

Bidding model for sustainable projects using the traditional procurement method

By

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Abstract

The evolving concept of sustainable development introduced a new dimension to development processes and procurement routes. Consumption of natural raw materials that have fixed quantity without commensurate replacement should be a matter of concern to humanity. The need to maintain the ever growing human populace instigates the challenge that society's developmental effort meets the demand of economic prudence, social equity and environmental conservation. This is quite daunting one, yet must be met if this planet earth and its inhabitants are not to be put in harm's way. Sustainability in development seeks to achieve the reduction of input-output ratio yet presenting qualitative and satisfactory products to end users. The traditional procurement method (TPM) is still widely used in construction because of some advantages it offers over other methods. Contractor selection in the traditional procurement method can no longer be overlooked- being a vital process that influences project success in terms of cost, quality, function, and environmental care. Many scholars have asserted that time allowed for bidding in the TPM is little in Nigeria as such responsible for the persistent cost over-run in building construction projects. Increasing the time increases the overall project procurement period. Since market fluctuation due to other market forces is unfriendly, the goal of sustainable projects is defeated in this context. This paper seeks to enquire if the TPM remains a good base for project procurement and then modified to retain its numerous advantages over its disadvantages. Estimates from 50 samples of projects were tested using analysis of variance (ANOVA) to find if the (estimates) are reliable at times of tender. This was established and a new bidding model using the TPM proposed. The model reduced time taken to bid yet gave bidders more time to prepare their offer. Other critiques of the TPM have also been addressed in the model. This helps to achieve the goal of sustainable development and enhances TPM for built environment.

Introduction

The evolving need for sustainable development has introduced a new management concept in project procurement process. While controlling the input-output process, the sources of material input have equally become very important. Consumption of raw material without commensurate replacement is a threat to human survival on earth. Thus, the need for a sustainable built environment emerged. Sustainability in construction developments seek to balance the equation between project development in one hand and the eco-system in the other (Owoyale, 1997:48). This is achieved through minimum intrusion into the sources of raw material by being economic prudent, and also through social equity and environmental care. It reduces input in the production process yet uncompromising to the standard of output. In the creation of a construction product, it seeks to produce qualitative products that meet demand with the minimum input of resources through prudent management.

There are many procurement alternatives for a developer. Some of them include the design and

built method, management contracting method, the construction management methods and the traditional procurement method (TPM) (Brook 1998: 9-22). Harris and McAffer, (1989) asserted that the traditional method with the element of competition is still the most favored procurement method in the developed world. It is the same in the case of Nigeria (Oladapo 1999). The competitive element in this method gives best value for money (Smith 1986), universal remedy for corruption if properly implemented (Ofong 1999) and entrenches transparency and accountability in the public procurement process in Nigeria (Oladapo 1999). Yet, competitive bidding as a process is more expensive than the non competitive bidding process. Apart from that, it takes long planning process to start the job. It does not therefore conform to the concept of sustainable projects which seeks to deliver qualitative projects cheaply as well as timely. According to Harrison (1992:4), time is money; therefore, greater advantages abound in completing projects in time. A way is sought to derive the maximum advantage in TPM yet reducing the disadvantages.

The traditional procurement method

The main feature in the traditional procurement method is that designs are completed, bills of quantities produced and contractor invited to tender. This method is sequential in nature and the employer takes the scheme to an advanced stage with the professional team before appointing a contractor (Brook 1998:15). Brook asserted further that responsibilities for design and construction are separated in the traditional procurement method and observed that it is a problem, as such the move for an alternative construction arrangement. The new arrangement should seek to bring the design and construction closer. Morledge et-al (2006:8) reported that Latham recommended strongly to the British government in a report for a move towards collaborative methods of procurement. Another report followed in 1998 headed by Sir John Egan (Egan 1998), and yet another report in 1999 sponsored by the National Audit Office tagged Modernizing Procurement (Morledge et-al 2006:8). The result of these reports was a drift towards closer collaboration between the client and contractor in construction delivery (Cooke and Williams 2004:43) which is lacking in the TPM. Partnering was proposed as an alternative procurement method to address the shortcomings in the TPM. Unfortunately, Partnering equally dropped the advantages clients derive from the TPM. While bringing closer cooperation desired, it deemphasizes the competitive element enjoyed in TPM. A smart contractor can twist the process to his advantage. Furthermore, constructors are involved in projects they have no in-depth information about. At the long run, they may discover that they lack the capacity to handle the needs of the project. In the TPM there is an

important ingredient of proper checks and control of the planning and implementation. Constructors also comprehend properly the project demand in terms of quality, technology and scope before getting involved. These are also lacking in partnering. A method should be devised to thin out the bold line between planning and implementation in place of merging the whole process. This can maintain the advantages of the traditional procurement method and at the same time reduce the disadvantages. The steps involved in the traditional procurement method can broadly be grouped into three stages as shown in table 1.

Stages 1 and 2 in most cases involve only the client and his consultants. This is the stage where all necessary planning and decisions regards client's satisfaction are taken. The detail information is usually compiled to a satisfactory level before the contractor is engaged at stage3.

Control of Development of the construction product in a traditional procurement method

Complete information is good basis for efficient and effective control of construction works (Bennett and Grice 1992:254). It derives the advantages of a proper supervision of the construction product development for a qualitative output. This method offers this opportunity including adequate cost plan, which can reduce cost input through proper cost control and monitoring from inception to completion of the project. Figure 1 shows the detailed step-by-step developmental control of the construction product in the traditional procurement setting.

Table 1: Stages of the traditional procurement method

Stage	Stage description	Activities
1	Inception	Client commissions a design team and brief them of the project requirements
2	Design action	Feasibility studies Sketch design Skew design Detailed design Production information
3	Tender action	Invitation to tender Issue of tender to bidders Return of bids Tender analysis Award of contract

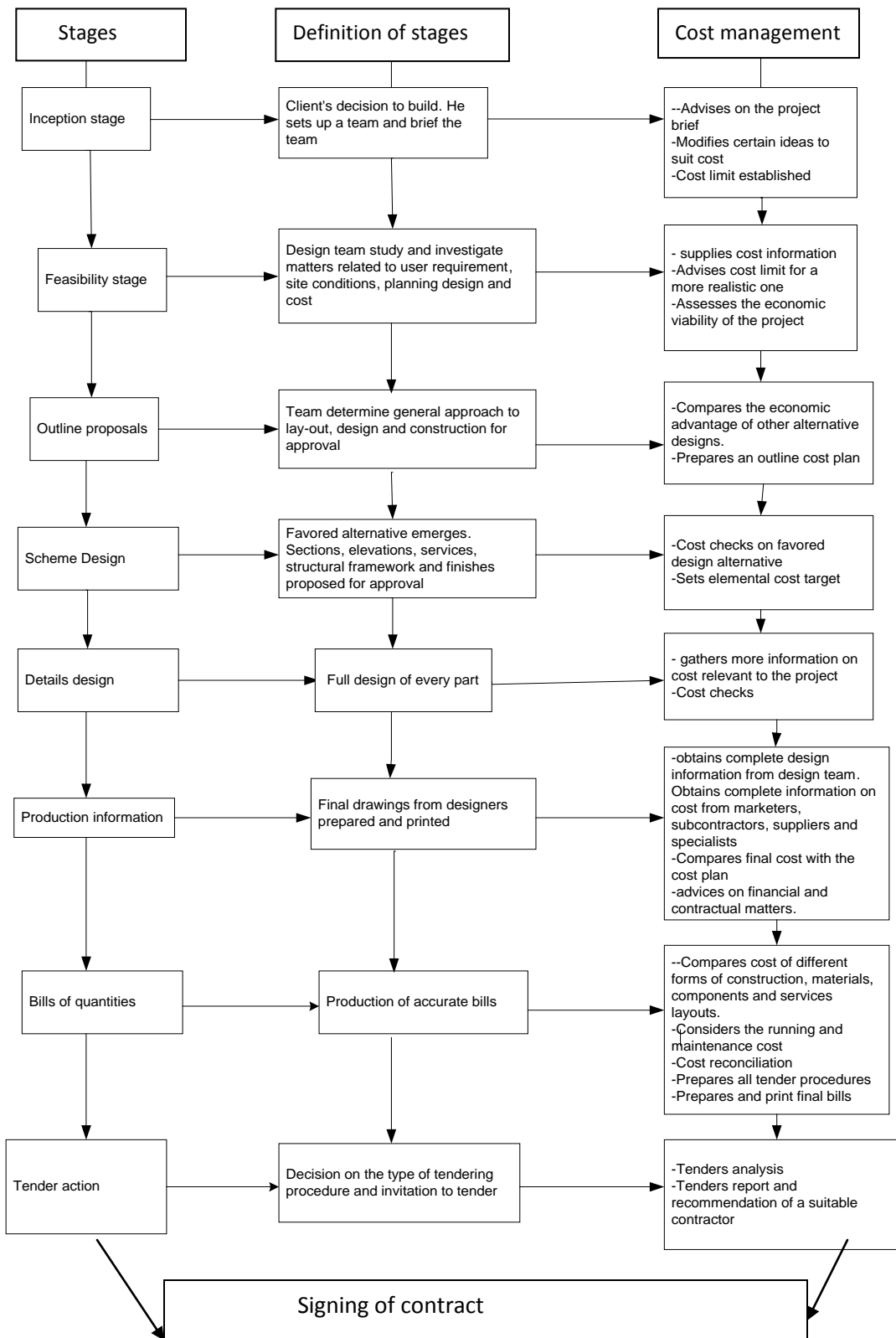


Figure 1: The developmental stages of a construction product

Source: Adapted from Gandu and Haddarry (2007)

From Figure 1, the contractor is engaged at the tender action stage. At this stage the contractor is expected to bid for the proposed project based on the information supplied to him.

Many activities do take place in the contractor's organization during bidding. Lueng et-al (2005:34) listed some as collection of useful information from various departments within the company (e.g. the plant department, planning department, etc.), other organizations in the construction supply chain (e.g. subcontractors, suppliers, etc.), and/or external bodies (e.g. the statutory bodies, construction indexes, etc). In addition, estimators must study the contract drawings to grab the project concept, the legal implication and draw the attention of bidder and consultants, if implicative, before signing the contract. Gandu (2005:25) succinctly summarized activities during bidding in the contractor's organization in a table (see table 2):

Disadvantages of the conventional bidding method

The disadvantages of the conventional method include the following

1. Most information about the project remains unknown to prospective bidders until the tender action stage, and managing the bulk of information within the given bidding period becomes difficult
2. After production of contract documents, there is that anxiety within client's organization to start the project, so the time allowed for bidding is not often sufficient
3. When bidders encounter difficulty in getting requisite technology or some of the

materials recommended for the job, accommodating alternatives in the contract becomes difficult. The bidding process is either aborted, or it is completed and then variation accommodated after the work starts

The need for the study

Selecting a wrong contractor during bidding can cause serious problems during contract execution (Ramus and Birchall 1996:45). Giwa (1982:117) studied a set of building projects and found out that the cost do overshoot their initial estimates by 113.33% and Aliyu (1990:98) by 2107%. Nuhu (1987:69) asserted that bidding process do affect the cost of construction projects. It is because time for estimating process is usually very limited (Ahmadu 1991:53, Leung et-al 2005:33). Ahmadu (1991:53) further opined that more time should be given for bidders to offer a bon-a-fide bid. Alas, this suggestion is capable of increasing the procurement period after commission. Mogbo (1992:210) reported that cost and time are directly related. Bala (2002:66) succinctly summarized the inflation situation in Nigeria by presenting the market trend in cost growth against time of a typical construction material. From 1998 to 2000 cement was found to rose by 2000%. Any suggestion to increase time in procurement process can cause adverse effect (Harrison 1992:4). Therefore, the problem of long time in the planning process should be of greater concern. Efforts should be made to reduce the long bidding time yet allowing bidders sufficient time to prepare bon-a-fide bids.

Table 2: Conventional contractor bidding process

No	Steps in bidding	Department involved and actions taken	Things to consider	Reasons for action
1	Decision to tender	Management meets to decide	Type of project, Size of project Location of the project, Profitability, Current work load Time allowed to tender Starting and completion time for the project	To be sure that the company can do the job and also set up steps for proper panning
2	Programming the bidding process	Management meets to discuss on how the process will be handled	Extent of engagement of staff	To establish key dates to monitor progress and share responsibility
3	Procurement of contract documents	Procurement officer obtains tender documents	Types of project agreed upon, all documents said to be obtained	To forward complete information to the estimating department for study
4	Project study	Estimating and Engineering department meet to study drawings and conditions of contract, visit site and Prepare method statement	Tender period, fluctuation clauses, type of contract, retention, constructability, risks involved, discrepancies, ambiguities	To appreciate the task involved To raise queries on ambiguous issues related to the project Raise legal issues Confirm quantity of work in the bill Assess provisional sums and provisional quantities Assess extent of preliminary work Describe how the work will be executed with detail types of labor, plant and equipment required Establish the preferred construction approach Assess risks involved
5	Collection of cost information	Estimating department Market research Enquiries from sub contractors, suppliers and other sources of resource	Conditions attached to subcontractor's and supplier's quotations, Time it takes to deliver resource on request	To be sure of the availability of resources and assess difficulty in getting them if available Update cost data files
6	Preparing the estimate	Establish unit rates Price the bill	Characteristics of the project, difficulty in access to the site and getting materials	To establish a feasible estimated cost to do the work by the contractor
7	Re-evaluate the estimate	Cross checking the bill	Omissions, calculation error, inconsistency in pricing,	To ensure an error free estimate is prepared
7	Project program and cash flow forecasting	Estimating department meet for resource analysis	Consider man power available, Plant and equipment and the project program of work	Estimate contract period Prepare program of work Prepare cash flow schedule To assess benefit for taking a job
8	Estimator's report	Management meet to take report on all findings	Report on estimated cost, availability of resource, risk involved in the project, any other information available	To enable management take final decision
9	Adjudication	Top management meet to adjust the estimate	Mark up, competitors	Convert estimate to tender figure
10	Submitting tender	Estimating department submits	Closing time, pattern of submission	To qualify for competition

Source: Adapted from Gandu (2005:25)

Methodology

A wealth of literature is used in reviewing assertions and research findings about the traditional procurement method. There after, a test is conducted to find out if the traditional procurement method continue to meet the objective of providing fair basis for competition in competitive bidding. Clients' or consultants' estimates prepared in the traditional procurement methods are compared to establish the reliability of the estimates. Fifty tender figures were extracted from fifty different tender reports between 1989 and 1998 obtained from consultant's organizations in Kaduna and Abuja. For each year five projects were used and three bids for each project. Analysis of variance (ANOVA) was used to test if the estimates produced by bidders are the same statistically or they differ. Consultants estimate was introduced and the same test carried out. This was conducted yearly for ten years. The results are presented in tables 3 and table 4.

As can be seen from table 3.0, the traditional procurement method still provides reliable bases to select a bidder. For all projects tested spanning a period of ten years, only 1991 and 1995 showed that estimates were not reliable. It shows that contractors competing with each other for projects under the traditional procurement method produce reliable pre-contract estimates. Table 4.0 also shows statistically that consultants under the traditional procurement method produce reliable estimates for competitive bidding. Generally, the traditional procurement method is still a reliable method of acquiring a construction facility for the investor to use. The time taken to plan and execute jobs enables proper planning and control. A new method should therefore be designed to reduce the disadvantages of the traditional method.

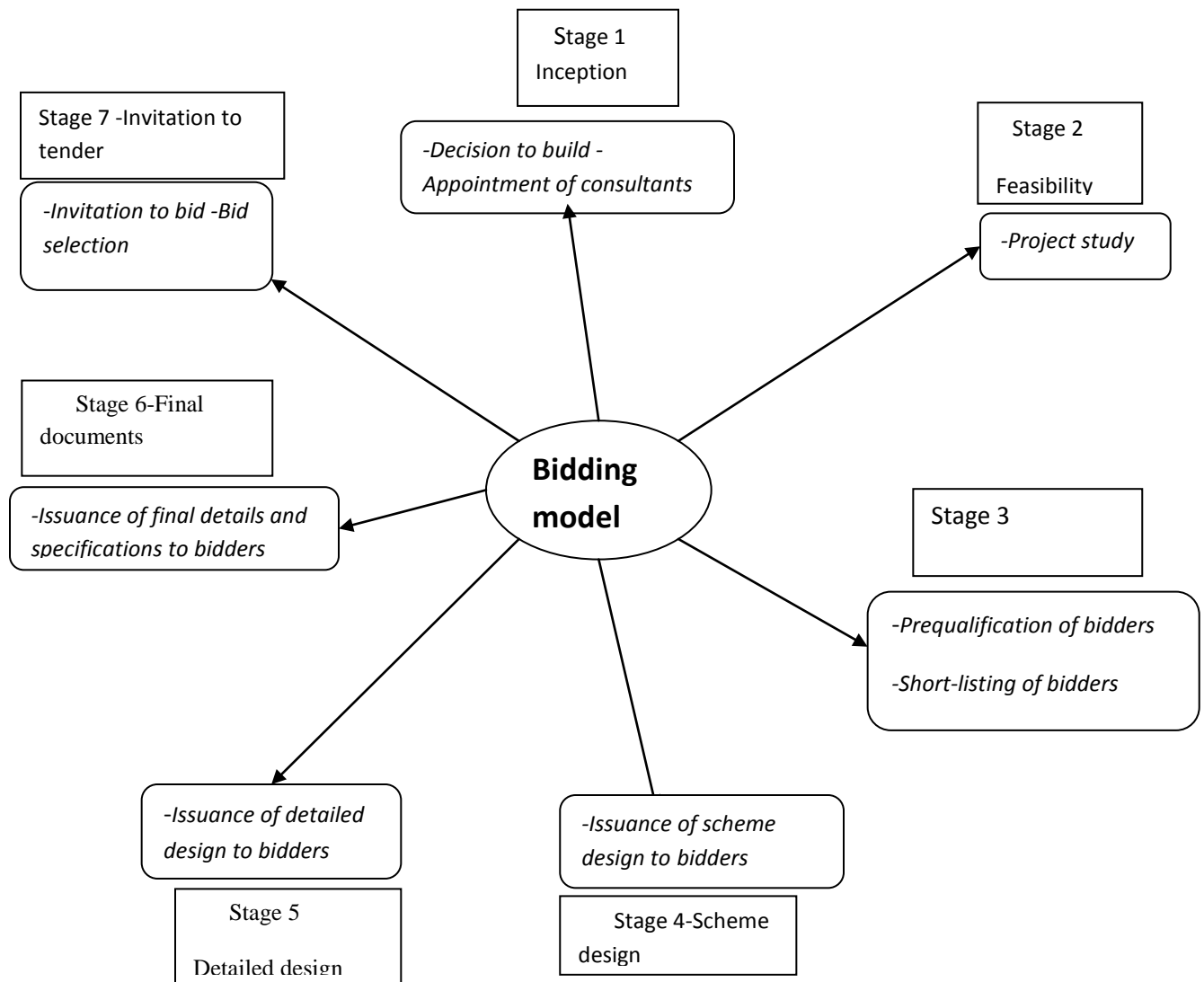
Table 3.0 test of reliability of contractors estimates

Year	Computed value of f	Critical region	Conclusion
1989	0.957	4.46	Reliable
1990	2.78	4.46	Reliable
1991	5.88	4.46	Not Reliable
1992	2.98	4.46	Reliable
1993	3.36	4.46	Reliable
1994	3.02	4.46	Reliable
1995	5.91	4.46	Not Reliable
1996	2.10	4.46	Reliable
1997	2.01	4.46	Reliable
1998	1.02	4.46	Reliable

Table 4.0 Test of reliability of consultant's estimate

Year	Computed value of f	Critical region	Conclusion
1989	0.149	± 1.734	Reliable
1990	1.23	± 1.734	Reliable
1991	0.015	± 1.734	Reliable
1992	0.07	± 1.734	Reliable
1993	0.27	± 1.734	Reliable
1994	0.27	± 1.734	Reliable
1995	0.19	± 1.734	Reliable
1996	0.10	± 1.734	Reliable
1997	0.36	± 1.734	Reliable
1998	0.034	± 1.734	Reliable

The model and discussion on the model



The model above shows the seven stages of the planning process in the traditional procurement method. Instead of inviting for offer at stage 6 as practiced, the short list of qualified bidders should be completed at stage 3. The scheme design seeking for approval by the client is also issued to bidders. It enables them to grab the concept, establish some basic quantities, unit rates, and identify sources for material, plant and equipment for the job. Their capacity to handle the job is also established within the design process. The detail design submitted to

the quantity surveyor is also submitted to them. At the time of invitation to tender at stage 6, they can be entitle to the bill only since they are already familiar and have the detailed designs. The time allowed for to return bids is used for pricing and making little amendments only since all other activities are carried out simultaneously with the design process. The time to return bids after issuance of the bill can now be very short. Some of the major criticisms of the traditional procurement method have been overcome by this model e.g.

1. Longer time for contractors to bid yet, shorter time to complete the bidding process which offers early start of project
2. Early involvement of bidders in the design process enables suggestions from their wealth of experience to be derived
3. Easier to accommodate new bidders when there is withdrawal in the bidding process and may not affect the time.
4. Difficult for contractors to collude since shorter time is allowed to return bids after final information from the quantity surveyor

Disadvantage:

1. The main disadvantage lies in the additional cost of issuing scheme design to bidders
2. If bidders know themselves early they can form a ring and keep the tender high

Reference

- Ahmadu, M. M. (1991), Relative importance of cost determinants in construction tendering. Unpublished M.Sc. Thesis submitted to Department of Building, Ahmadu Bello University Zaria.
- Aliyu, M. M. (1999), Open and competitive tendering-the PTF approach. The quantity surveyor, a journal of the Nigerian institute of quantity surveyors, June/July
- Bala, K. (2000), The professionals' perception of successful project management parameters. Unpublished PhD Thesis Submitted to Department of Building, A.B.U Zaria.
- Bennett, John and Grice, Tony (1992), Procurement Systems For Buildings, In Quantity Surveying Techniques New Direction, Edited By Bradon, Peter S, Blackwell Science Ltd Great Britain.
- Brook, Martin (1998), Estimating And Tendering For Construction Work. Butterworth-Heinemann, Great Britain
- Cooke, Brain and Williams, Peter (2004), construction planning programming and control, Blackwell Publishing Ltd., UK
- Gandu, Y. J. (2005), Reliability of Predicted Costs for Competitive Bidding in Building Projects in Nigeria. Unpublished MSc. Thesis submitted to department of Building, A.B.U Zaria.
- Gandu, Y. J. and Haddary, Y. M. (2007), Understanding Steps In Quantity Surveying Procedure, Shanshan Publishers Limited, Kaduna Nigeria
- Giwa, S. L (1982). Reliability of the Engineer's Estimate in Selective Tendering for Building Works (A case for Kaduna State). Unpublished MSc. Thesis submitted to Department of Building, A.B.U Zaria.
- Harrison F. L. (1992), Advanced Project Management, A Structured Approach, Gower Publishing Company Limited, England.
- Leung, Mei-Yung; Thomas Ng. S; Skitmore, Martin and Cheung, Sai-On (2005), A Journal of Construction Management and Economics, Taylor & Francis Group Ltd.
[Http://Www.Tandf.Co.Uk/Journals](http://www.tandf.co.uk/journals)
- Mogbo, T. C. (1992), Time and Cost Relationship of Housing Construction in Northern Nigeria. Unpublished PhD Thesis Submitted to Department of Building, A.B.U Zaria.
- Morledge,Roy; Smith, Andrain; and Kashiwagi, T. Dean (2006). Building Procurement. Blackwell Publishing Ltd. UK
- Nuhu, G. Z. (1987). Tender Management and Bid Evaluation for Optimum Results. Unpublished MSc. Thesis submitted to Department of Building, A.B.U Zaria.
- Owoyale S.O. (2005), An Overview of Negative Impact of Construction Activities on the Environment In Towards a Sustainable Built Environment, Conference Proceedings, Department of Building, Ahmadu Bello University Zaria. Edited by Mbamali I., September 2005 Pp48
- Ramus, J and Birchall, S. (1996). Contract Practice for Surveyors. Heinemann, London