



RESEARCH ARTICLE

A STUDY ON PUBLIC SECTOR PROJECT DELIVERY IN KATSINA STATE, NIGERIA

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ABSTRACT

Project is one-off task that has specific objective and accomplished under the restriction of choice, time and quality. The construction of public buildings require the coordinated efforts of large number of professionals and organizations, these are critical to the successful delivery of the project goals. Construction on the public sector activities requires major investment outlays in developing countries, yet most construction projects are characterized by cost overrun. The research study was carried out in Katsina State on a population size of 38 construction sites. Structured questionnaires were administered and 32 responses obtained. The data were analysed using descriptive analysis. The result indicates that corruption, delays in payment, materials theft, and fluctuation of prices, poor infrastructure are factors militating against timely project delivery in the state. It is therefore recommended that construction work as an inherently uncertain process should incorporate value management to ease delivery and timely project completion.

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INTRODUCTION

With global economy down turn the search for performance excellence and timely project delivery as an overriding objective of the construction industry has long been criticised (Huan, John, Albert, Chiang and Daniel, 2010); the increasing complexity in construction projects requires the building blocks of high performance (Accenture, 2012). Nigerian construction industry has suffered many setbacks, in terms of completion of projects at agreed time and cost. Majority of the construction projects in Nigerian experienced time and cost overrun which in turn led to abandonment in some cases. Improving construction efficiency by the means of cost and time effectiveness of project would certainly contributes largely to economical saving for the country (Adekunle, 2001). Construction is being used to control the economy of a nations; it is always strongly related to politics, sociology and the legal framework. Political contribution in the construction planning is obligatory in the current world dichotomy; construction cannot grow in the weak and low economy. Project delivery is a contractual relationship between the owner, architect, engineer, contractor, and the management services to design and execute a plan. It is the process by which all of the procedures and components of designing and building a project are organized and articulated by agreement which results into a product. Different research have identified

project delivery methods as a system for organizing and financing design, construction, operations, and maintenance services for a structure or facility activated by legal agreements with one or more entities (Umbugala, 2009). Several problems might have arisen during the construction of the project which has adverse effect on the schedule causing delay in the long run. Ogunlana, Promkuntong, and Jearkjian, (1996) stated that delays occur in most construction project and significant of these varies considerably from project to project. Findings by Elinwa and Joshua (2001) revealed that the mode of financing and payment for completed works, improper planning and under estimation of project durations were among important factors causing delays. Othman, Torrance, and Abdulhamid (2005) highlighted some of the research findings attributing most of the blames for project delays on the contractors. The research further stressed that 50% of the delays can be categorized as non-excusable for which the contractors were responsible. Delay in time during which some part of construction project have been extended or not performed due to unanticipated circumstances, accident or delay can originate from within the contractors organization or from any other factors interfacing upon construction project (Majid, 1998). The outcome or consequences are project failures, reduction in profit margin etc. Delay is slowing down of work without stopping in entirety (Bartholomew, 1998; Othman *et al.*, 2005). Delay give rise to deconstruction and loss of productivity, delay completion of project increase time and cost of construction project, third party claim, an abandonment or eventual termination of the contract. It is important that the

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management keep track of project progress to reduce the possibility of delay occurrence or identify it at early stage (Othman *et al.*, 2005). Delay either by any nominated sub-contractor opening up for inspection leads to an increase in the cost of the project. These are issues critical to delivery which are often overlooked and are contributing negatively to the project goal. This requires strategic management action as sufficient measure to ensure desired outcome are not adversely affected. Construction project is an inherently uncertain process that requires value management to bring the parties involved towards a more cooperative and synergistic environment to ease delivery and timely completion of a goal. Value is created by managing relationship by parties involved in a project. The basic expectation of any building owner is having the right project at the right cost and time (Umbugala, Hishamuddin, and Abdulhamid, 2011). Unfortunately, majority of the building construction projects in Nigeria are delayed and most time led to cost overrun. Generally overrun in a construction project simply means going beyond stipulated cost or duration. Many countries have been trying to change public organization and management, responding to stepped pressure to reduce budgets and increase the quality of services delivery (Liyan and Shoujian, 2005; Umbugala *et al.*, 2011). This has been a driving force for many nations adapting their procedure and structures complying with the economies of scale and effectiveness (Umbugala, 2016). The outcome led to reforms and elimination of wastes. In some extent the strategy for government funded projects are successful in developed countries (Liyan and Shoujian, 2005). Overruns can be defined as a waste of resources; time and money. It is a worldwide phenomenon which can occur in any project be it large, medium, or small public or private". In general it is hard to commit to change; stimulating participants in project delivery to adapt and improve their acts which can go a long way to save cost and time in execution of a goal. Service reliability and performance are source of competitive advantage (Umbugala *et al.*, 2011).

### Project Delivery

Uncompleted Construction projects have flourished all over Nigeria, especially public projects for several years (Odeyinka and Yusuf, 1997). Based in part on significant national expansion of public works projects in the middle of procuring infrastructures historically has relied on a single project delivery system, design-bid-build (DBB). However with the unprecedented increase in size and complexity of projects due to technological advancement other options were exploited. Over roughly the last few decades, various federal and state entities have revived, created several alternative forms of project delivery systems for public works, including design-build (DB) which refers to delivery method where a single entity provides the required services design and construct a structure or facility. Gransberg, Badilo, Gayla, and Molenaar (2003) in Monir (2005) had shown that cost and time growth were significant using design-bid rather than design-bid-build. The study also developed a decision model to assist in checking the suitability of design-build delivery method to projects. A public private partnership (PPP) is a partnership between public sector and private sector in one or more entity to execute a project. The objective is to encourage cooperation between government and private sectors (Shang, Hong, and Zhida, 2005). In Integrated project delivery (IPD) primarily the team members are primarily aligned in an integrated way for better performance, optimal and timely project delivery.

This method removes considerable waste from the construction process while improving quality. It is a return to more collaborative method distinct from the past. There is also the project management consultancy (PMC) which offers project management and development consultancy services. They achieve healthy cash flow, add value to development and take care of end user's satisfaction. It also promotes the achievement of aesthetics and project deliverables. There is the joint venture (JV) whereby two or more firms complement each other to undertake the construction and completion of a project. This indeed is for economy of scale, sharing of resources, strategic alliance, synergy etc. Design-build-operate-maintain takes D-B one step further by including the operation and maintenance of the completed project in the same original contract. Build-Operate-Transfer (BOT) represents complete integration of the project delivery; the same contract governs the design, construction, operation, maintenance and financing of the project. After some concessionary period, the facility is transferred back to the owner. The choice of a method is critical to successful and timely delivery of a project (Ogunlana, Promkuntong, and Jearkjiran, 1996).

The consequential collaborative, value-based process delivering high-outcome results to the entire building team. There are two key variables which account for the bulk of the variation between delivery methods. The extent of the integration of the various services provider and the extent which the owner is directly financing the project. When the various services provider are segmented, the owner has the most amount of control, but this control is costly and doesn't give each provider an incentive to optimize its contribution for the next service. When there is tight integration among providers, each step of the delivery is undertaken with future activities in mind, resulting in cost savings, but limiting the owners influence throughout the project. The owner's direct financing of a project simply means that the owner directly pays the provider for their services. In the case of a facility with a consistent revenue stream, indirectly financing becomes possible, rather than be paid by the owner; the providers are facility's operators. The construction Management (CM) method of project delivery provides the owner with flexibility in selecting a contractor based on several factors other than solely on the price. These qualifications include project specific-expertise, history of performance and stability.

Under a CM method of delivery, the owner selects the contractor based on qualifications and then the contractor's fee is negotiated. The owner has open book access to all projects costs. This includes participation in the bidding and selection of subcontractors and vendors, which represents the most costly component of deployment. Throughout the course of construction, the construction manager basically serves as an extension of the owners staff. Many owners select CM knowing that the lowest initial price derived through the design, bid and build bidding process does not always ultimately turn out to be neither the lowest price nor the best value by the end of the construction. When a project includes CM in the mix, the transition from design is also more apt to be a smooth one. Within the overall label of construction management there are two different project delivery systems, with the variances related to preliminary to pricing and contractual obligations (Ogunlana *et al.*, 1996). Factors affecting the choice of a project delivery method were identified through literature review as time, cost, scope,

quality, owner organization, funding and cash flow, project characteristics, risk, etc. (Al-khalil and Al-Ghafly, 1999). The basic expectation of any building owner however is having the product delivered at the earliest possible time. Unfortunately, most projects in Nigeria moved beyond their initial schedules. Therefore, it is essential and necessary to bring to fore the causes militating against project delivery in order to minimize and avoid project overruns. The rapid expansion and size of current and future projects have constrained firms and owners to start experimenting alternative delivery methods as well. To overcome the disadvantages some owners adopted facilities management concept, where different construction packages are outsourced to several prime firms. This has proven to expedite project delivery quality and allow cost saving from increased competition (Monir, 2005; Abdulhamid, Umbugala, and Hishamuddin, 2015). There are a number of delivery methods available; each has its own advantage and disadvantage. There are however several factors that guide the selection of a delivery method. This is critical and key to time and quality delivery of projects at safe cost. Constructions of projects and abandonment have flourished all over Nigeria, so technical skills in the construction teams are indispensable, but good working relationship is often seen as at least important. The project manager's competence is substantial. More delivery-focused organization has a stronger sense of the importance of project management as a skill set. The design and construction of public buildings require the coordinated efforts of a large number of professionals and organizations. Critical to the successful delivery of a complex or building project is effectively integrating these diverse parties into productive and responsive force that yield the desire goals (Umbugala, 2016). Identifying the optimum delivery method for public projects depends on how public institutions value their own input; projects cost and schedule; overall project quality; short and long-term goals; the competence and transparency of the project participants.

## MATERIALS AND METHODS

The work is carried out by field survey and the questionnaires assess the delivery in public sector building projects. A total of 38 questionnaires were administered, out of which 32 number, representing 84.21% were returned and 6 questionnaires representing 15.78% were withheld. The questionnaire listed out execution process under 7 sub headings with a rating done on 5 points Likert scale. The sample was drawn from a list of construction sites in Katsina State. The population study was made up of 38 different construction sites. The data obtained was analysed using descriptive statistics, in the form of mean score value, standard deviation, standard errors. They were arranged in accordance with public sector building projects delivery from the most important challenged to the least important.

## RESULTS AND DISCUSSIONS

**Table 1. Respondents**

S/N	Respondents' professions	Frequency	Percentage (%)
1	Architects	9	28.1
2	Builders	8	25.0
3	Engineers	6	18.8
4	Quantity surveyors	5	15.6
5	Land surveyors	4	12.5
TOTAL		32	100

Table 1 indicate that 28.1% of the respondents are Architects, representing the highest professionals involved in construction practice in Katsina state while 12.5% of the respondents are Land surveyors, representing the least number of professionals involved in construction practice in the state.

**Table 2. Contractor Factors Affecting Public Sector Project Delivery**

S/n	Factors	Mean score	Rank	S.E	S.D
1.	Relationship with the client	3.72	1 <sup>st</sup>	0.202	1.143
2.	Poor communication	3.37	2 <sup>nd</sup>	0.182	1.030
3.	Delay caused by sub-contractor	3.31	3 <sup>rd</sup>	0.171	0.965
4.	Inexperience of contractor	3.01	4 <sup>th</sup>	0.225	1.270
5.	Mistake during construction	3.00	5 <sup>th</sup>	0.191	1.078
6.	Nature of work	2.97	6 <sup>th</sup>	0.193	1.092

Contractors related factors affecting smooth public sector project delivery as shown in Table 2 indicate that, relationship with the client has mean score value of 3.72 as the most ranked with the a standard deviation of 1.143 (i.e. most critical factor), while poor communication, with mean score of 3.37 is the second most critical factor with standard deviation of 1.030 and ranked second. Other factors like delay caused by subcontractor, inexperience of contractor, mistake during construction ranked 3<sup>rd</sup>, 4<sup>th</sup> respectively, in accordance with their mean scores values, while 'nature of work' was ranked 6<sup>th</sup>, the smaller the value, the more closely the opinions of respondents than a factor with larger standard deviation.

**Table 3. Employers Factors that Affect Delivery in Public Building Project**

S/N	Factors	Mean score	Rank	S.E	S.D
1.	Delay in payments	3.84	1 <sup>st</sup>	0.156	0.884
2.	Slow response to requests	3.59	2 <sup>nd</sup>	0.145	0.835
3.	Variation of works	3.41	3 <sup>RD</sup>	0.195	1.103
4.	Change orders	3.34	4 <sup>TH</sup>	0.183	1.035
5.	Under valuation	3.28	5 <sup>TH</sup>	0.230	1.301
6.	Over valuation	3.25	6 <sup>TH</sup>	0.233	1.320

Table 3 shows the challenges posed by employers to the contractor, ranked in order of importance. Delay in payments is ranked first with mean score value of 3.84 and standard deviation of 0.884, followed by slow response to requests, with mean score value of 3.59 and standard deviation 0.835, as being the second critical delivery factor. Variation of work is ranked 3<sup>rd</sup> with mean score value of 3.41, change orders is fourth with 3.34 mean, while under-valuation is the fifth critical challenges with mean value score of 3.28. The low difference between the mean score value shows the significant effect of all the listed challenges caused by the employer to the execution of building projects.

**Table 4. Social Environment Factors Affecting Public Building Delivery**

S/N	Factors	Mean score	Rank	S.E	S.D
1	Materials theft	3.56	1 <sup>ST</sup>	0.174	0.836
2	Vandalism	3.19	2 <sup>nd</sup>	0.188	0.621
3	Area boys syndrome	3.03	3 <sup>rd</sup>	0.198	0.150
4	Community fracas	2.88	4 <sup>th</sup>	0.205	0.143

Table 4 shows the respondents view on delivery, posed by the social environment which affect the execution of a building project. Theft of material is ranked first, having mean score value of 3.56, the second ranked factor is vandalism, while area boys' syndrome is ranked third and community fracas, is the least on the table with a mean score of 2.88.

instability of policies, statutory amendments and problems with land acquisition are ranked 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> respectively in order of decreasing mean score values. Table 6 show the challenges posed by the economic and financial environment, Fluctuation of prices is ranked first with mean score value of 3.66 and standard deviation of 0.971, while inflation is ranked

**Table 5. Political and Regulatory Environment Factors Affecting Public Building Delivery**

S/N	Factors	Mean score	Rank	S.E	S.D
1	Corrupt government officials	4.19	1 <sup>st</sup>	0.138	0.780
2	Unstable politics	3.73	2 <sup>nd</sup>	0.206	1.164
3	Long procedure for approval and payment	3.63	3 <sup>rd</sup>	0.154	0.871
4	Instability of policies	3.59	4 <sup>th</sup>	0.210	1.188
5	Statutory amendments	3.16	5 <sup>th</sup>	0.163	0.920
6	Problem with land acquisition	3.09	6 <sup>th</sup>	0.208	1.176
7	Custom and import restriction	2.75	7 <sup>th</sup>	0.162	0.196

**Table 6. Economic and Financial Environment Factors Affecting Public Building Delivery**

S/N	Factors	Mean score	Rank	S.E.	S.D
1	Fluctuation of prices	3.66	1 <sup>st</sup>	0.172	0.971
2	Inflation	3.65	2 <sup>nd</sup>	0.183	1.035
3	High interest rate	3.38	3 <sup>rd</sup>	0.205	1.157
4	Lack of capital	3.38	4 <sup>th</sup>	0.219	1.238
5	Exchange rate	3.22	5 <sup>th</sup>	0.189	1.070
6	High local and national tax	2.94	6 <sup>th</sup>	0.185	1.045

**Table 7. Environment and Infrastructural Factors Affecting Public Building Delivery**

S/N	Factors	Mean score	Ranked	S.E	S.D
1	Poor infrastructure e.g. roads etc.	3.53	1 <sup>st</sup>	0.149	0.842
2	Site location and access	3.19	2 <sup>nd</sup>	0.152	0.859
3	Unfavourable site condition	3.06	3 <sup>rd</sup>	0.179	0.014

**Table 8. Management and Environment Factors Affecting Public Building Projects Delivery**

S/N	Factors	Mean score	Rank	S.E	S.D
1	Corruption and fraud	3.94	1 <sup>st</sup>	0.190	1.076
2	Poor planning and organization	3.84	2 <sup>nd</sup>	0.136	0.767
3	Poor financial and management	3.63	3 <sup>rd</sup>	0.178	1.008
4	Poor communication between users developers	3.28	4 <sup>th</sup>	0.163	0.924
5	Coordination problems	3.19	5 <sup>th</sup>	0.138	0.780
6	Dispute between team members	3.16	6 <sup>th</sup>	0.186	1.051

**Table 9. Technical and Labour Factors Affecting Public Building Project Delivery**

S/N	Factors	Mean Score	Rank	S.E	S.D
1	Poor workmanship	3.44	1 <sup>st</sup>	0.233	1.318
2	Low productivity of labour	3.41	2 <sup>nd</sup>	0.200	1.132
3	Lack of technological improvement	3.31	3 <sup>rd</sup>	0.193	1.091
4	High cost of labour	3.22	4 <sup>th</sup>	0.178	1.008
5	Design failure/errors	3.13	5 <sup>th</sup>	0.232	1.314
6	Construction failure	3.06	6 <sup>th</sup>	0.0195	1.105
7	Shortage of labour	2.94	7 <sup>th</sup>	0.224	1.268
8	Volume of work	2.78	8 <sup>th</sup>	0.184	1.039
9	Labour strike	2.59	9 <sup>th</sup>	0.195	1.103
10	Difficulty in acquisition of plant	2.44	10 <sup>th</sup>	0.190	1.076

Table 5 shows the challenges posed by the political and regulatory environment. The delivery and the execution of the building projects ranked according to their impact on the projects from the highest to the least in order of decreasing mean score values. corrupt government officials is the first ranked factor with the mean value of 4.19 and standard deviation of 0.780, while unstable politics ranked second and has a mean score value of 3.73 and standard deviation of 1.164, the last on the list is custom and import restrictions which is ranked 7<sup>th</sup> with mean score value of 2.75 and standard deviation of 0.196. Long procedure for approval and payment,

second on the table with mean score value of 3.65 and standard deviation of 1.035. High local and national tax effects are ranked least (6<sup>th</sup>) as having mean score value of 2.94 and standard deviation of 1.045. Table 7 is representation of the challenges at the environment and infrastructure in the execution of building projects. The table show poor infrastructure as the highest ranked by respondents with mean score value of 3.53 and standard deviation of with mean of 0.842 and Site location and access ranked second and has mean value of 3.19 and standard deviation of 0.859. Unfavourable site conditions are ranked third and least with

mean score value of 3.06 and standard deviation of 1.014 Table 8 above represents delivery in public sector building projects and Challenges faced by the management. Corruption and fraud is ranked highest with mean score value of 3.94 and Standard deviation of 1.076, poor planning and organization is second ranked with mean score value of 3.84 and standard deviation of 0.767, While dispute between team members has the least mean score value of 3.16 And standard deviation of 1.051.

Table 9 show delivery and challenges faced by the technical and labor objective, with poor workmanship as the most critical challenge and ranked the first with a mean score value of 3.44 and standard deviation of 1.318. Low productivity of labor is second with a mean value of 3.41; lack of technological improvement has a mean value of 3.31. Due to the nature of public sector building projects, contractors have a remote relationship with the client. Hence delay in payments was found to be substantial. Theft of materials, fluctuation of prices, and poor workmanship were also discovered to be challenges to the process of executing works.

### Conclusion

Mistakes, relationships with client, corrupt government officials and management, poor infrastructure, delay in payments, fluctuation of prices, materials theft, and poor workmanship are the factors that affect delivery and execution of public sector building projects at the most. The client faced the challenges of fluctuation of prices, inflation, high interest rate etc., in the execution and delivery of the projects. The contractor faces challenges from the economic to financial limitations; others are political and regulatory, social, infrastructural and natural, managerial and technical constraints. The social, political, economic, infrastructural, managerial, and technical constraints have negative effects on the execution of public sector building project if left unattended. It is obvious that lots of public sector buildings delivery firms faced delay in payment which brought slow response in request; these have severe impacts on the execution of the projects. From the analysis it has shown that the blames rest on both parties as in the findings of Othman, et al. (2005). In public sector buildings delivery, these challenges are caused by all parties involved in the project and their respective employers, while other are caused by neither parties nor their employers. Where there is project overrun the two parties at times collaborate to inflate the cost which led to abandonment in some cases. The concrete industry embraces innovations and modern methods of construction by offering concrete solutions which can be used to reduce construction time and promote sustainable development, as well as offering cost savings. These indeed will enhance timely project completion with transparency.

### Recommendations

Based on the conclusion drawn, the following recommendations are made in the public sector building projects delivery. Technical competence of the contractor and participants is a priority in the execution and delivery of the project. Liquidity ratio, the client and professionals should encourage managing their financial and human resources adequately. These will largely contribute to project delivery improvement, effectiveness, quality and more value at the long run.

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