.4
	Consultants	21.8
	Project Manager	22.4
	Others	26.5

### 3.1. Different Factors Mostly Affecting Delays and Cost Overruns

The mean value index (MV) and relative importance index (RII) was used to rank and find out the importance of the various factors affecting delay and cost-overrun in the study area.

Table 2: Various factors of Cost overrun and Delay (Abuja)

No	Critical Factors	Cost Overrun		Delay	
		RII	MV	RII	MV
1	Money-Related Factors	0.731	3.657	0.810	4.049
2	Material-Related Factors	0.670	3.349	0.675	3.461
3	Man-Related Factors	0.753	3.767	0.566	2.829
4	Method-Related Factors	0.630	3.153	0.628	3.141
5	Machine-Related Factors	0.698	3.488	0.693	3.463
6	Environmental-Related Factors	0.639	3.194	0.637	3.186

Source: Author's fieldwork (2019).

This Table 2 above depicts the RII and MV for various factors affecting delay and cost-overrun. The variables for man related factors for cost overrun as RII and MV of 0.753 and 3.767, followed by money-related factors with RII AND MV of 0.731 and 3.657 and machine-related factors with RII AND MV of 0.698 and 3.488 as the most critical factors affecting cost overrun. However, material related factors, related environmental factors, and method related factors with RII and MV OF 0.670 and 3.349, 0.639 and 3.194 and 0.630 and 3.153 respectively as they are of least essential factors affecting cost overrun in the study area.

This implies that the most critical factor affecting cost overrun of a road construction project in Abuja is man related factors. While the for the delay, the variables for money related factors for the delay as RII and MV of 0.810 and 4.049, followed by machine-related factors



with RII AND MV of 0.693 and 3.463 and material related factors with RII AND MV of 0.675 and 3.461 as the most critical factors affecting delay.

However, related environmental factors, method-related factors, and man related factors with RII and MV OF 0.637 and 3.186, 0.6298 and 3.141 and 0.566 and 2.829 respectively as they are of least essential factors affecting delay in the study area. This implies that the most critical factor affecting the delay of a road construction project in Abuja is money related factors.

### 3.2. Ranking of delay factors in the study area

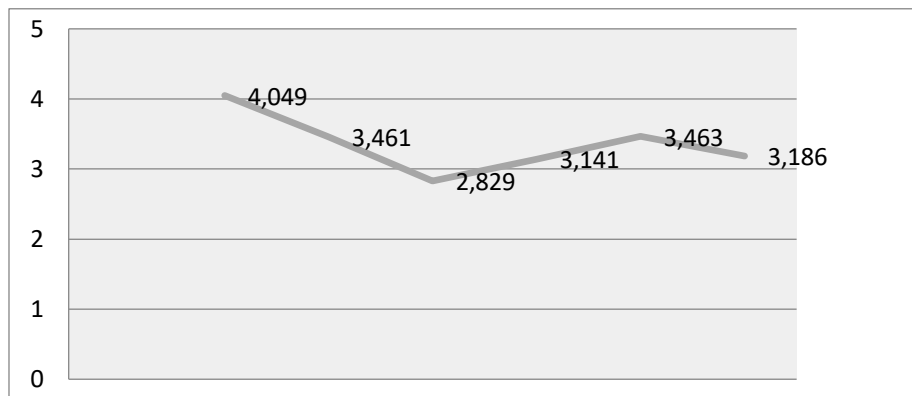


Figure 1: graph showing ranking of Delay factors based on MV  
 Source: Author's fieldwork (2019).

The ranking of factors responsible delay of road construction projects as shown Figure 1 reveals that variables for money related factors for the delay as MV of 4.049 as the highest-ranking, followed by machine-related factors with MV of 3.463 and material related factors with MV of 3.461 as the 3<sup>rd</sup> most essential factors affecting delay. However, 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> go to related environmental factors, method-related factors, and man related factors with MV of 3.186, 3.141, and 2.829 respectively as they of least importance factors affecting delay in the study area.

### 3.3. Ranking of Cost overrun factors based on this study area

The ranking of factors responsible for cost-overrun of road construction projects as shown Figure 2 reveals the variables for man related factors for cost overrun as MV of 3.767 as the highest-ranking, followed by money-related factors with MV of 3.657 and machine-related factors with MV of 3.488 as the 3<sup>rd</sup> most important factors affecting cost overrun. However, 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> ranking go-to material related factors, related environmental factors, and method related factors with MV OF 3.349, 3.194, and 3.153 respectively as they are of least importance factors affecting cost overrun in the study area.

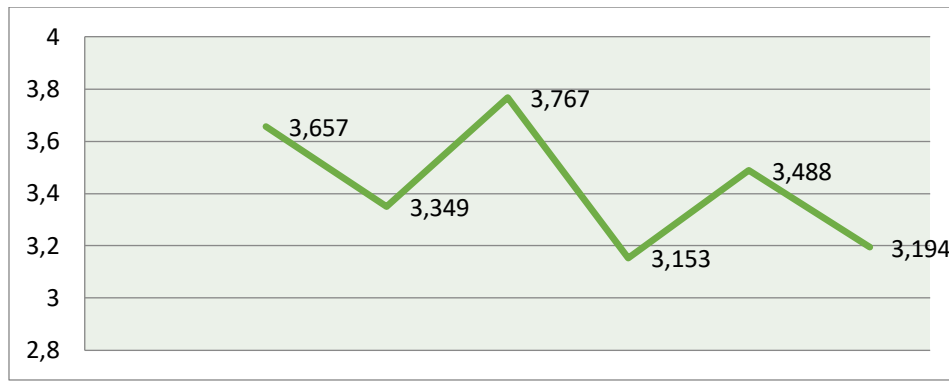


Figure 2: graph showing ranking of Cost overrun factors based on MV  
 Source: Author's fieldwork (2019).

### 3.4. Hypothesis one

- $H_0$ : There is no significant relationship between delays in the progress of payment and overprice fluctuation in road construction projects
- $H_1$ : There is a significant relationship between delays in the progress of payment and overprice fluctuation in road construction projects

Table 3: Correlations

	Delays in Progress Over Price Fluctuations	
Delays in Progress	Pearson Correlation	1 .248**
	Sig. (2-tailed)	.000
	N	340 340
Over Price Fluctuations	Pearson Correlation	.248** 1
	Sig. (2-tailed)	.000
	N	340 340

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Pearson product-moment correlation (PPMC) was used to test this hypothesis. Variables for this hypothesis are delays in the progress of payment and overprice fluctuation in road construction projects. The correlation coefficient shows that the  $P = 0.000$  (two-tailed)  $< 0.01$ . This shows that the  $H_1$  which there is a relationship between delays in the progress of payment and overprice fluctuation in road construction projects was accepted. There is a little correlation between the two variables.

### 3.5. Hypothesis Two

- $H_0$ : There is no significant relationship between the unavailability of material and low-quality materials in road construction projects
- $H_1$ : There is a significant relationship between the unavailability of material and low-quality materials in road construction projects

Table 4: Correlations

		Unavailability of Material	Low Quality of Materials
Unavailability of Material	Pearson Correlation	1	.087
	Sig. (2-tailed)		.111
	N	340	340
low quality of materials	Pearson Correlation	.087	1
	Sig. (2-tailed)	.111	
	N	340	340

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Pearson product-moment correlation (PPMC) was used to test this hypothesis. Variables for this hypothesis are the unavailability of material and low-quality materials in road construction projects. The correlation coefficient shows that the  $P = 0.111$  (two-tailed)  $> 0.01$ . This shows that the  $H_0$  There is no significant relationship between the unavailability of material and low-quality materials in road construction projects was accepted. There is a high correlation between the two variables.

### 3.6. Hypothesis Three

- $H_0$ : There is no significant relationship between the frequent breakdown of construction equipment and equipment availability failure in road construction projects
- $H_1$ : There is a significant relationship between the frequent breakdown of construction equipment and equipment availability failure in road construction projects

Table 5: Correlations

		Frequent Breakdown of Construction Equipments	Equipment Availability and Failure
Frequent Breakdown of Construction Equipments	Pearson Correlation	1	.574**
	Sig. (2-tailed)		.000
	N	340	340
Equipment Availability and Failure	Pearson Correlation	.574**	
	Sig. (2-tailed)	.000	
	N	340	340

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Pearson product-moment correlation (PPMC) was used to test this hypothesis. Variables for this hypothesis are a frequent breakdown of construction equipment and equipment availability failure. The correlation coefficient shows that the  $P = 0.00$  (two-tailed)  $> 0.01$ . This shows that the  $H_1$ , which state there is a significant relationship between the frequent breakdown of construction equipment and equipment availability failure in road construction projects. There is a moderate correlation between the two variables.

### 3.7. Hypothesis Four

- H<sub>0</sub>: There is no significant relationship between weather-related issues and the act of God in road construction projects
- H<sub>1</sub>: There is a significant relationship between weather-related issues and the act of God in road construction project

Table 6: Correlations

		Weather-Related Issues	An act of God (Earthquake)
Weather Related Issues	Pearson Correlation	1	.211**
	Sig. (2-tailed)		.000
	N	340	340
An act of God (Earthquake)	Pearson Correlation	.211**	1
	Sig. (2-tailed)	.000	
	N	340	340

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Pearson product-moment correlation (PPMC) was used to test this hypothesis. Variables for this hypothesis are weather-related issues and the act of God. The correlation coefficient shows that the  $P = 0.00$  (two-tailed)  $> 0.01$ . This shows that the H<sub>1</sub> which state There is a significant relationship between weather-related issues and the act of God in a road construction project. There is a moderate correlation between the two variables.

## 4. SUMMARY OF FINDINGS

This research has critical revealed the detailed analysis of delay and cost overrun of road construction projects in Abuja FCT Nigeria. The summary of the findings of this study based on the objectives is as follows.

The various factors mostly influencing the delays and cost overruns in road construction projects are identified as man related factors, money-related factors, machine-related factors, material related factors, related environmental factors, and method related factors.

The ranking of the these factors shows that money-related factors for delay ranked highest with RII and MV of 0.810 and 4.049, respectively. This was followed by machine-related factors with RII and MV of 0.693 and 3.463, and material related factors with RII and MV of 0.675 and 3.461 ranked third.

The ranking of factors responsible for cost-overrun of road construction projects shows that variables for man related factors for cost overrun ranked 1<sup>st</sup> having RII and MV of 0.753 and 3.767, followed by money-related factors with RII and MV of 0.731 and 3.657; machine-

related factors with RII and MV of 0.698 and 3.488 as the 3<sup>rd</sup> most important factors affecting cost overrun.

Cronbach's alpha coefficient was used to test for the reliability of the questionnaire. The Cronbach's alpha coefficient shows that  $\alpha = .928$ . This shows that the questionnaire is very reliable.

Lastly, the hypothesis was tested using the correlation analysis in order to find if there is or no significant relationship between selected factors of delay and that of cost-overrun.

## 5. CONCLUSION

This study critically analyses the factors responsible for delay and cost overrun of road construction projects in Abuja, Nigeria. Based on the findings of this research, it is concluded that money-related factors, machine-related factors, material-related factors, related environmental factors, method-related factors, and man related factors respectively are factors responsible for the delay of road construction projects in the study area. While man related factors, money-related factors, machine-related factors, material related factors, related environmental factors, and method related factors are factors responsible for cost overrun of road construction projects in the study area.

## 6. RECOMMENDATION

Based on the findings of this study, the following recommendations were offered as conservative ways to address the challenges from delays and cost overruns of future road construction projects.

- 1) The Government should Endeavour to fast-track the process involved in the payment of the contractors, consultants, and the project manager.
- 2) Construction materials should be made readily available for contractors to avoid delay.
- 3) The government policy should be designed to create an environment that will be suitable for the contractors and consultants to operate.
- 4) The government should do more in the fight against corruption.

## REFERENCES

- ABBAS, M. I. (2006) **Causes and effect of delays in the Achele construction industry.**
- ABD.MAJID, M. Z. (1997) **Non-excusable delays in construction.** Ph.D. Thesis, Loughborough University, United Kingdom.



- ABDULLAH, A. (2013) Factors Affecting Cost Overrun in Road Construction Projects in Saudi Arabia. **Journal of Management in Engineering**, v. 32, n. 1.
- ADINDU, C. C.; DIUGWU, I. A.; YUSUF, S. O.; MUSA, A. M. (2019) Issues of Corruption in Construction Projects and Infrastructure Development in Nigeria – An Empirical Approach. **6th International Conference on Development and Investment in Infrastructure - Strategies for Africa**, Zambia. P. 145-154
- AHMED, S. M.; AZHAR, S.; CASTILLO, M.; KAPPA, G. P. (2002) An empirical study. **Department of construction management**, v. 132, n. 7, p. 667-677.
- AIBINU, A. A.; JAGBORO, G. O. (2002) The effects of construction delays on project delivery in Nigeria construction industry. **Internation Journal of project management**, n. 20, p. 593-599.
- AL-HAZIM, N.; AHMAD, H.; ZAYDOUN, A. (2017) Delay and Cost Overrun in infrastructure Projects In Jordan. **Procedia Engineering**, p. 18-23.
- ALKASS, S.; MAZEROLLE, M.; HARRIS, F. (1996) Construction delay analysis techniques. **construction management and economics**, v. 14, n. 5, p. 375-394.
- ASSAF, S. A.; AL-HEJJI, S. (2006) Cause of delay in large construction project. **internatinal journal of project management**, v. 24, n. 4, p. 349-357.
- AVOTS (1983) Cost-relevance anaysis for overrun control. **Internation journal of project management**, v. 1, p. 142-148.
- BARTHOLOMEW, S. (1998) **Construction contracting, business, and legal principles**. New Jersey.
- BINTI SAFRI, S. D. (2009) **A comparative study of construction project delays in Johor and Sabah region**. Masters, University of Technology, Malaysia, Civil Engineering, Malaysia.
- BRAIMAH, N. (2008) **An investigation into the use of construction delay and disruption analysis methodologies**. Ph.D. Thesis, University of Wolverhampton.
- BRAMBLE, B. B.; CALLAHAN, M. T. (1992) **Construction delay claims** (2nd Edition ed.) Wiley, New York.
- BRAMBLE, B. B.; CALLAHAN, M. T. (2010) **Construction Delay Claims** (4th Edition, USA: Wolters Kluwer Law & Business Ed.) The USA.
- BUBSHAIT, A. A.; CUNNIGHAM, M. J. (2004) Management of Concurrent Delay in Construction. **Cost Engineering**, v. 46, n. 6, p. 22-28.
- CHAN, A. (2004) Factors affecting the success of a construction project. **Construction Engineering and Management**, v. 130, n. 1, p. 153-155.
- DLAKWA, M.; CULPIN, M. (1990) Reasons for overrun in public sector construction projects in Nigeria. **International Journal of Project Management**, v. 8, n. 4, p. 237-241.
- ELLIS, R.; THOMAS, H. (2002) **The root causes of delays in highway construction**. 82nd The annual meeting of the transportation research board.
- WIJEKOON, S. B. (2007) **Study on the cost overruns in road construction projects**, v. 3, n. 4.

- HASSAN, A.; BAYAGBON, O. (2017) **Premium Times and The Cable**. Retrieved: February 21, 2018, from Premium Times and The Cable: <http://www.premiuntimesng.com>, <http://www.thecable.ng>
- HOLTZ-EAKIN, D.; WACHS, M. (2011) Strengthening connections between transportation investment and economic growth, **the Bipartisan Policy Center**.
- HOWICK, S.; ACKERMANN, F.; EDEN, C.; WILLIAMS, T. (2009) **Understanding the causes and consequences of disruption and delay in complex projects**: how system dynamics can help. (In, Meyers, R.; Ed.) encyclopedia of complexity & systems science.
- JACKSON, S. (1990) Project Cost Overrun and Risk Management in Greenwood. **Proceedings** of association of researches in construction management. New Castle.
- JAHREN, C. (1990) Predictors of cost overrun rates. **Journal of Construction Engineering Management ASCE**, v. 116, n. 3, p. 548-552.
- KOUSHIK, P. A.; AL-RASHID, K.; KARTAM, N. (2005) Delay and cost increase in the construction of private resident in Kuwait. **Construction management economy**, v. 23, p. 517-526.
- LAST, W. C. (1997) **Can you recover from construction delays?** Retrieved from <http://Library.findlaw.com/2000/may/1/128355.html>
- LUO, H.; GEBREHIWET, T. (2017) Analysis of Delay Impact on Construction Project Based on RII and Correlation Coefficient: Empirical Study. **Procedia Engineering**.
- MANFIELD, N. (1994) Cause of delay and cost overrun in a Nigerian construction project. **International journal of project mangement**, v. 12, n. 4, p. 254-260.
- MANSFIELD, N.; UGWU, O.; DORAN, T. (1994) Causes of delay and cost overrun in Nigerian construction projects. **International journal of project management**, v. 12, n. 4, p. 254-260.
- MARZOUK, M.; EL-RASA, T. (2012) Analysis delay causes in Egyptian construction projects. **Journal of Advanced Research**, p. 49-54.
- MCBURNEY, D. H. (1994) **Research Methods** (3rd Edition ed.) Pacific Grove, CA: Brooks/Cole.
- MEZHER, T.; TAWIL.; W. (1998) Cause of delays in the construction industry in Lebanon. **Engineering, construction, and architectural management**, v. 5, n. 3, p. 252-260.
- MORRIS, P. (1987) **The anatomy of significant projects in New York**: A study of the reality of project management. New York.
- MUKUKA, M.; AIGBAVBOA, C.; THWALA, W. (2015) Effects of construction projects overruns: A case of the Gauteng Province, South Africa. **Procedia Manufacturing**, p. 1690-1695.
- NIGERIA ZIP CODES. (2013) **Nigeria Zip Codes**. Retrieved from <http://www.nigeriazipcodes.com>
- NOULMANEE, A.; WACHIRATHAMROJIN, J.; TANTICHATTANONT, P.; SITTIVIJIAN, P. (1999) **Internal causes on delays in highway construction projects in Thailand**.
- NWORGU, B. G. (1991) **Educational Research**: Basic Issues and Methodology, Ibadan: Wisdom Publishers Ltd.

- OLALOKU, F. A. (1987) T quantity surveyor, the second-tier foreign exchange market (SFEM) Moreover, the construction industry in Nigeria: options and challenges' **Construction in Nigeria**, v. 4, n. 1, p. 4-8.
- OLATUNJI, A.; DIUGWU, I. (2013) A Project Management Perspective to the Management of Federal Roads in Nigeria: A Case Study of Minna- Bida Road. **Finance and Economics**, v. 1, p. 54-60.
- OLAWALE, Y. (2010) **Cost and time control practice of construction project in the UK**.
- ONI, S.; OKANLAWON, K. (2006) Nigeria's transport infrastructural development: an integral part of the national development and empowerment and development strategy (NEEDS) **Social and Policy Issues**, p. 7-13,
- ONTHEWORLDMAP. (2012) **OnTheWorldMap**. Retrieved February 21, 2019, from OnTheWorldMap: <http://ontheworldmap.com>
- PONZ-TIENDA, J. L.; GÓMEZ-CABRERA, A. (2017) A Critical Review Exploring the Challenges of Research in Delays and Cost Overruns in Construction Projects. **Civil Engineering Research Journal**, v. 1, n. 5, p. 1-4.
- RAJ, K. S. (2016) An Exploration Of Causes of Delay and Cost Overrun In Construction Projects: A Case Study Of Australia, Malaysia & Ghana. **Advanced College Of Engineering and Management**, v. 2, p. 1-11.
- RAJAKUMAR, A. C. (2016) Analysis Of Cost Overrun in Road Construction Activities- A Critical Review. *International Research Journal of Engineering and Technology (IRJET)*, 3 (4), 1433-1438.
- REYNOLDS, R. B.; SEVAY, S. G. (2001) Concurrent Delay: A modest proposal, **Revay Report**, v. 20, n. 2.
- SALEM, Z. A.; AL-HAZIM, N. (n.d.) **Delay and Cost overrun in infrastructure projects in Jordan**.
- SAMBASIVAN, M.; SOON, Y. (2007) Causes and effects of delays in the Malaysian construction industry. **International Journal Project Management**, v. 25, n. 5, p. 517-526.
- SCL. (2002) **Society of Construction Law: Delay and Disruption**. Retrieved from <http://www.eotprotocol.com>
- SIBAYAMA. (2012) An overview of construction claims: A case study of the Zambian construction industry. **The international journal of construction management**, p. 65-81.
- SORIOLO, E. (2017) **NAIJ.com**. Retrieved from NAIJ.com: <http://www.naija.ng>
- SOHAIL, M.; CAVILL, S. (2008) Does Corruption Affect Construction? CIB W107 Construction in Developing Countries International Symposium “**Construction in Developing Countries: Procurement, Ethics, and Technology**” 16 – 18 January 2008, Trinidad & Tobago, W.I
- SPACEY, J. (2017) **Simplicable**. Retrieved March 12, 2018, from [Simplicable: simplicable.com/new/cost-overrun](http://Simplicable.com/new/cost-overrun)
- SRIPRASERT, E. (2000) **Assessment of cost control system: A case study of Thai Construction**. M.S. Thesis, Asian Institute of Technology, Bangkok.
- UNITED NATION. (2011) **World population prospects: the 2010 revision, highlights, and advanced tables,** " Working paper No. ESA/P/WP.2202011, United Nation. Economic and Social Affairs/Population Division.



WESTHUIZEN, V. D. (2005) **Defining and measuring project success**. University of Queensland.

WIKIPEDIA. (n.d.) WIKIPEDIA. (J. German, Producer) Retrieved March 2, 2019, from WIKIPEDIA: en.m.wikipedia.org

YATES, J. K.; EPSTEIN, A. (2006) Avoiding and minimising construction delay claim disputes in relational contracting. **Journal of Professional Issues in Engineering Education and Practice**, v. 132, n. 2, p. 168-179.

YOSEF, A.; EMER, T. Q.; MAMUYE, B. (2017) Causes of Delay During Construction Phase of Road Projects due to the Failures of Contractor, Consultant, and Employer in Addis Ababa City Road Authority. **International Journal Of Scientific and Engineering Research**, v. 8, n. 3, p. 1.