

TARGET VALUE DELIVERY IN BID PROCESS

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ABSTRACT

The use of the traditional tendering procedure is predominant in the construction industry; although it is ill-equipped for the current complex and dynamic nature of the industry. Various Lean construction scholars have noted that while construction clients are demanding for more complex and dynamic projects, there is a need to transform the traditional tendering procedure which focuses on the lowest cost for the selection of contractors, while neglecting their technical and management qualifications to one that focuses on needs and requirement of the project.

Collaborative approaches like Target Value Design (TVD) can be incorporated in the tendering procedure to ensure that the project needs are met. The case study method was used to demonstrate how TVD principles were used to make competing companies collaborate and contribute during the pre-tender selection process in the traditional tendering procedure to improve project outcomes.

Semi-structured interviews were conducted with 17 professionals who participated in 2 case study projects. The study provides empirical data showing that the incorporation of TVD mitigates the reported challenges of the traditional tendering process. Cost reduction/certainty, reduction of waste/rework/variation, stakeholders' satisfaction, accurate cost specifications, early involvement of stakeholders, tenderer's competency and identification of problems were some of the benefits identified.

KEYWORDS

Lean construction, Competitive tendering, collaborative design and Target value delivery.

INTRODUCTION

The use of the traditional tendering procedure is predominant in the construction industry; although it is ill-equipped for the current complex and dynamic nature of the industry. Various Lean construction scholars have noted that while construction clients are demanding for more complex and dynamic projects; the traditional tendering procedure is becoming incapable of handling the complexities. (Power and Taylor 2019; Howell and Koskela 2000; Howell et al. 2010). Schöttle and Gehbauer (2012) observed that the traditional contracts are wasteful because the contractors exploit the client by maximizing their profit to the detriment of the client's value.

There has been an increased emphasis in current lean construction literature that the lowest price should not be the principal evaluation criteria during the bid selection.

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However, the traditional tendering procedure still focuses on the lowest cost for the selection of contractors, while neglecting the technical and management qualifications. The growing numbers of criteria for selecting contractors in the lean construction literature indicate the immense significance the lean construction community places on appropriate contractor selection.

The selection of the contractor based on the lowest bid price has been linked to project completion delays, poor quality and/or financial losses, etc. (Zavadskas et al. 2008), especially in complex, cost-intensive and uncertain projects. Arguably, project abandonment, delay in project delivery, cost inflation, poor quality of work, the high initial cost of projects etc., could be linked to poor methods and procedures of the selection of contractor (Olatunji 2008).

With increased project complexity, there is a need to evolve the tendering procedure to one that is determined by the needs and requirement of the project (Schöttle et al. 2015). Collaborative approaches such as TVD can be incorporated in the tendering procedure to ensure that the tenderers contribute during the selection of the contractor and they are selected based on competence, value for the client and cost. Schöttle et al. (2015) noted that collaboration is required in a complex and uncertain project for its success; however, there is no incentive or compelling force to foster collaboration in the lowest bid tendering process.

TVD is a strategic pathway for achieving more collaboration by adopting value perceived by the client as a driver of design, (Obi and Arif 2015; Oliva et al. 2016). It seeks to eliminate waste and satisfy the client's expectations (Kim and Lee 2010). The foundational principles of TVD include concurrently designing the product and process in design sets; collaborating in small and diverse groups and meeting regularly in a "big room" setting of co-location to facilitate communication and develop creative interactions (Suhr 1999). The principle of TVD is to collaborate and work together in the same place or as a virtual team while designing to predetermined targets.

So far, TVD research and practice are linked and restricted to collaborative forms of project delivery based on multi-party contracting such as Integrated Project Delivery (IPD). Some researchers in the UK have investigated "the minimum required setting for TVD implementation in any non-IPD environment" (Kaushik et al. 2014). The investigation reported that the application of TVD is quite challenging, especially in the public sector projects and traditional bid process, mostly due to the lack of early involvement of contractors/stakeholders and government policies. The need to test TVD application on the traditional bid process and public sector projects cannot, therefore, be over-emphasised.

The inclusion of TVD in the bid process will help to mitigate the problems encountered by selecting the final contractor based only on cost alone. Schöttle et al. (2015) suggested that it is incumbent on clients to establish the procurement methods at the beginning; else tenderers can make claims against the tendering process, thereby invalidating the results. Inclusion of TVD encompasses design, competency and cost when evaluating bids for selecting the most appropriate contractor.

This paper aims to demonstrate how TVD principles can be incorporated into the traditional tendering process and make competing companies collaborate during the pre-tender selection process to improve project outcomes. TVD was used to test the competencies of tenderers. Pre-qualified tenderers were made to participate in the design stage of the project. Their compliance with TVD practices, innovation, creativity and participation was part of the criteria for final selection and award of the contract.

LITERATURE REVIEW

TARGET VALUE DESIGN

TVD is the term given to the adaptation of target costing to construction projects by Macomber et al. (2007). Target value design (TVD) emerged from target costing from the manufacturing industry by modifying its principles, processes and practices. It is an improved version of target costing with the addition of stakeholder's value as a driver of design and construction. The idea of target costing focuses mainly on setting "cost" target while target value design broadens the concept to include time, quality, value targets, etc. Tillmann et al. (2017) described target costing (TC), as a practice used in the development of new products, especially in the car manufacturing industry. Target costing systems recognise the cost at which the product must be manufactured first if it is to attain its profit objective and then creates an environment that is controlled to help guarantee that the target cost is met (Cooper and Slagmulder 1997). Target costing ensures that the product is designed to satisfy the customers' needs with a strategically determined cost in mind. Ansari et al. (1997) cleverly refer to target costing as a "system of profit planning and cost management that is price-led, customer-focused, design-centred, and cross-functional."

Many researchers have come up with different definitions of target value design (TVD): Kim and Lee (2010) defined it as a management strategy that is designed to eliminate waste and deliver value by using a 'design-to-cost' method, while Morêda Neto et al. (2016) described it as a management approach that focuses on making the client's value a primary driver of design by improving the project definition during programming, thus optimizing the design phase. "TVD is a management practice rather than a type of contract or simply a cost control technique" (Zimina et al. 2012). Essential to TVD is the practice of designing to targets rather than designing, then checking whether budgets, schedules, etc. have been exceeded. This is contrary to the common practice in the NCI where the architect/civil/structural engineers design first before estimates are developed. This leads to a design-estimate-rework cycle due to missing information from the design stage. Consequently, projects normally exceed time and cost targets.

In practice, TVD has been reported to be good at maintaining predictable project cost and controlling cost overruns; delivering projects up 20% below their market prices without affecting time or compromising quality; ensuring early involvement of key stakeholders; and enabling collaboration (Do et al. 2014). It ensures that the client gets the best possible quality within an affordable and realistic budget.

The literature reveals cases where TVD has been successfully adopted/implemented in the past decade in various countries. These cases have reported significant benefits, support for high collaboration, cost reductions/certainty, and the delivery of products with higher added value in design and construction within a set target cost below the market price (Ballard and Reiser 2004; Ballard 2011; Denerolle 2013; Do et al. 2014; Macomber et al. 2007; Oliva et al. 2016; Rybkowski et al. 2012; Zimina et al. 2012).

TENDERING PROCESS

Tendering is a procurement procedure where potential suppliers are invited to make a clear and realistic offer on the price and terms for specified goods, services or works they intend to supply, upon which subsequent contracts are based on if accepted. (Lysons and Farrington 2006). Tendering process generally follows one of several basic procedures,

which include: open tendering, negotiated tendering, serial tendering, framework tendering and selective tendering.

SELECTIVE TENDERING

Selective tendering is a method where only qualified suppliers known by their track record to be suitable for a contract of the size, nature and complexity required are invited by the procuring entity to submit a tender (Lewik 2018; DBW 2018). A preferred tenderer is selected based on criteria such as price, quality and negotiations entered from the tenders received (DBW 2018). The goal of selective tendering is to improve the quality of the bids by ensuring that only contractors with the necessary experience and competence are allowed to submit the necessary bids. It also helps to make the tendering procedure more manageable and reduces the drudgery on the parties involved. Kim (1998) argued that the main objective of selective tendering is to choose "qualified" bidders *ex-ante* while enforcing contract via the credible threat of exclusion. This process tends to be faster than open tendering, and also less wasteful as there is no pre-qualification process.

COMPETITIVE TENDERING

According to Laedre et al. (2006), competitive tendering is a procurement method that does not allow the client or contractor to negotiate before they have signed the final contract documents. Competitive tenders are arrived at from documents that have been prepared to enable several contractors to offer rivalry in designs and prices (Davis et al. 2008). It is aimed at driving costs down and improving the effectiveness of government-funded organisations.

Hasanzadeh et al. (2014) maintain that research in construction procurement methods indicates that there is an exigent need for a change of culture and attitude in the construction industry; a shift from the archaic confrontational relationship into a more cooperative and collaborative relationship. The need for this change stems from the characteristic complexity, uncertainty and time pressure typical of construction projects.

METHODOLOGY

This study was carried out in northern Nigeria. Primary data was collected using project documents, semi-structured interviews of 17 professionals who participated in 2 case study projects. The interviewees include civil engineers, quantity surveyors, electrical engineers, mechanical engineers and architects with over 10 of the respondents having more than 15 years of experience. The researcher participated in both case studies as the project manager in the first case study and as the project director in the second case study; the respondents were interviewed face to face on the project sites. The interviews were divided into five sections. Section one focused on the background information while the other sections focused on the objectives of the study.

The case study method was used to demonstrate how TVD principles were used to make competing companies collaborate during the pre-tender selection process to improve project outcomes. A case study is “an empirical inquiry that investigates a contemporary phenomenon within its real-life context using multiple sources of evidence” (Noor 2008). The evidence used in a case study focuses on developing an in-depth rather than broad, generalizable understanding. Case studies can be used to explore, describe, or explain phenomena by an exhaustive study within its natural setting (Yin 1984).

In the two case studies, the researcher sent out: a tender invitation to some prequalified tenderers; and the tender document containing the scope of work and tender criteria. A Pre-Construction Services Agreement which stipulated the willingness to work collaboratively and participate during the design stage while adhering to TVD practices/benchmarks was a pre-qualifying condition.

RESULTS AND DISCUSSION

TVD IN THE CASE STUDIES

In the two case studies, the client sent out: a tender invitation to some prequalified tenderers; and the tender document containing the scope of work and tender criteria. A Pre-Construction Services Agreement which stipulated the willingness to work collaboratively and participate during the design stage while adhering to TVD practices/benchmarks was a pre-qualifying condition. The bidding process was divided into stages.

Contractors were selected and prequalified then an invitation to tender was sent to the prequalified tenderers along with tender documents that specified the scope of work and tender criteria (which included TVD practice as a major criterion). Interested tenders sent in representatives of their companies to participate in the design process; workshops and training on TVD were conducted for all participants after which the team proceeded to set project targets. The in-house team met with each tenderer’s representatives separately where they broke down the targets cost to smaller cost for each cluster formed and they designed to target. The designs from each tenders group were reviewed and elements were used to form the final project design. The final design outcome was given to the tenderers to present their bid. After which negotiation was carried out with tenderers (see Figure 1).

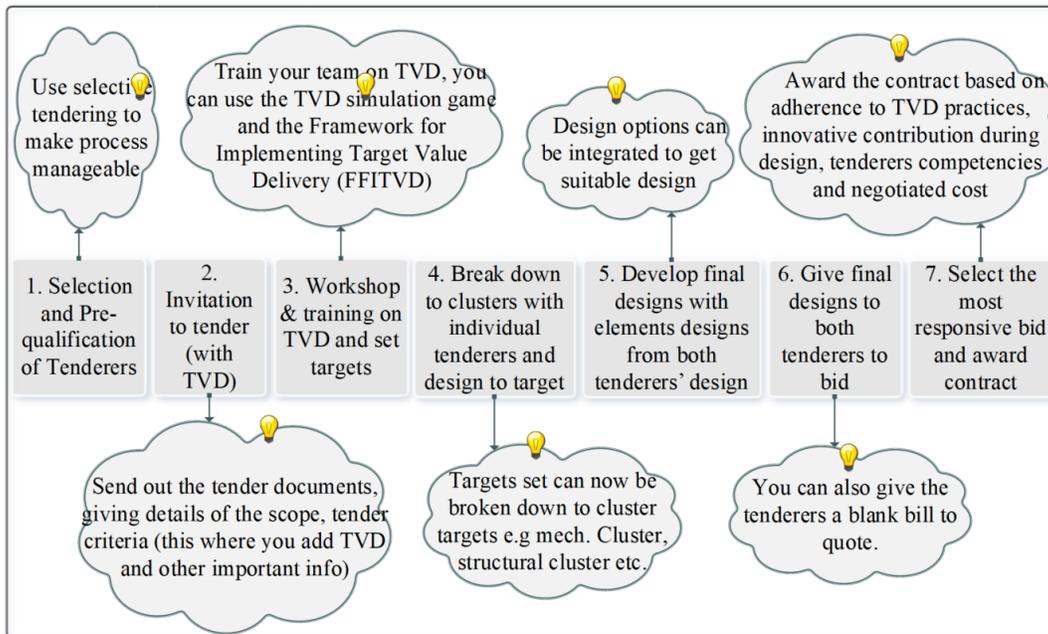


Figure 1: TVD Steps in the bid process

The final award of the contract was based on tenderer's adherence to TVD practices, innovative contribution during design, tenderers competencies, and final negotiated cost. The active supervision of the researcher who served as a consultant in the first case study and Project Director in the second case study facilitated the success of the TVD implementation process, competitive tendering and the project.

THE FIRST CASE STUDY

TVD was implemented at the initiation and planning/design stage of a project using the traditional procurement method. The project site is in Barnawa, Kaduna state in Northern Nigeria. It involved the demolition of a dilapidated petrol filling station, redesign and construction of a new one. The project's duration was planned to last 5 months with a value of approximately USD 236,000. The project included the construction of a petrol filling station building with a lube bay, burial of tanks, construction of the forecourt, the erection of a steel canopy with Pump Island and external works. The need to reduce rework, improve the construction process, save costs and achieve the construction cost below the budget was the major drivers of TVD implementation on the project.

TVD in Bid Process

The project adopted a traditional procurement route with some prequalified contractors. Two contractors were prequalified for the building construction, while four contractors were prequalified for the electrical works. The project management (PM) was handled by the company where the researcher was the Managing Director. Two groups of team members were involved in this project: the team from the PM firm and the teams from the tenderers. The team from the PM firm consisted of the client's representatives, government representatives, key stakeholders, researcher, senior project manager/QS, a site project manager, a quantity surveyor/estimator and an architect. The prequalified contractors (tenderers) had representative consultants as team members for the planning and design stages of the project. The team from each prequalified tenderer, together with the team of the PM firm, formed cluster teams (see figure 2) independently of the other prequalified tenderer teams. Roles and responsibilities were assigned to team members and transparency was a requirement for all. The determination of the responsive bid was based on the tenderer's compliance with the TVD practices that resulted in the most responsive financial quotations, the contribution of the team during design, and the practicability of the design options.

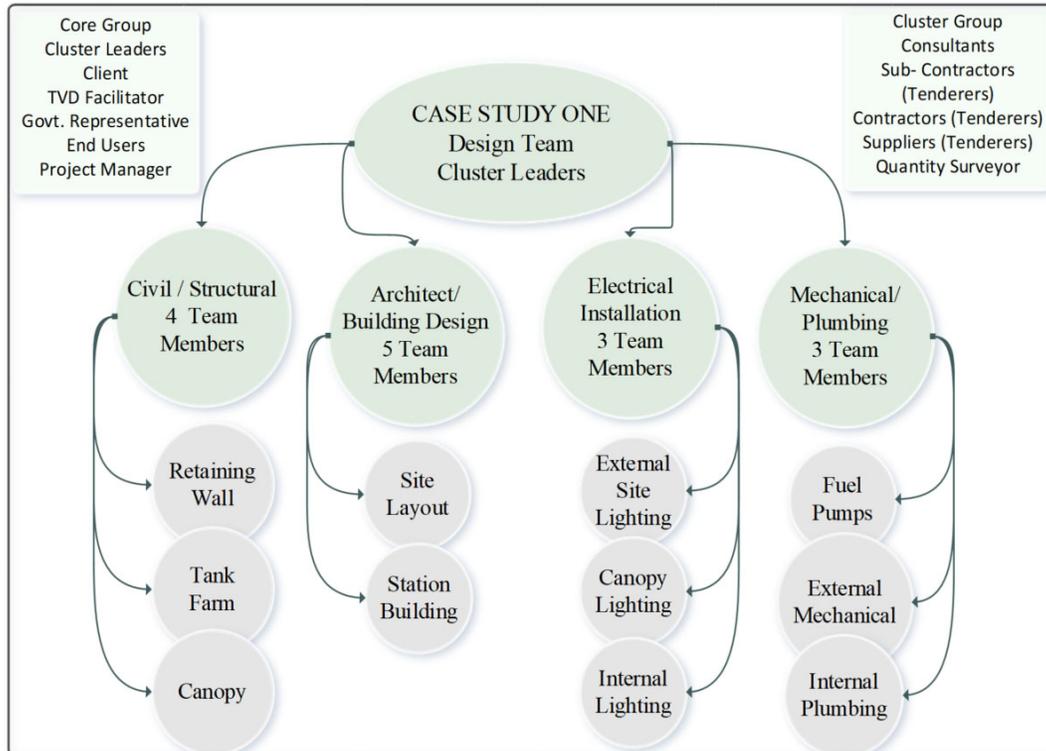


Figure 2: Cluster teams formed for case study one

SECOND CASE STUDY

This case study involves the external electrification of 640 units of homes (121 blocks), the blocks consist of different building types: one-bedroom, two-bedroom, three-bedroom, four-bedroom, and four-bedroom terraces with boys' quarters, which were in the Idu-Gwari residential district of Abuja, North-central Nigeria.

The planning and designing of the electrical equipment adopted the traditional procurement route. Three contractors were selected and invited to tender for the contract. To get the proposed contractors involved even though only the most responsive tenderer will be chosen at the end, the client gave the contractors a Pre-Construction Services Agreement (PCSA). A major stipulation in the PCSA is the introduction of TVD practices; the prequalified tenderers agreed to participate in the design stage with an understanding that their innovative contributions will be used to test their competencies and influence the final selection of the contractors.

Training on TVD was conducted for the three prequalified tenderers and was required to adhere to TVD principles during the design process. Integrated design teams comprising of team members from the Project Management firm and tenderers were formed to carry out the designs for the external electrical installations. A representative from each prequalified tenderer, together with the in-house project team, client representative and government representative formed the cluster teams independent of the other prequalified tenderer's team. Roles and responsibilities were assigned, and the team worked transparently.

The determination of the most responsive bid was based on the tenderer's compliance with the TVD practices, the most responsive financial quotations, the contribution of the tenderer during design, and the practicability of the design options. The most responsive

tenderer was selected to supply and install the external electrical equipment and cables after robust collaborative design and competitive bidding.

POST- TVD IMPLEMENTATION INTERVIEW IN THE TWO CASE STUDIES

The impact of TVD on the bid process in the two case studies is shown in Figure 3.

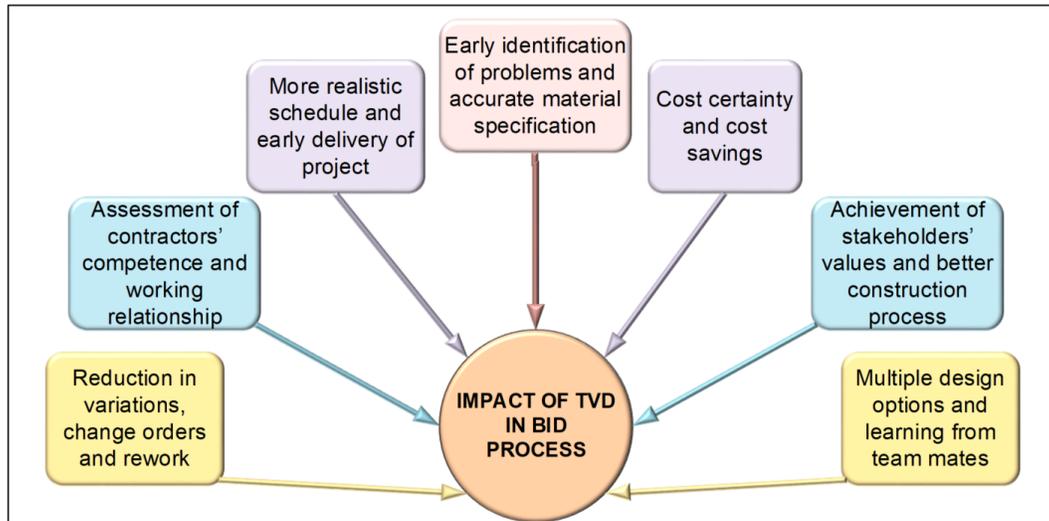


Figure 3: Impact of TVD in the bid process

The participants reported that the process had a momentous impact on the following:

Budget and cost; The researcher found that there was a significant reduction in cost due to the early involvement of key stakeholders especially the potential contractors. The team gained about 35.4% and 8.2% savings from the allowable cost in first and second case study products respectively. This could be attributed to the fact that the contractor/suppliers were able to give us accurate specifications of items available in the market and their accurate market cost during design. There was cost certainty during the construction. This is in line with the submission of Do et al. (2014) who noted that TVD has been reported to be good at maintaining predictable project cost and controlling cost overruns, and delivering projects up to 20% below their market prices without affecting time or compromising quality. This is unlike in the traditional tendering process where projects normally exceed the budget.

The study showed that the implementation of TVD in the case-studies produced a more realistic schedule and enabled the project team to deliver the project a month before the scheduled time for case study one and three weeks ahead of time for case study two. The success of TVD is dependent on the setting and achievement of targets; this is further supported by one of the cardinal rules of TVD, which states that targets must be agreed upon by the project team members; targets cannot be exceeded; however, only the client has the power to change the scope, quality, cost or schedule targets.

Competency Assessment: the study revealed that the introduction of TVD practices in the tendering process helped to assess the competence of the tenderers through direct interactions and quality of ideas suggested, as the researcher was able to assess the contractor based on interaction directly with the professionals that will perform the task and not just the top-level management or the company profiles submitted. Also, the participation of the tenderers in the design process produced multiple design options as

the contractors tried to come up with different ways to get the job done without exceeding target costs. Rework, variations and wastes were minimised from the projects as missing items were identified early when team members and tenderers assessed the site before designs commenced.

Stakeholder satisfaction: In the quest to improve stakeholders' satisfaction, construction stakeholders are seeking innovative approaches to better deliver clients' value. These projects delivered that as the team worked transparently and all stakeholders participated and contributed to the design process. All the project stakeholders, client, project team and tenderers left with a sense of satisfaction.

Improved tender document: having the tenderers in the design team ensured that the team had adequate and updated information concerning the material specifications available in the market, this influenced their decisions during the design. Tenderers also had the opportunity to assess the sites and make recommendations during the design process. The design team and contractors were involved early in the project through the process of competitive bidding and collaborative design, this encouraged a collaborative and harmonious working relationship between the contractors and project team.

Better construction process/method and a better-integrated team were also recognised as a benefit of TVD in the bid process. Improved constructability, cost-certainty and better-integrated project team were some of the benefits of early involvement of contractors. Also, the introduction of TVD in the bid process ensured the prevention and elimination of corruption.

The commonly used traditional tendering process in the NCI does not provide an avenue for all project members to participate and collaborate at the beginning of the project. But the introduction of TVD to the bid process by including it as part of the tender criteria enabled the early involvement of project stakeholders which in turn enabled the project reap the benefits of TVD. These findings support the conclusions from the previous research of Oliva et al. (2016) that suggest that projects can benefit from the early involvement of key stakeholders using TVD. Furthermore, some of these findings support the conclusions from the previous literature review as these have been reported by other researchers.

The study had demonstrated how TVD principles can be incorporated into the traditional tendering process and provides evidence to the body of knowledge that it is possible to get competing tenderers to collaborate by including TVD in the tender documents as a major criterion for selection. The findings suggest that TVD flourishes with collaborative co-location, this is supported by TVD benchmark 17 that states Co-location is strongly advised, at least when teams are newly formed. This result applies to members of the construction industry, and the lean construction community. The research shows that TVD can be implemented in the traditional bid process. It also outlines some of the necessary steps to take to ensure that TVD in the traditional bid process is successful, these steps include making TVD a part of (or mandatory in) the contract with prospective contractors.

This paper shows that the benefits of TVD can be experienced in all procurement methods. This result applies to industry practitioners and researchers within the lean community.

BARRIERS/DRAWBACKS

Initially, a lack of trust was noticed among contractors as a few of them felt that the process was a way of exploiting their ideas without awarding the contract to them. Murray

(2011) asserted that competitive tendering can destroy any possibility of a good relationship between customer and supplier; it also has a tendency of reducing the level of trust between suppliers and purchasers.

Another barrier to this process is the lack of incentives and payment for the participating contractors. A few of the contractors felt that they ought to be paid for their contribution and logistics during the design especially if they fail to get the final contract.

CONCLUSION

This study has demonstrated that using TVD principles to bring competing contractors to collaborate and participate in the design stage of a project during the bid process is beneficial. The inclusion of TVD in the bid process in this study has helped to mitigate the problems caused by selecting the final contractor based on cost alone which has been a concern for the lean community. This study has established that there are other criteria (such as competency, value for the client, cost, the need and requirements of the project) that can be used to select a tenderer other than the lowest cost.

Given the limited research reported by lean construction scholars on the bid process, this study is relevant to the lean construction community as it provides empirical data to show that despite the challenges and negative reputation of the traditional bid process, the incorporation of collaborative approaches such as TVD mitigates the reported challenges.

Review of literature shows that there is a lack of early involvement of contractors in public sector projects and traditional bid process, however, this research has exposed that, key stakeholders including competing tenderers can be involved early in the project by introducing TVD principles and practice in the tender criteria. It also shows the even non-IPD contracts can implement TVD successfully and benefits such as cost reduction, reduction of waste, change orders, rework and variation, realistic schedule, stakeholders' satisfaction and accurate cost specifications of items can be realised. This will also be useful to the construction industry in Nigeria (that relies heavily on the public sector) and other parts of the world. This study offers a solution with practical evidence of how TVD can improve the bid process and mitigate the previous challenges reported. Incentives are recommended to motivate all participants especially those that are not awarded the contract to eliminate the perception of exploitation.

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