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Assessing IPD's Potential in Improving Building Projects Performance in Enugu State, Nigeria

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Abstract:
Construction projects performance is judged by their meeting with the requirements of time, cost and quality and evidences in Nigeria dispute the fact that projects have performedoptimally. Optimal performance of projects has been linked to that procurement method that guarantees integration of multiple efforts and collaboration, which, unfortunately is not the case in Nigeria. The aim of the study was to project the potentials of IPD in improving project performance so as to stimulate the consciousness that will lead to its consideration and subsequent adoption. Resources for achieving the aim of the study were pulled from both related literary works and survey. The survey made use of questionnaires administered to a population of construction stakeholders (clients, consultants and registered contractors in Enugu state). With the simple random sampling applied to each group, a total of 114 questionnaires were administered on the respondents out of which 92 were used for the study. By confirming that building projects have not performed satisfactorily especially in the areas of cost and time targets initially set for them, the study sets the tone for the consideration of IPD and concludes that it will improve building projects performance if the right atmosphere is created for its adoption.

Keywords: *Collaboration, cordial relationship, integration, procurement, project performance*

1. Introduction

The procurement of construction projects is immense in scope and requires the ability to manage construction resources towards the achievement of specific goals for the clients or customers (Jayasena and Senevirathnas, 2012). It specifies the structure through which a project is acquired; it also defines the type of relationship that must be present among project participants, which, in turn determines the performance of projects (Ghadamsi and Briamah, 2012). There are different procurement models with diverse relationship structure, which lead to the completion of projects at different success levels.The choice of any type must correspond with the peculiar need of the project (UKESSAYS, 2015; Austroads, 2014).

In Nigeria, construction projects are mainly procured through the traditional design-bid-build (DBB), which stratifies design and construction into two mutually exclusive entities carried out by different sets of team members so that very little chance is offered for the integration of efforts and smooth communication among team members. In fact, as observed by several authors, and as such observations were stimulated by the UK commissions at different times, DBB has been found to be notorious for its adversarial nature, and as such this impediment as expressed by(Azha, Kang and Ahmad, 2013; Jayasena and Senevirathna, 2012;Ojo, Adeyemi and Fagbenle, 2006)has paved way for the exploration of other options that promote synergy among project participants.

Project performance in Nigeria has fallen below the expected mark as expressed in incompliance of projects with the cardinal tangibles of cost, time and safety requirements (Bercerick-Gerber, 2011); this, in turn has been linked to the use of DBB, which has been identified to impact negatively on project success (Ghassemi and Bercerick-Gerber, 2011; Olatunji, 2006). The foregoing is supported by the Latham (1994) and NEDO (1983) reports, which, while condemning the DBB as the bane of project failures in the UK, advocated the use of procurement approaches that will stimulate and nurture cooperation and good communication.

Integrated project delivery (IPD) is an alliancing type of project delivery, which is built on the principle of integration of effortsin order to facilitate faster projects at the minimum cost and desired quality (Davis, 2015). IPD has proved successful in projects where it was applied. Projects like the Autodesk Inc. AEC solutions division headquarters, Sutter Health Fairfield medical office building, Cardinal Glennon children's hospital expansion, St Clare health Centre and Walter Cronkite School of

journalism, Arizona state university etc.where it was usedrecorded significant savings in the time and cost of the projects(AIA and AIACC, AGC California and McGraw Hill construction, 2010)

From the foregoing, it is obvious that IPD will improve project performance if it is applied widely on projects delivery; however, since its projection in 2007, it is yet to gain the attention necessary for its wide application on projects. Apart from America where the concept was first developed and used (Jayasena and Senevirathna, 2012), and a few countries like the United Kingdom, and Malaysia, where they are being applied either wholly or partly to project procurement, most countries are unaware of it (Raisbeck, Millie and Maher, 2010). The aim of the study is toproject IPD as a probable solution to project performance problems in Enugu state and to ascertain whether the level of its awareness in the state will affect its adoption. The study will also ascertain in the light of the present situation with regards to project performance in Nigeria, whether it isor not necessary to consider the adoption of IPD.

1.1. Statement of the Problem

In recent times, the construction industry has been criticized for its inefficiency and lack of productivity, which are as a result of its fragmented nature of project delivery (Khalfan and Anumba cited in Abubakar, Ibrahim, Kado and Bala, 2014). Similarly, the industry is bedeviled with strong competition and unhealthy relationship among professionals, which engender the activities of quacks and also contribute to the industry's poor performance. Furthermore, poor performance of construction projects has been attributed to the wrong procurement decision and continuous use of traditional framework (Oyedele cited in Ekun, Siriwardena and Adeniran 2013), which encourage adversarial practice that does not favour the overall project performance. The construction industry will therefore record huge success in project delivery if its fragmented processes are transformed to a collaborative, value-based process (AIA, and AIACC, 2007).

2. Review of Literature

The construction industry all over the world is regarded as the driver of any economy (Ogunlana, 2010 cited in Dada and Akpadiaha, 2012). Unfortunately, in Nigeria, this may not be so considering that the industry has consistently contributed about 5-15% to the gross domestic product (GDP) (NBS, 2015; NBS, 2014) over the years. Such low contribution to the nation's GDP is not in tandem with the volume of construction activities in the country and can only be interpreted to mean that the industry is performing below themark. Evidences in the industry have shown that its underperformance is mainly due to lack of synergy, hence, as the industry grows and its challenges and the demands on it assume a more complex nature, there is need for integration as encapsulated in Obafemi and Morledge (2013).

2.1. Principles/Features of IPD and their Implications

There are lots of definitions on IPD by various authors; the summary of them shows that it is a relational design and construction approach that includes a contractual arrangement among an owner, constructor, subcontractors, architect and design professionals so as to align the interest of the individual members, motivate collaboration throughout the design and construction and tie the team's success to the project success. (Conrad, 2013; Mossman, 2009; AIA, 2007). On the other hand, Jayasena and Senevirathna (2012) noted that IPD may assume another form in which case IPD features or principles are applied to more traditional delivery approaches such that the owner is not a party to a multi-party contract. Whichever form IPD may take, it is built on some basic principles without which it is impossible. The AIA (2007) summarizes the IPD as embodying two principles namely contractual (those that can be written into agreement) and behavioural principles, (those that are necessary for project optimization but are ultimately choice based). These are further broken down by NASFA et al. (2010) and Jayasena and Senevirathna (2012) as summarized in figure 1.

Principles of IPD	
Contractual	**Behavioural**
Shared financial risk and reward based on project outcome;	Mutual respect and trust
Liability waivers between key participants;	Willingness to collaborate
Fiscal transparency between key participants;	Open Communication.
Early involvement of key participants;	
Intensified design;	
Jointly developed project target criteria;	
Collaborative decision making.	

Figure1: Principles/Features of IPD

Inferring from the intention of the founders of IPD, the highlighted principles in figure 1 are intended to close in the gap of synergy existing in the traditional project delivery approach. An analysis of the features/principles of IPD by Azhar, Kang and Ahmad (2013) has shown how these principles are meant to improve project performance.

Characteristics	Description
Early involvement of key participants (EIKP)	Involving the team including designer, constructor and trade contractors' right from the beginning of the project to help the owners to crystallize the project's goals and objectives from very early on and collaborate throughout the project.
Shared risk and reward (SRR)	Participating team members mutually share the benefit of achieving project targets and simultaneously bear the risk of missing the targeted cost (schedule and quality).
Multiparty contract (MPC)	The parties sign a single integrated agreement that clearly sets, defines the role and responsibilities of all team members.
Collective decision making and control (CDMC)	The parties need to agree upon a clear and specific set of criteria for decision-making and control of project, which can be established according to the owner's goal for the project.
Liability waiver among key participants (LWKP)	Contracted parties waive any claim amongst themselves except for in the instance of a willful default to reinforce the sense of unity and a collaborative environment.
Jointly developed and validated goals (JDVG	Owner, with the help of the project team clearly defines achievable goals and benchmarks for measuring them. Risk and rewards are associated with achieving the set targets.

Table 1: Key IPD Characteristics and Description
Adopted From: Azhar, Kang and Ahmad (2013)

From the foregoing, it is evident that the success of IPD lies on the project team members, which implies that forming a viable and strong team, and sustaining it are vital points for consideration. In IPD projects, a strong team is created early to enable members build familiarity and trust among themselves. Team formation may be done by the members on a pre-existing relationship or through a selection process that is qualification based (NASFA *et al*., 2010). Furthermore selection may be based on the willingness of participants to buy-in completely to the ideas of sharing risk, (O' Connor, 2009). In addition to this, commercial discussions are delayed until after the team members are chosen; this reduces the risk of producing the wrong participants through the selection process.

On the other hand, team sustenance is essential to the completion of the project, as suchsome features of IPD like the collective decision making mechanism, compensation structures, risk sharing formula and dispute resolution procedures will ensure that the team membership is sustained.

2.2. IPD Potential in Improving Project Performance

The proponents of Integrated Project Delivery (IPD) claim it can potentially achieve superior results over other procurement models (Raisbeck, Millie and Maher, 2010). This is because by employing the key characteristics in an IPD project, most of the shortfalls of the commonly used project delivery methods can be addressed. If IPD is compared to other delivery methods (For example DBB) on the same parameters like cost, schedule, quality, administrative burden and coordination and team work, it can be seen that IPD has a potential to perform better (Table 2).

Parameter	DBB	IPD
Cost	Ranks lower than others due to trend of intentional underbidding due to problems in design. This leads to change orders and thus increase in total cost of the project	Cost is carefully estimated and agreed upon with the necessary input by the project team members especially the builder's expertise in budget estimating. In addition, the opportunity to identify and resolve design issues related to constructability will increase the value of the design.
Schedule	Stakeholders take the initial decision deadlines less seriously because changes can be made later	Schedule is carefully estimated with detailed analysis of risks and situations that will affect the project schedule.
Quality	Quality of projects delivered through this system is usually good due to presence of independent advisors and the expanded design phase.	Early involvement of key participants ensures quality project since there is varied inputs, analysis and agreement with what constitute quality in the project

Parameter	DBB	IPD
Administrative burden	Administratively burdened due to the need for developing multiple bid packages, issuing them, receiving proposals, evaluating them, negotiating the contracts and overseeing its implementation	Single contract drastically reduces administrative burden.
Coordination and team work	Fragmented and does not promote teamwork	Coordination and teamwork are not just a culture but a necessity of IPD projects.

Table 2: Performance Comparison of IPD and DBB
Adopted from: Azhar, Kang and Ahmad (2013)

3. Methodology

The study population was drawn from the three major stakeholders in the building construction industry namely the clients (both public and private corporate institutions), the consultants and the registered contractors. The population size of 130 was obtained from a pilot study, state chapter secretariat of professional bodies and from the Enugu state ministry of works respectively. A simple random sampling applied to each group with the Taro Yamene formular yielded a sample size of 114 as shown in table 3.

Stakeholders	Population size	Sample size
Public/government institutions	15	14
Private corporate institutions	15	14
Consultants	80	67
Registered contractors	20	19
Total	130	114

Table 3: Population Group and Size and the Corresponding Sample Size

A well-structured questionnaire divided into three sectionswas used to elicit the necessary information from the respondents. Apart from section A, which was aimed at gaining essential demographic information on the respondents,sections B and C elicited stakeholders' opinion on the performance of projects under the design-bid-build procurement design and assessed their awareness of IPD and readiness to adopt it. Data were presented and analysed with the descriptive tools like the frequency tables and mean score ranking.

4. Analysis of Data and Results

A total of 114 questionnaires were administered on the respondents, out of which 92 (80.7%) were duly filled and returned and used for the study. Other data generated from the study are presented in the following tables.

Performance of Projects	VS 4	S 3	U 2	VU 1	M	R
Projects are completed within the budget	0.13	0.26	0.49	0.12	2.40	5
Projects are completed within schedule	0.11	0.23	0.51	0.15	2.29	6
Projects are completed to the required standard and quality	0.15	0.43	0.32	0.10	2.64	3
Projects record low accident in site	0.22	0.60	0.18	0	3.03	1
Client's expectation and satisfaction are met	0.15	0.53	0.25	0.07	2.77	2
Project's team satisfaction is met	0.17	0.40	0.27	0.15	2.60	4

Table 4: Mean Score Ranking of Project Performance in Enugu State
Source: Field Survey (2016)
VS (Very Satisfactory), S (Satisfactory), U (Unsatisfactory), VU (Very Unsatisfactory), M (Mean Score), R (Rank)

From the different rankings obtained from table 4 on the performance of projects based on the stated performance criteria of projects in Enugu, it can be deduced that project performance in Enugu state is somewhat satisfactory when all the criteria are assessed together, however the reverse is the case when the individual criterion is assessed separately based on the weak variation of figures among the four levels of satisfaction.

Furthermore, the poorest performance was recorded in projects not meeting with time schedules and cost budgets; this corresponds with the assertion made by (Ojo, Adeyemi and Fagbenle, 2006), showing that stratification of design and construction stages under traditional procurement approach causes delay of construction projects and its eventual cost overruns

Setbacks in the use of design-bid-build	SA(4)	A (3)	D(2)	SD (1)	Mean	Rank
There is adversarial relationship between the designer and contractor	0.28	0.59	0.10	0.03	3.12	2nd
There is time and cost overruns	0.36	0.59	0.03	0.02	3.29	1st
There is constant variation order	0.25	0.41	0.30	0.03	2.86	3rd
Constructed product differ excessively from the initial design	0.16	0.38	0.36	0.10	2.6	4th
Projects do not attain the desired quality	0.10	0.34	0.47	0.10	2.46	5th

Table 5: Mean Score Ranking of the Problems Inherent in the Use of Design Bid Build (DBB)
Source: Field Survey (2016)
SA=Strongly Agree, A= Agree, D= Disagree, SD= Strongly Disagree

The findings in table 5 agree with Ojo, Adeyemi and Fagbenle (2006) assertion that cost and time overruns are the major problems inherent in the use of the DBB, which arise from conflicts between the designer and contractor, causing ineffective communication and coordination.

In the same vein, cost and time overruns of projects are attributed to lack of synergy, which is lacking in the DBB setting. Adversarial relationship, which ranked 2nd in the problems of DBB has confirmed the assertions of Mbamali and Okotie (2012), which related adversarial practice to the traditional procurement method of project delivery.

IPD	Yes	Percentage yes	No	Percentage No
Awareness	55	60	37	40
Participation	28	30	64	70

Table 6: Awareness of IPD
Source: Field Survey (2016)

Table 6 shows that 60% of the respondents against 40% are aware of IPD, while 30% of the respondents claim to have participated or experienced where it was used.

From the findings, the percentage of those who have participated or experienced where IPD was used is small when compared to the higher percentage of those who are aware. This suggests that the level of awareness as revealed form the findings do not necessarily come from experience or participation but perhaps from literature or from being informed.

Potentials of IPD in improving project performance	SA (4)	A (3)	D (2)	SD (1)	Mean	Rank
Early engagement of project stakeholders will help define project objectives and identify any problems for easy assessment and prevention	0.89	0.1	0.01	0	3.88	1
Extensive planning will optimize both design and construction	0.70	0.30	0	0	3.70	3
Unrestrained information sharing will help in the timely completion of projects	0.61	0.38	0.01	0	3.60	4
Gain and risk sharing will enhance information sharing necessary for project performance	0.61	0.28	0.11	0	3.39	6
Joint decision making will enhance commitment and speedy resolution of problems	0.54	0.43	0.01	0	3.47	5
Early engagement of project stakeholders will help the project benefit from the pool of knowledge of stakeholders and will reduce variation order that causes unnecessary delay of projects	0.75	0.23	0.02	0	3.73	2

Table 7: Mean Score Ranking Of How IPD Will Improve Project Performance
Source: Field Survey (2016)

Table 7shows that early engagement of stakeholders is considered the most vital feature and potential of IPD to improve project performance; hence respondents gave it the 1st and 2nd positions. Furthermore, 89% and 75% of the respondents strongly agree that early engagement of stakeholders will help stakeholders contribute to the pool of knowledge that will help define project objectives, enhance commitment to them as well as perfect designs so that variation that will lead to delay and cost overrun of projects will be minimized. The strong agreement to this corresponds with the assertions of Kent and Becerick-Gerber (2010), which considered early formation of team members vital to addressing the problem of fragmentation between design and construction professionals that result to inefficient work practices and costly changes late in the construction phase.

Willingness to adopt IPD	VW 4	W 3	U 2	VU 1
Frequency	68	24	0	0
Percentage	74	26	0	0

Table 8: Willingness to Adopt IPD
Source: Field Survey (2016)
Vw (Very Willing), W (Willing), U (Unwilling) VU (Very Unwilling)

From table 8, 68% of the respondents show strong willingness to adopt IPD whereas 24% are willing to try it. From this observation, there is clear dissatisfaction with the result of performance of projects under the current procurement method in Enugu especially as none of the respondents indicate an unwillingness to adopt IPD. The indication of strong willingness on to adopt IPD is a testimony that stakeholders are dissatisfied with project performance.

5. Conclusion

As construction becomes more complex and specialized, it is necessary that practices that aim at maximizing project performance be vigorously pursued and strictly adhered to. Such practices are embedded in the IPD, which stress on collaboration and integration of efforts of a multidisciplinary party in order to improve project performance through intensive planning. Planning is required at the early stage of the project so that participants brain storm on the probable challenges of design and construction and take steps to prevent them, set the objectives of the project and develop strategies for their implementation. The study, therefore, concludes as follows:

- That since projects have not performed optimally under the DBB, there is need to change the approach of project procurement and delivery from its present transactional stance to a relational one through the use of alliancing procurement model like IPD;
- That the level of awareness of IPD among stakeholders is not sufficient to advance its adoption in Nigeria;
- That IPD has the potential for improving project performance;
- That stakeholders are willing to buy into IPD if the right atmosphere for its adoption is created.

6. Recommendations

In the light of the revelations made on the study, the following recommendations are proposed:

- Governments should adopt the IPD for its projects, so that the integrated efforts of the project stakeholders will enhance project performance and public accountability;
- Professional bodies in the building and construction industry should factor into the concept, organize workshops for selling the concept among themselves so that they can sell the IPD principles to the government;
- Collaborative and consortium arrangements should be introduced into the curriculum of tertiary institutions in the country so that students can be oriented to think integrative;

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