

# **A quest for better quality in procurement delivery: A comparative analysis of design-build and traditional system**

**Ramabodu, M.S.<sup>1</sup> and Verster, J.J.P.<sup>2</sup>**

1. Department of Quantity Surveying and Construction Management, University of the Free State, Bloemfontein, South Africa. [RamaboduMS@ufs.ac.za](mailto:RamaboduMS@ufs.ac.za)
2. Department of Quantity Surveying and Construction Management, University of the Free State, Bloemfontein, South Africa [VersterJ@ufs.ac.za](mailto:VersterJ@ufs.ac.za)

## **ABSTRACT**

### **Purpose of this paper**

In Europe and the United States, clients are increasingly adopting the use of Design-Build procurement system rather than the traditional method. Considering the challenges faced by the construction industries in developing countries of improving cost performance and project delivery of the government project. The aim of this paper is to compare the use of Design-Build with the traditional method.

### **Methodology/approach**

Data was collected through a survey, consisting of a questionnaire and personal interviews, conducted among industry professionals. These questionnaires were hand delivered to 30 industry professionals during the month of May 2012. Responses were received from 24 respondents which represent 80% of the participants. The sampling comprised of 11 architects, 5 engineers, 8 quantity surveyors and 1 contractor. These professionals were mainly consultants from the private sector.

### **Findings**

The results show that there are significant cost/time benefits when Design-Build is selected, especially when implemented on a suitable project. Secondly that variation orders are controlled in this type of procurement when compared to traditional method.

### **Value of paper**

This paper shows South African clients' alternative procurement methods to fast track projects to obtain value for money.

**Keywords:** Design-Build, procurement, construction, traditional system

## 1 INTRODUCTION AND LITERATURE REVIEW

According to Chan and Ada (2004:203-221), as cited in Marx (2009:2), there are three most basic but very important performance indicators in construction projects, which are cost, time and quality. However, this makes the process of deciding which procurement method to use extremely complex and a difficult task for clients and project administrators, mainly because there are so many procurement systems available to choose from (Morledge, Smith and Kashiwagi:2006). Therefore, the most important outcome most clients want is that projects must be completed on time within budget and with the most acceptable quality (Rowlinson:1999).

According to a study conducted by Love, Smith and Regan (2010:37) the majority of state projects are roll-out using the traditional method of procurement, where government manages internally or appoints service providers to design and manage the projects.

Furthermore, evidence from literature suggests proof of failure by traditional methods on complex projects. The study also showed that, in Europe and Australia, where lowest price tender methods are used, about 70% of projects are completed late and over budget with a similar percentage (Love et al., 2010:39).

In recent times clients have the possibility to choose from several methods for delivering construction projects with Design-Build being among the popular methods. Under Design-Build there is a single point of contact, early knowledge in terms of cost, time and enhanced quality and communication (Migliaccio, Bogus and Chen, 2010:26). Design-Build refers to a method of project delivery in which a single entity provides to the client or owner all of the services necessary to both design and construct all or a portion of the project (Twomey: 1989).

Government being the main client of the construction industry is the economic controller of the building industry (Ashworth: 2004). Media targets high profile infrastructure projects with challenges relating to cost, time or contractual disputes, due to the fact that government contributes in funding such, (Love, 2011).

The biggest challenge facing policy makers today is how to plan and implement mega projects (Szyliowicz &Goetz:1995). The manner in which companies compete is based on their focus and commitment to creating and retaining satisfied customers.

In the construction industry, to ensure customer satisfaction, service providers need to meet the clients' requirements and expectations, all the while including the quality, cost targets and delivery of project within time (Luder:1986; Raftery:1999).

If the clients' needs are sufficiently addressed, objectives for investment, delivering the project within time, quality and cost could mean the client should be satisfied (Nkado and Mbachu:2001).

Like all other methods of project delivery, there are advantages as well as disadvantages which will be briefly discussed below.

Some of the major advantages include elimination of owner risk in warranting the design (meaning the owner does not have to warrant the design), decrease in litigation and reduction of problems associated with design errors or omissions, to name a few.

Some disadvantages to Design-Build are: Design-Build is unfamiliar to courts, insurance companies, etc., which may result in unexpected problems. Another disadvantage is that the selection process can be more lengthy and complicated. This is especially true for public contracts which must follow specified procedures to allow fair and open competition.

### **1.1 Project Delivery in the Traditional system**

According to a KPMG report (2010:online), there is no definition from the industry which is clear in terms of what exactly constitutes project delivery. Furthermore, the report posits that project delivery is not about which form of contract can be used to share or transfer the risk inherent in large scale projects. Project delivery is indeed about completing a high quality project on time and on budget. Marx (2011:1) indicates in his research that contractors' quality was disregarded as being of any importance in many tenders awarded; he further argues that there is a strong political intervention in the allocation of bids.

However, the traditional system of project delivery assumes that the project client has accurately completed the scope of work through its design consultant and that a preferred bidder will be appointed to construct the project. The client appoints the consultant team to develop the project requirements in the form of drawings and specifications which are intended to guide the contractor in delivering the project (KPMG Report, 2010: online).

### **1.2 Factors influencing the selection of project delivery system**

The KPMG Report (2010) also discusses the factors that influence the selection of a project delivery strategy, which are cost, time, quality, project scope, and allocation of risk.

The National Economic Development Organisation (NEDO:1985) identify nine generic criteria that public sector clients could adopt to select their priorities for projects. These are:

- Time
- Certainty of time
- Certainty of cost
- Price competition
- Flexibility
- Complexity
- Quality

4 *A Quest for Better Quality in Procurement Delivery: A Comparative Analysis of Design-Build and Traditional System*

- Responsibility
- Risk

Alhamzi and McCaffer (2000) argue that the selection criteria representing the constraints imposed on the projects should be considered before a decision is taken by the client as to which procurement is best suited to the project at hand.

According to Al-Tabtabi (2002, cited in Love *et al.*, 2010:52) major difficulties associated with procurement selection are:

- No knowledge of a single person has been found who is familiar with all primary procurement methods (Hamilton:1987);
- No consensus has been found between experts who easily systemise procurement selection; and
- No mutually exclusive sets of criteria, uniquely and completely determine the appropriate procurement method for a specific project (Love, Skitmore and Earl:1998).

### **1.3 Market opportunity for Design-Build systems**

Konchar and Sanvid (1998) as well as Tulacz (2002) argue that projects that are procured using Design-Build has experienced substantial growth in recent years. In 2001 alone, the number of Design-Build projects accounted for more than 30% of construction in the United States.

### **1.4 Risk**

According to Clamp, Cox and Lupton (2007:45) every building contract has some degree of risk. Table 1 below refers to speculative risk, which can be apportioned in advance by the parties to a contract.

This may include losses in time or cost, which are, but not limited to, unexpected ground conditions, adverse weather, an unforeseeable shortage of labour or materials and other similar matters wholly beyond the builder's control. With traditional procurement, the speculative risk should be fairly balanced between parties and the balance can be adjusted as required. In Table 1 is evident that in Design-Build, the speculative risk will lie almost wholly with the contractor (Clamp *et al.*, 2007:44).

**Table 1:** Speculative risk

Contract Type	Risk	
	Client	Contractor
<b>Design and Build</b> (by supplier)		
<b>Design and Build</b> (by contractor)		
<b>Traditional lump-sum</b> (Fixed price)		
<b>Traditional lump-sum</b> (Fluctuation)		
<b>Traditional measurements</b> (Approx. quantities)		
<b>Traditional measurement</b> (Fixed fee prime cost)		
<b>Traditional measurement</b> (Percentage fee)		
<b>Management contracting</b>		

Source: Clamp, *et al.*, (2007: 45)

## 2. OBJECTIVE OF THE STUDY

The objective of the study was to compare Design-Build to traditional procurement systems in the quest to seek a solution for a procurement method that offers value for money quicker with high quality projects not withstanding other factors like complexity of the project and risk.

### **3 METHOD**

A post positivist paradigm was applied to evaluate between two comparative procurement methods, which are Design-Build and the traditional procurement system. Questionnaires were hand delivered to 30 industry professionals during the month of May 2012. Responses were received from 24 respondents which represent 80% of participants. The sampling was purposively selected professionals in the Free State construction industry. These professionals comprised of 11 architects, 5 engineers, 8 quantity surveyors and 1 contractor. These professionals were mainly consultants from the private sector.

The questionnaire included comparisons between Design-Build and the traditional system of procurement. There were 17 questions on both Design-Build and the traditional method in which respondents presented their opinions on a 5 point Likert scale where 1 represented “strongly disagree” and 5 represented “strongly agree”. The quantitative questionnaire consisted of structured and unstructured questions designed to enable respondents to add any other factors that they considered necessary.

#### **3.2 Data Sets**

The initial data collection efforts targeted 30 participants and 24 surveys were completed and returned. In this survey it was found that participants with more years in the construction industry prefer the traditional system over the Design-Build method of procurement.

Using the descriptive statistics test, the responses showed that there was no conclusive agreement on which method was more effective than the other. Although slight differences were observed with regard to both Design-Build and the traditional system, more than 67% of the respondents preferred that the client use the traditional method of procurement, with a mere 33% opting for Design-Build for projects in which they are involved.

### **4 RESULTS AND DISCUSSION**

Table 2 represents the opinion of the respondents in terms of questions 1 to 5. This clearly indicates that 37% of the respondents agree that Design-Build offers more benefit than the traditional method of procurement. Furthermore, 37% of the respondents agree that this method might be the solution to fast track construction projects. 32% of the respondents strongly agree that Design-Build gives value for money and high quality within a reasonable timeframe, whereas 45% of the respondents agree that

variation orders are more controlled when using Design-Build and 40% agreed that projects can be completed on time and within budget.

**Table 2: Analysis of the respondent's sample**

No	Type of Question	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	Design-Build offers more benefits than traditional method	16%	7%	16%	37%	24%
2	Design-Build will be a solution to fast track projects	3%	16%	12%	37%	32%
3	Value for money, high quality and reasonable time frame	8%	28%	12%	20%	32%
4	Variation orders are more controlled	8%	16%	7%	45%	24%
5	Projects can be completed on time and within budget	12%	3%	20%	40%	25%

Furthermore, for Question six (6), 83% of the respondents said that yes, they would indeed influence their clients to use Design-Build as a preferred method of delivery, whereas in the subsequent question 7, 50% said they would influence their clients to use the traditional method of delivery. The other 50% said no, and therefore the respondents were indecisive on this question.

Question eight (8) shows that 75% of the respondents agree that Design-Build holds fewer risks for clients than in the traditional method. Question nine (9), 92% of the respondents agreed that projects perform better in respect of time when Design-Build is selected as a procurement method. For Question 10 and 11 in Table 3 below, 29% and 57% respectively of the respondents agreed with the statement as posed to them, but in question 12, 32% of the respondents remained neutral about the fact that Design-Build made procurement difficult and takes time to initiate, and 28% of these respondents agreed with the statement.

**Table 3:** Analysis of the respondent's sample

No	Type of Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
10	Design-Build offers higher quality when compared to traditional system	17%	17%	17%	29%	21%
11	Design-Build is the method that most clients must utilise when decision is taken to fast-track	3%	8%	12%	57%	20%
12	Difficult to procure and takes time to initiate (Design-Build)	12%	20%	32%	28%	8%
13	Selection of bidders can easily be influenced (traditional)	0%	20%	19%	29%	32%
14	Design-Build has little competition when compared to traditional system	11%	20%	23%	40%	6%
15	Design-Build has high cost for preparation and evaluation of tender	8%	40%	33%	15%	4%
16	Lack of adequate insurance to cover both design and construction (Design-Build)	0%	33%	44%	11%	12%
17	Design-Build owner don't get enough information on progress	24%	24%	28%	20%	4%
18	Design-build shows a lot of delays in construction	13%	33%	25%	25%	4%

	commencement					
--	--------------	--	--	--	--	--

For Question 13, 32% of the respondents strongly agree that selection of bidders can easily be influenced when the traditional method is used. In Question 14, 40% of the respondents agree that Design-Build has little competition when compared to the traditional method of tendering.

Of all the respondents to Question 15, 40% disagree with the fact that Design-Build has a high cost for preparation and evaluation of tender. For Questions 16 and 17 respectively, 44% of the respondents are neutral about insurance issues on the Design-Build method and 28% are neutral about circulation of information to clients. Question 17 showed that 33% of respondents stated that Design-Build does not have any delays in the commencement of projects.

## 5 CONCLUSIONS

The following observations are is evident from the results of the questionnaire:

- Variation orders can be better controlled and this will limit the possibility of cost overruns;
- Projects can be completed on budget and on time when Design-Build is selected;
- That indeed there are more benefits for a client when design and build is used and can fast track project delivery;
- That there is little competition in Design-Build when compared to the traditional method;
- That there might be a potential threat when using Design-Build in terms of insurance for the works.

## 6 RECOMMENDATIONS

Clients should do a thorough need analysis before choosing any procurement system, especially for a complex project, and examine risk in terms of cost, time and quality.

Clients must seek advice from industry specialists to crystallize project objectives and asses the associated risks

Clients should use similar projects as a starting point for a better outcome.

## 7 REFERENCES

- Alhamzi, T. and McCaffer, R. (2000). *Project Procurement System Selection model*. ASCE Journal of Construction Engineering and Management, 126(3), pp. 117-184
- Al-Tabtabi, H. M. (2002). *Construction Procurement Selection Strategy Using Analytical Hierarchy Process*. Journal of Construction Procurement, 8(2), pp 117-184
- Ashworth, A. (2004) *Cost studies of buildings*, 4<sup>th</sup> Edition. Essex: Pearson Prentice Hall
- Chan, A.P.C and Ada, P.I (2004) *Key performance indicators of measuring construction success*. "Benchmarking: An international Journal", 11 (2), pp203-211
- Clamp, H., Cox, S., and Lupton, S., (2007), *Which Contract? Choosing the appropriate building contract*. Fourth Edition. RIBA Publishing.
- Konchar, M and Sanvido, V. (1998). *Comparison of US Project delivery systems*. Journal of Construction Engineering and Management, 124(6): 434-444
- KPMG Report, 2010. Project Delivery Strategy: Getting It Right [online]. Available from: <URL <http://www.kpmg.com/ZA/en/IssuesAndInsights/ArticlesPublications/General-Industries-Publications/Documents/ProjectDeliveryStrategy-GettingItRight.pdf>>. [Accessed: 20 March 2012].
- Love, P., Smith, J. and Regan, M. Comparative procurement methodology analysis in Australia: A new approach" 18<sup>th</sup> CIB World Building Congress: *Building a better world*. Salford, Manchester. May 2010
- Love, P.E.D. (2011) *Plugging the gaps between optimum bias and strategic misrepresentation and infrastructure cost overruns*. The twelfth East Asia-Pacific conference on Structural Engineering and Construction (EASEC-12) 26<sup>th</sup> – 28<sup>th</sup> January, Hong Kong
- Love, P.E.D., Skitmore, R. M. and Earl, G. (1998). Selecting an Appropriate Procurement Method for a Building Project. *Construction Management and Economics*, 16, pp 221-223
- Luder, O (1986) "*The Speed and Style of the Broadgate Development*". Building. 18 July. P23.
- Marx, H.J. (2009a) *Consultants' and Clients' perspective on the construction industry as captured by the CIDB survey of construction industry indicators 2007* The fourth Build Environment Conference 17 – 19 May 2009. Livingstone, Zambia, Association of school of construction of Southern Africa, CD ROM version
- Marx, H.J. (2011) *Key Construction Performance Indicators for Employers and their Agents*. COBRA 2011 proceedings of RICS Construction and Property Conference, 12-13 September 2012, School of the Built Environment. University of Salford. CD ROM version.
- Migliaccio, G.C, Bogus, S. M. and Chen, A. (2010). *Relationship between Design-Build Procurement Duration and Projects success*. Proceeding of the 2010 CIB World Congress CN (2010)
- Morledge, R., Smith A., Kashiwagi, D.T. 2006. *Building Procurement*. Blackwell, Oxford, UK.

- NEDO (1985). *Think about Building: A successful Business Customer's Guide to Using the Construction Industry*. National Economic Development Organization, London
- Nkado, R.N. and Mbachu, J.L (2001) *Modeling Clients Needs and Satisfaction in the Built Environment* Proceeding of the ARCOM Conference, Salford, UK, (5<sup>th</sup> - &7<sup>th</sup> September)
- Raftery, J. (1999) *Quasi-Rational Behavior in the Property and Construction Market*. *Construction Management and Economics*, 17, 21-27
- Rowlinson, S. (1999) A definition of procurement system. In Rowlinson, S. and P.Mc Dermott. *Procurement systems: A guide to best practice in construction* E&F. pp221-223
- Szyliowics, J.S. and Goetz, A.R. (1995) Getting realistic about megaproject planning: The case of the new Denver International Airport, *Policy Science*, Vol. 28, pp. 347-367
- Twomey, T. R. (1989). *Understanding the Legal Aspects of Design-Build*, R. S. Means Co., Kingston, Ma.
- Tulacz, G. J. (2002) *Project delivery is still evolving*. *Engineering News Record* 250 (23). 38