



Stakeholders Assessment of Constraints to Project Delivery in the Nigerian Construction Industry

Bruno L. Tanko

Department of Quantity Surveying, Faculty of Environmental Sciences, University of Jos, Jos, 930222, Nigeria

Email: tankob@unijos.edu.ng

Fadhlin Abdullah; Zuhaili Mohamad Ramly

Department of Quantity Surveying, Faculty of Built Environment, Universiti Teknologi Malaysia, Johor, 81310, Malaysia

Email: b-fadhlin@utm.my; zuhaili@utm.my

History:

Received: 10 November 2016

Accepted: 11 January 2017

Available Online: 30 January 2017

Keywords:

Construction problems; construction industry; stakeholders; Nigeria.

DOI:

10.11113/ijbes.v4.n1.160

ABSTRACT

The central goal of construction stakeholders is to successfully deliver projects to stated objective (s). However, for decades, construction projects have been plagued by perennial constraints of cost and time overruns, poor quality, and lack of sustainability. The objective of this paper is to identify and assess the constraints to construction project delivery, and to recommend solutions to enhance project performance. This paper adopted both quantitative and qualitative methods to establish the constraints in the Nigerian construction industry. A pilot survey and literature reviewed revealed a total of fifty (50) construction constraints, which were further classified into eight (8) major groups. Well-structured questionnaires were administered to construction stakeholders (client, consultant and contractor) in Abuja, the federal capital city of Nigeria. Relative Importance Index (RII) was used to analyze the data using Likert scale. The results suggest that cost/time overrun related factors (inability to reduce project cost), Stakeholders interactive-related factors (inability to establish client value system), Client-related factors (Delay in interim payment and finance problem), and Labor/material-related factors (escalation of material prices and materials quality variability) are the most prevalent constraints in the Nigerian construction environment. To mitigate the effects of these challenges, it is suggested that a formal innovative approach should be used by stakeholders to address the problems of poor communication, high project cost, and delay. Clients should also take measures to provide adequate funding and should promptly honor interim certificates.

1. Introduction

The construction industry is all-important and indispensable to the economic development of most nations in the world. It is one of the largest single industries that greatly subscribe to the development of a nation (Helen et al., 2015). The industry is large because it provides investment products and Government is usually its major client. The industry has been described by Ali and Rahmat (2010) as an engine of growth and a growth-stimulating catalyst of a nation's economy. The duty for the physical development of any country rests on the construction sector.

From a wider viewpoint, the construction industry is a complex system of construction stakeholders (clients, consultants, contractors, manufacturers and distributors, suppliers and sub-contractors, end-users etc.), building works (residential, commercial, industrial etc.), civil and heavy engineering works (roads, railways, bridges, sewers, dams, airports, jetties, cofferdams, caissons, tunnels, refineries, power stations etc), and construction training establishments (research institutes, polytechnics and universities). The industry globally generates employment and contributes between 2%-10% to the GDP of most developing and developed countries. Therefore, the construction

industry has the proficiency of either to sustain a floating economy or recuperates an economy that is already depressed. Presently its new role includes the call for low carbon ideologies by using eco-friendly and energy-saving construction materials.

Global Construction (2010) forecasted that Nigeria's construction growth would be one of the fastest of all markets by 2018, as a result of an increase in wealth and urbanisation emanating from the production of its oil. In 2015, Nigeria Gross Domestic Product (GDP) was 2.79% (NBS, 2016) and the construction industry accounted for 4.18% of the GDP (NBS, 2015a). Tanko and Azi (2011) submitted that the industry in Nigeria is an essential contributor to the process of development which includes the construction of schools, houses, hospitals, factories and several infrastructures. Consequently, the demand for infrastructure and buildings in Nigeria has led to the growth of the country's construction industry over the recent years. However, the industry is faced with many multi-faced problems. The successful operation of construction industry in any economy has a huge influence on various sectors of the economy. Therefore, the problem of unsuccessful delivery of products and services by the construction industry becomes a critical challenge.

2. Background

The Nigerian construction industry is characterized by lack of planning, control and organization. Any individual could build any structure without the knowledge of government and against building codes and standards. Therefore, there are no restrictions to entry into the construction industry. As a result, a number of contractors are unprofessional and lack probity. In the same vein, Akanni (2014) submitted that the construction industry in Nigeria is a wide range of loosely integrated organizations that collectively construct, alter and repair a wide range of different buildings and civil engineering projects. Awodele et al. (2009) stated that the Nigerian construction industry is poor as it is characterized with frequent setbacks, cost overruns and abandonment of projects. According to Omoregie and Radford (2006), one of the critical concerns in the construction industry of most developing countries is the high rate of project delay and cost escalations. The project environment in many developing countries like Nigeria present special challenges for project managers that almost presupposes extensive cost and time overruns even before the commencement of a project (Akanni, 2014). Aibinu and Jagboro (2002) found out that an average of 92.64% and 59.23% time overruns on housing projects of less than 10million and above 10million respectively.

A construction project is a complex process that involves many stakeholders, long project durations, and complex contractual relationships (Oyegoke et al., 2013). One of the most significant expectations of every construction industry is the ability to meet the client's need of quality, cost, time, satisfaction, business performance, and safety. However, the Nigerian construction industry is characterized with many problems due to the fact that the problems of quality, cost and time are evident in every stage of the project from design to completion. These challenges need to be controlled early or face the certainty of poor quality, cost overruns and time delays which will eventually lead to displeasure to clients. As clearly emphasized by Helen et al. (2015), relationship and continuous coordination between stakeholders is paramount throughout the life cycle of projects to enhance the performance of projects. Stakeholders can overcome the construction problems by identifying and assessing the most prevalent problems in the industry.

According to Helen et al. (2015), poor construction performance has affected the Nigerian construction industry and its stakeholders do not have documented construction problems for future references. Although Akanni (2014) classified the problems into six (6) groups which include: economic and financial; political; legal; political; social and cultural; physical factors and construction technology and resources. The first five (5) groups were considered in this study and are captured under external factors. Consequently, Helen et al. (2015) had eight (8) classifications (project characteristics, labour and material, contractual relationship, project procedures, consultants, clients, and contractors' related factors). All these groupings were taken into consideration in this study. However, several researchers have advanced the problems facing the industry, but lack appropriate classification that would have included cost/time overrun and stakeholders interactive related groups. Therefore, the paper through the review of literature, interaction with construction stakeholders, and a pilot survey, seeks to identify and assess the critical problems in the Nigerian construction industry as perceived by major stakeholders, and to proffer solutions to enhance the performance of projects. Accordingly, the findings of this study will assist in recommending necessary measures that will tackle the constraints of project delivery and improve the performance of the

construction industry. In this paper, the term 'stakeholders' refers to the client, consultant and contractor.

3. Constraints to Project Delivery in the Nigerian Construction Industry

Previous related studies by Helen et al. (2015), identified 46 factors affecting the performance of construction projects in Akure, Nigeria. Their findings however indicated that 10 leading factors were identified. These include material price escalation, motivating skills of the project team leader, quality control of materials, consultant's commitment, delay of progress payment, project team leaders experience, technical skill of the project team leader, overall management actions, and the economic environment. Atomen et al. (2015) found out that the engagement of non-professionals and shortages of materials on construction sites affect the productivity of the construction and advocated for a better trained and skilled manpower. Another common problem in the industry is the lack of construction skills certification scheme which would have addressed the challenge of construction skilled workforce. The challenge of skills certification, and other problems which include: slow decision making; unskilled workers; lack of skills certification scheme; delay in site handing over; client interference during construction; inadequate design/specifications; no adherence to specifications; lack of cultural changes to new innovations; and inadequate budget allocation by government/government policy, were identified at the preliminary stage (pilot survey) of this study.

Akanni (2014) identified 29 environmental factors that affect construction project performance and found 'civil conflicts and disturbance' as the leading environmental factor influencing the performance of construction projects. According to Balogun (2005), cost escalation is the most common problem facing the industry. Daniel et al. (2014) advanced that the prevalence of non-value adding activities and poor performance of the construction industry result in economic loss to the country. Conversely, the slow adoption of new innovative construction management methods (e.g. lean construction, six sigma and value management) has been a major challenge facing the industry. Wahab and Alake (2007) further identified inappropriate contract documents and procurement preparations, old-fashioned methods of dispute resolution, and delay in paying public projects' contractors as various constraints in the construction industry. According to Odeyinka and Yusif (1997), seven (7) out of every ten (10) projects experience delay in the Nigerian housing industry.

Generally, there are a lot of scholarly works on constraints in the Nigerian construction sector. These challenges range from poor communication and management (Ojoko et al. 2016; Helen et al. 2015; Omoreige & Radford 2006; Kunya et al. 2005), inability of construction professionals to define clients' objectives (Dim and Ezeabasili, 2015; Odediran and Windapo, 2014), poor contract management (Ameh et al., 2010; Otunola, 2008; Eshofonie, 2008; Omoreige and Radford, 2006; Kunya et al., 2005; Mansfield et al., 1994; Okpala and Aniekwu, 1988), finance problems (Odediran & Windapo 2014; Akanni et al. 2014; Eshofonie 2008; Otunola 2008; Omoreige & Radford 2006; Atomen et al. 2015), inappropriate contingency allowance (Aibinu and Jagboro, 2002), unrealistic schedules (Otunola, 2008; Eshofonie, 2008; Omoreige and Radford, 2006; Kunya et al., 2005; Nwosu, 2003; Mansfield et al., 1994), escalation of material prices (Ojoko et al. 2016; Helen et al. 2015; Dim and Ezeabasili 2015; Odediran & Windapo 2014; Akanni et al. 2014), to the inability to reduce project cost (Aibinu and Jagboro, 2002).

Table 1 Previous research on project delivery constraints in the Nigerian construction industry

N/S	Constraints	Authors	Ojoko et al. (2016)	Pilot Survey (2015)	Helen et al. (2015)	Atomen et al. (2015)	Dim and Ezebasili (2015)	Odediran & Windapo (2014)	Akanni et al. (2014)	Ameh et al. (2010)	Eshofomie (2008)	Otunola (2008)	Omoriege & Radford (2006)	Kunya et al. (2005)	Nwosu (2003)	Aibinu & Jagboro (2002)	Mansfield et al. (1994)	Okpala & Aniekwu (1988)
C1	Nature of project				√													
C2	Complexity of project				√													
C3	Size of project				√													
C4	Inadequate Completion period			√														
C5	Inaccurate estimates									√	√	√	√	√	√			√
C6	Inappropriate contingency allowance									√								√
C7	Delay		√															
C8	Inability to reduce project cost						√							√				√
C9	Unrealistic schedule						√						√		√			
C10	Poor planning/ monitoring/feedback mech.		√									√		√				
C11	Inability to establish client value system (objectives)						√	√										
C12	Poor communication, management, and teamwork.		√		√									√	√			√
C13	Delay in conflict resolution			√														
C14	Slow decision making			√														
C15	Inadequate planning and control		√							√	√							
C16	Lack of progress meetings			√														
C17	Inability to identify cost and time overrun items at the design stage						√											
C18	Materials quality variability		√		√													
C19	Escalation of material Prices		√		√			√	√	√		√	√					√
C20	Unskilled workers			√		√												
C21	Lack of skills certification scheme			√														
C22	Delay in material availability											√	√					√
C23	Unavailability of requisite equipment								√									
C24	Proximity to needed resources								√				√					
C25	Imported materials								√	√			√					
C26	Delay in interim payment		√		√													
C27	Finance problems					√		√	√		√	√	√					√
C28	Variation change orders		√					√					√	√				
C29	Delay in site handing over			√														
C30	Lack of maintenance culture			√														
C31	Client Interference during construct.			√														
C32	Inability to define project objectives						√											
C33	Inadequate design/specifications			√														
C34	No adherence to specifications			√														
C35	Variances in contract documents		√															
C36	Delay in inspection and approval			√														
C37	Inadequate safety/accidents on site			√														
C38	Rework due to errors		√															

Table 1 Previous research on project delivery constraints in the Nigerian construction industry (Cont'd)

N/S	Constraints	Authors																
		Ojoko et al. (2016)	Pilot Survey (2015)	Helen et al. (2015)	Atomen et al. (2015)	Dim and Ezebasili (2015)	Odediran & Windapo (2014)	Akanni et al. (2014)	Aneh et al. (2010)	Eshofonie (2008)	Otinola (2008)	Omoriege & Radford (2006)	Kunya et al. (2005)	Nwosu (2003)	Aibinu & Jagboro (2002)	Mansfield et al. (1994)	Okpala & Aniekwu (1988)	
C39	Low labor output		√															
C40	Poor construction method	√																
C41	Conflict with other stakeholders				√			√										
C42	Civil unrest/lack of political stability	√						√										
C43	Lack of economic stability			√						√	√							
C44	Adherence to codes and standards	√																
C45	Unethical/unprofessional practices					√				√								
C46	Delay in construct. permit approval		√															
C47	Bye laws and regulation changes	√								√								
C48	Inclement weather	√		√				√	√									
C49	Lack of cultural changes		√							√								
C50	Inadequate budget allocation by government/government policy		√								√							

Table 1 shows a summary of previous related studies on the constraints to project delivery in the Nigerian construction environment.

4. Methodology

The study adopted a mixed qualitative-exploratory and quantitative survey. Non-probability purposive sampling technique was used for this study, and well-structured questionnaires were administered to construction stakeholders (client, consultant and contractor) in Abuja, the federal capital city of Nigeria, which has a significant level of construction output. Fifty (50) construction delivery constraints were identified through literature review, pilot survey, and interaction with some stakeholders in the construction industry. The questionnaire was designed to evaluate the frequency of the identified problems, and administered to 90 construction professionals undertaking public projects in Abuja. The Quantity Surveyors, Architects, Builders, Structural/Civil Engineers, and Electrical/Mechanical Engineers were the target construction professionals selected for this study. A good number of professionals were registered with either the Quantity Surveyors Registration Board of Nigeria (QSRBN), Architects Registration Council of Nigeria (ARCON), Registered Builders of Nigeria (CORBON) or the Council of Registered Engineers of Nigeria (COREN).

The professionals were chosen from client organization, contracting, and consulting firms. The respondents were asked to express their level of assessment on a 5-point Likert. Out of 90 administered questionnaires, 62 questionnaires were returned which represents 68.89% of returned questionnaires. This was considered appropriate for the analysis of the research. The sampling technique provided us with the opportunity to meet the target groups which informed a high rate of response.

The frequency of occurrence was established on a Likert scale (1= never; 2= rarely; 3= sometimes; 4= often; 5= very often) by using the Relative Importance Index (RII). This approach was adopted by Aibinu and Jagboro (2002), Muhwezi et al. (2014) and Desai & Bhatt (2013). The respondents provided numerical scores in order to express their assessment level with 5 as the highest value. The data collected were analyzed using RII calculated by equation 1.

$$RII = \sum ni \cdot pi / N \cdot Rv. \quad (Eq. 1)$$

Where,

- ni = number of respondents that chose pi.
- pi = 1 to 5 on a Likert scale
- N = total number of questionnaire returned.
- Rv.= highest value in Likert scale.

5. Results and Discussion

Table 2 shows respondents characteristics within the various organizations. A total of 62 questionnaires were returned, 18 were returned by the clients' organization, 24 and 20 were returned by the consulting and contracting organizations respectively. From the table, it can be deduced that 27% of the total respondents are Quantity surveyors, 34% Architects, 24% Builders, 11% Engineers and 3% are others. It can also be inferred from the table that 66% of the total respondents were registered professionals, and only 5% and 3% of the respondents had Ordinary National Diploma (OND) and no qualification (Others) respectively. That is to say 92% of respondents had at least a degree.

Table 3 depicts the respondent's working experience and specialization. It can be deduced from the table that, the respondents have the required experience to undertake this survey because only 19% of the

Table 2 Respondent's designation, registration body and qualification

Demographic Characteristics		Client (N= 18)		Consultant (N= 24)		Contractor (N=20)		Summary (ΣN=62)	
		f	%	f	%	f	%	Σf	%
Profession	QS	5	27.78	7	29.17	5	25.00	17	27.42
	Architects	7	38.89	11	45.83	3	15.00	21	33.87
	Builders	3	16.67	4	16.67	8	40.00	15	24.19
	Engineers	3	16.67	2	8.33	2	10.00	7	11.29
	Others	-	-	-	-	2	10.00	2	3.23
Registration Body	QSRBN	3	16.67	4	16.67	3	15.00	10	16.13
	ARCON	6	33.33	8	33.33	3	15.00	17	27.42
	CORBON	3	16.67	2	8.33	5	25.00	10	16.13
	COREN	1	5.56	2	8.33	1	5.00	4	6.45
	None	5	27.78	8	33.33	8	40.00	21	33.87
Qualification	OND	3	16.67	-	-	-	-	3	4.84
	HND/BSc	11	61.11	14	58.33	14	70.00	39	62.90
	PGD/MSc	3	16.67	8	33.33	4	15.00	15	24.19
	PhD	1	5.56	2	8.33	-	-	3	4.84
	Others	-	-	-	-	2	15.00	2	3.23

Table 3 Respondent's working experiences and field of specialization

Demographic Characteristics		Client (N=18)		Consultant (N= 24)		Contractor (N=20)		Summary (ΣN=62)	
		f	%	f	%	f	%	Σf	%
Working Experience	≤5yrs	1	5.56	2	8.33	3	15.00	6	9.68
	6-10yrs	2	11.11	2	8.33	2	10.00	6	9.68
	11-15yrs	9	50.00	10	41.67	5	25.00	24	38.71
	16-20yrs	4	22.22	6	25.00	7	35.00	17	27.41
	≥21yrs	2	11.11	4	16.67	3	15.00	9	14.52
Specialization	Building works	11	61.11	14	58.33	13	65.00	38	61.29
	Civil works	3	16.67	4	16.67	5	25.00	12	19.36
	Both	4	22.22	6	25.00	2	10.00	12	19.36

respondents had less than 10 years working experience. 61% and 19% of the respondents engage in building and civil works respectively. While 19% engage in both building and civil works.

Tables 4 and 5 show stakeholders' ranking of the constraints in the Nigerian construction industry. The most severe constraints are the inability to reduce project cost (Av.RII=0.97) under cost/time related factors and the inability to establish client value system (Av.RII=0.97) which falls under stakeholders interactive related group. Delay in interim payment and finance constraints which are both client related

factors ranked 3rd and 4th leading constraints in the industry. Stakeholders interactive related factors: poor communication and teamwork (Av.RII=0.91) and poor monitoring/feedback mechanism (Av.RII=0.89); ranked 5th and 6th leading constraints in the Nigerian construction industry. Thereafter, unrealistic schedule (Av.RII=0.88), which is cost/time overrun related group and variation change order (0.83) under client related group, ranked 7th and 9th respectively. While labour and materials related factors: escalation of material prices (Av.RII=0.84) and materials quality variability (Av.RII=0.80); ranked 8th and 10th leading constraints.

Table 4 RII and Rank (Rk) of construction problems as perceived by stakeholders

Project Delivery Constraints		Clients (N=18)		Consultants (N=24)		Contractors (N=20)		Overall; (ΣN=62) Average	
		RII	Rk	RII	Rk	RII	Rk	RII	Rk
Project characteristics related factors	C ₁ .Nature of project	0.50	32	0.33	40	0.44	33	0.397	38
	C ₂ .Complexity of project	0.31	44	0.24	48	0.28	43	0.277	46
	C ₃ .Size of project	0.32	42	0.28	44	0.23	48	0.313	43
	C ₄ .Inadequate Completion period	0.74	12	0.68	17	0.81	10	0.739	15
Cost/time Overrun related factors	C ₅ .Inaccurate estimates	0.71	15	0.63	19	0.75	13	0.697	18
	C ₆ .Inappropriate contingency allowance	0.32	42	0.31	41	0.29	42	0.332	42
	C ₇ .Delay	0.77	11	0.72	14	0.78	12	0.777	12
	C ₈ .Inability to reduce project cost	0.91	1	0.91	2	0.92	1	0.968	1
	C ₉ .Unrealistic schedule	0.82	6	0.83	7	0.88	5	0.877	7
Stakeholders Interactive related factors	C ₁₀ .Poor monitoring/feedback mech.	0.81	7	0.85	6	0.86	6	0.894	6
	C ₁₁ .Inability to establish client value sys.	0.89	2	0.92	1	0.89	3	0.968	1
	C ₁₂ .Poor communication and teamwork.	0.84	5	0.86	5	0.84	8	0.910	5
	C ₁₃ .Delay in conflict resolution	0.39	40	0.37	38	0.31	40	0.397	38
	C ₁₄ .Slow decision making	0.69	17	0.69	15	0.67	17	0.736	16
	C ₁₅ .Inadequate planning and control	0.80	8	0.79	8	0.86	6	0.777	12
	C ₁₆ .Lack of progress meetings	0.40	39	0.38	37	0.33	39	0.413	37
	C ₁₇ .Inability to identify cost and time overrun items at the design stage	0.70	16	0.74	13	0.73	15	0.777	12

Table 4 RII and Rank (Rk) of construction problems as perceived by stakeholders (Cont'd)

Project Delivery Constraints		Clients (N=18)		Consultants (N=24)		Contractors (N=20)		Overall; $\sum N = 62$ Average	
		RII	Rk	RII	Rk	RII	Rk	RII	Rk
<i>Labour and Materials related factors</i>	C ₁₈ .Materials quality variability	0.72	13	0.77	11	0.68	16	0.803	10
	C ₁₉ .Escalation of material Prices	0.80	8	0.78	9	0.82	9	0.839	8
	C ₂₀ .Unskilled workers	0.58	27	0.63	19	0.55	24	0.658	20
	C ₂₁ .Lack of skills certification scheme	0.59	26	0.56	24	0.60	20	0.603	25
	C ₂₂ .Delay in material availability	0.49	33	0.43	33	0.42	34	0.477	32
	C ₂₃ .Unavailability of requisite equipmt	0.30	45	0.29	43	0.27	44	0.313	43
	C ₂₄ .Proximity to needed resources	0.34	41	0.35	39	0.31	40	0.371	40
	C ₂₅ .Imported materials	0.47	34	0.43	33	0.37	37	0.471	33
<i>Client related factors</i>	C ₂₆ .Delay in interim payment	0.89	2	0.88	4	0.90	2	0.942	4
	C ₂₇ .Finance problems	0.86	4	0.91	2	0.89	3	0.952	3
	C ₂₈ .Variation change orders	0.78	10	0.78	9	0.81	10	0.832	9
	C ₂₉ .Delay in site handing over	0.42	37	0.44	32	0.45	32	0.465	34
	C ₃₀ .Lack of maintenance culture	0.46	35	0.39	36	0.41	35	0.436	36
	C ₃₁ .Client Interference during construct.	0.69	17	0.64	18	0.65	18	0.697	18
	C ₃₂ .Inability to brief project objectives	0.68	19	0.69	15	0.62	19	0.732	17
<i>Consultant related factors</i>	C ₃₃ .Inadequate design/specifications	0.63	21	0.58	22	0.59	22	0.636	22
	C ₃₄ .No adherence to specifications	0.61	23	0.54	27	0.55	24	0.597	27
	C ₃₅ .Variances in contract documents	0.63	21	0.61	21	0.57	23	0.655	21
	C ₃₆ .Delay in inspection and approval	0.56	29	0.48	30	0.52	28	0.536	30
<i>Contractor related factors</i>	C ₃₇ .Inadequate safety/accidents on site	0.60	24	0.58	22	0.54	26	0.626	23
	C ₃₈ .Rework due to errors	0.43	36	0.42	35	0.40	36	0.448	35
	C ₃₉ .Low labour output	0.60	24	0.55	25	0.53	27	0.600	26
	C ₄₀ .Poor construction method	0.42	37	0.31	41	0.34	38	0.361	41
	C ₄₁ .Conflict with other stakeholders	0.57	28	0.53	28	0.49	30	0.571	28
<i>External related factors</i>	C ₄₂ .Civil unrest/lack of political stability	0.28	46	0.23	49	0.24	47	0.261	49
	C ₄₃ .Lack of economic stability	0.28	46	0.26	45	0.24	47	0.281	45
	C ₄₄ .Adherence to codes and standards	0.26	49	0.25	46	0.25	45	0.268	48
	C ₄₅ .Unethical/unprofessional practices	0.72	13	0.75	12	0.74	14	0.790	11
	C ₄₆ .Delay in construct. permit approval	0.27	48	0.25	46	0.25	45	0.271	47
	C ₄₇ .Bye laws and regulation changes	0.52	31	0.46	31	0.50	29	0.507	31
	C ₄₈ .Inclement weather	0.24	50	0.23	49	0.23	48	0.252	50
	C ₄₉ .Lack of cultural changes	0.54	30	0.50	29	0.48	31	0.545	29
	C ₅₀ .Inadequate budget allocation by government	0.64	20	0.55	25	0.60	20	0.613	24

Table 5 Top ten (10) project delivery constraints in the Nigerian construction industry

S/N	Constraints	Group	RII	Ranking
C8	Inability to reduce project cost	Cost/time Overrun related	0.968	1
C11	Inability to establish client value system	Stakeholders Interactive related	0.968	1
C27	Finance problems	Client related	0.952	3
C26	Delay in interim payment	Client related	0.942	4
C12	Poor communication and teamwork.	Stakeholders Interactive related	0.910	5
C10	Poor monitoring/feedback mechanism	Stakeholders Interactive related	0.894	6
C9	Unrealistic schedule	Cost/time Overrun related	0.877	7
C19	Escalation of material Prices	Labor and Materials related	0.839	8
C28	Variation change orders	Client related	0.832	9
C18	Materials quality variability	Labor and Materials related	0.803	10

It can be deduced from this study that four (4) groups which include: project characteristics related; consultant related; contractor related; and external related categorizations, out of eight (8) classifications of the constructions constraints did not fall under the ten (10) most prevalent constraints in the construction industry.

6. Conclusion and Recommendations

Critical construction constraints are stumbling block or drawbacks to successful project delivery. These have affected the construction industry and as a result impacted negatively on the economic development of the country. However, these challenges can be mitigated when the weighty or critical constraints are identified. The stakeholders (Client, Consultant and Contractor) examined and assessed fifty (50) constraints in the Nigerian construction industry. The results of this paper revealed ten (10) most frequent constraints to project delivery in the industry. These include: Inability to reduce project cost; Inability to establish client value system; Finance problems; Delay in interim payment; Poor communication and teamwork; Poor monitoring/feedback mechanism; Unrealistic schedule; Escalation of material Prices; Variation change orders; and Materials quality variability. The findings of this study should create a path for the construction industry to add value to the country's physical products and services. Therefore:

1. A formal innovative approach should be used by construction stakeholders to tackle the stakeholders' interactive-related constraints of establishing the client value system, poor communication, and poor monitoring/feedback mechanism. This creative management system which should involve all decision makers and other stakeholders, could address the challenge of unnecessary and high project cost, unrealistic schedule, variation change order and materials quality variability.

2. Government being the major clients of public projects should also take measures to provide adequate funding and should promptly honor interim certificates.

Acknowledgements:

This study is part of an on-going PhD research on value management in the Nigerian construction industry. The authors would like to acknowledge the Universiti Teknologi Malaysia for the assistance granted for this programme.

References

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*, 20(8):593–599.

Akanni, P. O. (2014). Impact of environmental factors on building project performance in Delta state, Nigeria. *HBRC Journal*, 11(1):91–97.

Ali, A. S. and Rahmat, I. (2010). The Performance measurement of construction projects managed by ISO-certified contractors in Malaysia. *Journal of Retail & Leisure Property*, 9(1):25–35.

Ameh, O. J., Soyngbe, A. A., and Odusami, K.T. (2010). Significant factors causing cost overruns in telecommunication projects in Nigeria. *Journal of Construction in Developing Countries*, 15(2):49-67.

Atomen, E., Chuka, O.C., Emeka, I.K. and Samuel, O.S. (2015). Labour productivity in construction industry in Nigeria: case of Lagos and Port Harcourt, Southern Nigeria. *Civil and Environmental Research*, 7(4):28-33.

Awodele, O. A., Ogunlana, S. O. and Motawa, I. (2009). Understanding and managing risks necessary condition for success and sustainability of privately finance market projects in Nigeria. *Proceedings of the Fourth International Conference for Post-graduate Researchers of the Built and Natural Environment at Glasgow Caledonian University, Scotland*. Baloi.

Balogun, O.M. (2005). Clients' perception on measure of indigenous contractors performance in the construction industry. *The Professional Builders, Journal of Nigerian Institute of Building*. 42-48.

Daniel, E.I., Pasquire, C. and Ameh, O.J. (2014). The magic of the last planner system for Nigerian construction. *Production Planning and Control, Proceedings IGLC-22, June 2014 Oslo, Norway*, p.605-616. Retrieved on April 12, 2016 from iglc.net/Papers/Details/1070/pdf.

Desai, M. and Bhatt, R. (2013). Critical causes of delay in residential construction projects: case study of central Gujarat region of India. *International Journal of Engineering Trends and Technology*, 4(4):762-768.

Dim, N.U. and Ezebasili, A.C.C. (2015). Strategic supply chain framework as an effective approach to procurement of public construction projects in Nigeria. *International Journal of Management and Sustainability*. 4(7):163-172.

Eshofonic, F.T. (2008). Factors affecting cost of construction in Nigeria. Unpublished M.Sc. Thesis, Department of Building, University of Lagos, Nigeria.

Global Construction (2010). *Global construction 2020 and global opportunities. Global Construction Perspectives and Oxford Economics*. Retrieved on November 5, 2015 from www.globalconstruction2020.com.

Helen, B.I., Emmanuel, O.O., Lawal, A. and Elkanah, A. (2015). Factors influencing the performance of construction projects in Akure, Nigeria. *International Journal of Civil Engineering, Construction and Estate Management*, 3(4):57-67.

Kasimu, M.A. (2012). Significant factors that causes cost overruns in building construction projects in Nigeria. *Interdisciplinary Journal of Contemporary Research in Business*. 2:775-780.

Kunya, S. U., Hussaini, I.U., and Yusufu, M. I. (2005). Appraising causes of inflated costs of public construction projects in North East Nigeria. *Nigerian Journal of Construction Technology and Management*, 9(1):72-81.

Mansfield, N. R., Ugwu, O.O., and Doran, T. (1994). Causes of delay and cost overruns in Nigerian construction projects. *International Journal of Project Management*. 12(4):254-260.

Muhwezi, L., Acai, J. and Otim, G. (2014). An assessment of the factors causing delays on building construction projects in Uganda. *International Journal of Construction Engineering and Management*, 3(1): 13-23.

Nigerian Bureau of Statistics (2015). *Nigerian gross domestic product report. Quarter one*. Retrieved on October 11, 2015 from www.nigerianstat.gov.ng/pages/download/281.

Nigerian Bureau of Statistics (2016). *Nigerian gross domestic product report. Quarter two, issue 10*. Retrieved on August 15, 2015 from <http://www.nigerianstat.gov.ng/nanapages/download/329>.

Nwosu, C.C.C. (2003). High cost of building in Nigeria: factors responsible and remedies. *The Quantity Surveyor, Journal of the Nigerian Institute of Quantity Surveyors*, 44 (3):18-27.

Odediran, S.J. and Windapo, A.O. (2014). A systematic review of factors influencing the cost performance of building projects In: Laryea, S. and Ibem, E. (Eds) *Proceedings 8th Construction Industry Development Board (cidb) Postgraduate Conference, 10-11 February 2014, University of the Witwatersrand, Johannesburg, South Africa*, 501-520.

Odeyinka, H.A. and Yusif, A. (1997). The causes and effects of construction delays on completion cost of housing projects in Nigeria. *Journal of Financial Management of Property and Construction*, 2:31–44.

Okpala, D. and Aniekwu, A. (1988). Causes of high costs of construction in Nigeria. *Journal of Construction Engineering and Management*, 114(2):233–244.

Ojoko, E.O., Tanko, B.L., Jibrin, M., Ojoko, O. and Enegbuma, W.L. (2016). Project Delay Causes and Effects in the Construction Industry. In *IGCESH. Proceedings of the 6th International Graduate Conference on Engineering, Science and Humanities, 15th-17th August, 2016*, p.221-223.

Omoriegic, A. and Radford, D. (2006). Infrastructure Delays and Cost Escalation: Causes and Effects in Nigeria. *Proceeding of Sixth International Postgraduate Research Conference, Delft University of Technology and TNO, Netherlands*. 3rd-7th April 2006.

Otunola, A.T. (2008). Construction cost and time overrun-a builder's perception of contributory factors. *The Professional Builder, Journal of the Nigerian Institute of Building*, September, 2008.

Oyegoke, A. S., Dickinson, M., Khalfan, M. M. A. et al. (2013). Construction project procurement routes : an in- depth critique. Retrieved April 27, 2016 from <http://doi.org/10.1108/17538370910971018>.

Ramly, Z.M., Shen, G.Q. and Yu, A.T.W. (2015). Critical success factors for value management workshops in Malaysia. *Journal of Management in Engineering*, 31(2): 05014015.

Tanko, B.L. and Azi, T.A. (2011). Petroleum products prices as drivers of building construction materials price fluctuations in Abuja, Nigeria (1990 -2010). *Nigerian Journal of Construction Technology and Management*, 12 (1):21-25.

Wahab, A.B. and Alake, O. (2007). Effects of delay on construction projects in Nigeria. *Built Environment Journal*, 3(1): 21-27.