Discussion of procurement methods in the construction industry

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Abstract. Construction projects are highly complex and unique in nature yet this business holds prime importance for the economy of any country due to its high level of contribution to GDP. There have been a number of revolutions in the industry over the past few years. With the introduction of newer methods and advanced technologies, the approach that followed a number of major changes and modifications. This paper explores various procurement trends in the construction arena and makes an attempt to understand how their impacts and the trade-offs that are made while choosing for construction and sustainability of the construction process. There are various distinctive ways to deal with procurement of products, services, and mechanism, all of which can bring about various results. Procurement methodology is about the decisions taken in figuring out what is to be conveyed by a specific contract, the procuring and contracting courses of action and the way the auxiliary procurement targets are to be advanced. This paper will contribute to the body of knowledge by providing the analysis and a list of reliable factors for procurement technique in construction projects to inform future practice at strategic and tactic level. There are various distinctive ways to deal with procurement of products, services and mechanism, all of which can bring about various results. Procurement methodology is about the decisions taken in figuring out what is to be conveyed by a specific contract, the procuring and contracting courses of action and the way the auxiliary procurement targets are to be advanced. Methodological triangulation was adopted, including the literature review, and a questionnaire survey to obtain data from 50 construction professionals. The results revealed that employee’s awareness is the greatest strategy for procurement in the construction industry.

Keywords: Construction projects, product, services, Procurement strategy, suitability
ARCHITECTURE, CONSTRUCTION AND DESIGN

INTRODUCTION:

Construction procurement techniques are most appropriate to substantial, perplexing, quick moving tasks where early finishing is attractive. The choice of technique for procurement relies on a high level of certainty and faith. There is no definite contract cost before the work begins at construction place, and the choice to proceed more often than not needs to be tackled the premise of an assessment. Contractual operators are the specialists of the customer, and ought to accordingly put their intrigues first all through the venture. (Porter, 2010)

A construction procurement procedure can be created for a solitary venture, a system of undertakings or an arrangement of activities to recognize the most ideal method for accomplishing targets and worth for funds, at the same time as considering dangers and limitations. Construction procurement procedure is the mix of the conveyance managing system, contracting game plans and procuring game plans for a specific procurement. It requires that various decisions produced using the accessible alternatives and these can be utilized to interpret a system or an arrangement of ventures into a progression of bundles for conveyance under a solitary contract or a bundle request issued as far as a structure understanding. Decisions are made by venture goals, in particular the purpose behind carrying out the task and in addition more extensive social targets.

It is favourable position to name the management contractual agent at early stage, so that their insight and mastery are accessible to the design group all through the preconstruction period. Much of the point by point designing work can be left to continue separately with the site operations for some work bundles, along these lines lessening the time required before the task begins nearby. The customer has an impressive level of adaptability on design matters. The design can be balanced as construction continues, without relinquishing cost control. (Haskell, 2011). Venture goals should be converted into procurement goals. Procurement goals may identify with either the deliverance of the item (essential targets) or what can be advanced by the deliverance of the item (auxiliary goals). Essential targets regularly
identify with spending plan, plan, quality/execution, rate of deliverance, ecological/wellbeing and security perspectives, buildability, connections (e.g. long lasting relationship, early temporary worker inclusion, combination of configuration & construction and so on.), customer association in the construction task, end-client fulfilment & support and working obligations. The secondary goals ordinarily identify with the advancement of manageable improvement goals which usually identify with the targets including:

- Easing and diminishment of destitution,
- Minimising of the destructive impacts of advancement on the local surroundings,
- Foundation and fortifying local construction resources and strategies,
- Advancement of construction innovations that build job, and
- Advancement of expanded utilization of ecologically solid products, construction resources and building advancements.

Likely issues, and wider implications to the client described above in procuring the building.

Construction procurement exercises help the customer in acquiring skilled building facilities. The architect will get ready proposals or demands for proposition or capabilities and backing the choice, transaction, and contract granting procedures. In many undertakings construction procurement outputs are bundled with different architectural facilities, for example, outline, construction reports, or building contract facility. (Dreher, 2011).Customers at times regard construction procurement as a distinct administration, in any case. In traditional method, this decision had been based upon the undertaking, yet nowadays the need for construction procurement facilities is expanding with the inclination for optional deliverance strategies, for example, construction facility and design. The expansion in construction cases and suit and the related patterns for expanded control of expense and quality have put further stress on the construction procurement procedure. Customers need to guarantee that construction–contracting agents are very much skilled, that
facilities are acquired for practical price, and that their venturing contracts are structured rightly to minimize the potential for unreasonable changes and postpones. (S.Adams, 2009). According to the Chartered Institute of building (2010) the committed six categories are the selection criteria for taking up the procurement strategies for any construction project.

- Leadership of client
- Quality of design
- Integration & procurement
- Health and safety
- Sustainability
- Commitment

(COIB, 2010)

Some major issues linked with present general procurement directives include.

Tender necessities customized to go well with a particular, national, supplier; or pressurizing the suppliers to utilize locally available sub-contractual agents;
- Too legalistic ways to deal with communal procurement;
- False rivalry where universal biddings are welcomed yet there is small aim of granting a contract to a non-nationalized business;
- Segregating contracts into little parts to stay away from point by point procuring regulations

(Morton Ross, 2008)
- Value compressing’ to make the remote rivalry out of a business sector, especially when the govt. has a significant stake;
- Preference to countrywide suppliers even when the remote bidders are accepted to present improved worth for cash;
- Coaching flourishing bidders on the site of industrializing for a contract.

Though procurement is a part of a project but it is the heart of project which can play the major role for profit and loss. So procumbent strategy is one of the main pillar successful completion of the project.

The importance of procurement in a project cannot be underestimated – an overwhelming majority (87%) believe good
procurement to be synonymous with a successful project” (COIB, 2010)

Table 1

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Procurement route</th>
<th>Cost/Price</th>
<th>Design</th>
<th>Execution/Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Price certainty</td>
<td>Fee Levels</td>
<td>Multiple work suitability</td>
</tr>
<tr>
<td>1.</td>
<td>Traditional</td>
<td>Very Good</td>
<td>Medium</td>
<td>Not suitable</td>
</tr>
<tr>
<td>2.</td>
<td>Design and Build</td>
<td>Very prominent</td>
<td>Average</td>
<td>Suitable</td>
</tr>
<tr>
<td>3.</td>
<td>Management Contracting</td>
<td>Poor</td>
<td>Poor</td>
<td>Very much suitable</td>
</tr>
<tr>
<td>4.</td>
<td>Alliance/Frame work agreement</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>5.</td>
<td>Construction Management</td>
<td>Poor</td>
<td>Medium</td>
<td>Good</td>
</tr>
</tbody>
</table>

Specialist driven Contracts - **Traditional Contractual Arrangements**

It is the entire procedure of selecting the contractual worker to complete the job (tendering), and embracing an appropriate way to decide the cost or the price-decision technique for the construction job.

Specialist driven Contracts - designing & building Contractual Arrangements

It is a course of action where the owner utilizes a contractual agent for designing and construction of the venture. Whole of the designing task, managing and constructing are completed by the contractual agent. (Grahame, 2011).

Customer driven Contracts - Project management Arrangements (Frame work agreement)

The Project management is characterized as ‘the general plan, control and harmonization of a task from beginning to fulfilment in good time, inside of budget and to the essential quality norms’. It is in this manner arranged to deal with the customer’s demands from a client or an engineer’s
Management Contracting
In the method of Management contracting, the management contractor wholly dependent with the works contractors, and works contractors are contractually accountable to the management contractor. The Management Contracting procurement route is not suitable in terms of following points
- If the client is not experienced.

The vital point of this method is that, the quality control can be driven by the design team. So in terms of Design, quality may be compromised by the design team. (Webster P., 1990).

Construction Management
The construction managers undertake to carry out allied works through the trade contractors. Eventually these trade contractor’s works under the construction manager. In the terms of risk, client retains the contract risk of bad-performance of the trade contractors. The client is responsible for the performance of design team. (McGavey, Schelesinger, Shephard, & Winetrobe, 2015).

Research method and data presentation
The current study tends to adopt the triangulation approach including the combination of literature review information with regards to procurement strategies, including both the quantitative and qualitative data (Parnphumeesup and Kerr 2011). The reason to choose a triangulation method for the current study is that triangulation method can help in gaining the inclusive, holistic and contextual representation of the variables of the study. Using a combination of qualitative and quantitative method will provide an in-depth insight into the current procurement strategies widely used in construction industry.

In order to determine the sample size, following equation was used:

\[ n = \frac{196^2 \times \sigma^2}{E^2} \]

Where, \( n \) = Sample
\( 196^2 = 95\% \) Confidence Level
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\[ \sigma^2 = \text{Standard deviation} \]
\[ E^2 = \text{Rate of Error} \]

\[
n = \frac{196^2 \times 20^2}{3.84 \times 400} = \frac{1536}{16} = 96
\]

In order to collect data through the survey, a closed-ended questionnaire was designed for the survey. Each 96 industry professional was sent questionnaire through email. However, only 50 questionnaires were returned. Moreover, the background of the respondents was used to determine their roles and responsibility in managing the procurement. To attain the relevant outcomes with regard to conflict management strategies, the researcher waited for 6 months prior to starting the analysis of the questionnaire. Likert scale was used where respondents respond to the questions by using the scale 1 to 5 with a minimum value of 1 and maximum value of 5. The researcher designed the structured questionnaires as the main instrument for data collection.

3. Critically evaluate each method:
   - The two principle procurement methodologies (all together of utilization) are conventional, design and build.

3.1. Conventional / Traditional:
   Traditional procurement in the customary methodology, the business acknowledges that outline work will by and large be different from construction, specialists are designated for configuration and cost control, and the contractual worker is in charge of doing the works. This obligation reaches out to every workmanship and equipment, and incorporates entire tasks of the subcontractors and suppliers. The contractual agent is typically named by aggressive tendering on complete data, yet may if fundamental be named before by transaction on the premise of halfway or estimated data. The customary strategy, utilizing two-stage tendering or arranged tendering, is occasionally alluded to as the ‘Quickened Traditional Method’ – this is the place the outline and construction can keep running autonomously to a constrained
degree. Whereas this permits an encouraging start at the construction spot, it likewise involves less sureness regarding expense. There are three sorts of agreement under the customary procurement strategy:

1. Singular amount contracts - where the agreement’s whole amount is decided prior to construction’s beginning, and the sum is entered in the contract.

2. Estimation contracts - where the agreement amount is precisely recognized on culmination and after re-estimation to a particular approved manner.

3. Expense repayment - where the agreement total is decided as per the real expenses of workers, plant and resources, to which a charge to cover expenses and gain is additional. (Uyarra and Fnanagan, 2009).

Construction depends on the designing by the customer and this is the most widely recognized technique for construction procurement and is known and reputed way. In this course of action, the modeller or architect goes about as the undertaking facilitator. His part is to plan the constructions, set up the patterns and to create construction diagrams, regulate the agreement, let out the tasks, and deal with the works from initiation to finishing. There are immediate contractual connections between the customer and engineer (designer) and the customer and fundamental contractual agent. Any subcontractor will have a direct contractual association with the principle contractual agent. The contractual agent works to a characterized extent of work usually charged with the estimation units or at a decided cost amount as a whole. The customer stays in charge of the design and the execution of experts as per the construction contract. (Uyarra and Fnanagan, 2009).

The customer designates a design group, with an inspector in charge of money related and contractual counsel. A building contractual worker is designated, typically after a procedure of granting the tender (bid), and generally taking into account one of the standard types of agreement, to do the construction. (Jackson and Prince, 2012)

The bidding procedure can be found on complete design data or incomplete design data in addition to temporary direction if there is a need to begin a premature construction.
3.1. Advantage of conventional / Traditional method
- Widely used method, so building consultants and contractors are habituated.
- Tenders are on a like-for-like basis.
- All standards are easier to monitor.
- Early commitment to maximum price.
- The role and responsibilities of contractors and consultants are well understood.
- The client has full control of design team;
- There is because of direct reporting by the design team to the client, the quality control is well managed

3.1.2 The principle benefits of utilizing a traditional way to deal with procurement are:
- Responsibility because of a competitive choice;
- Aggressive value as each of the tendering contractual workers offer as per the same premise
- Designing guide, the clients and the customer can have an immediate impact which can encourage huge usefulness and enhance the excellence in the general designing
- The fixation of price at the grant of the agreement
- The changes to the agreement are moderately simple to plan and oversee; and
- An attempted and investigation strategy for procurement which the business sector is extremely acquainted with.

The fundamental drawbacks of utilizing a traditional way to deal with procurement are:
- It can be a suitable procedure to deliver the full contract documents.
- Tenders files from an inadequate designing can be created yet can cause less expenditure and time sureness, and might cause clashes.
- General undertaking length might be longer than different procurement strategies as the procedure is successive and construction can’t be started before the culmination of the configuration; and
- No information into the configuration or arranging of the venture by the contractual worker as they are not designated in the designing phase. (COIB, 2010)

3.1.3 Use of traditional procurement
As per Construction Management and Economics (2010), The Traditional procurement ought to be utilized once:
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- a system permits adequate time;
- expert configuration is justified;
- a customer wants to delegate planners and contractual workers independently;
- fixation of price is needed before the beginning of construction;
- item quality is necessary; and
- at parity of risks is to be set among the customer and constructor

(Construction Management and Economics, 2010)

Contractual Relationship:

Figure 1
Contractual Relationship in traditional procurement route

Figure 2
RIBA member’s online survey, 2012
In terms of cost, there may be certainty of price (when the work is properly designed in advance) and priced BOQ provide a basis for variations to be priced at tendered rates, sometimes the contractor may quote price to win the job rather than providing a price that realistic price that the work to be carried out and this can develop further claims trend if the submitted price was too low as per the market rate.

In terms of quality, the client holds all responsibility of control of design team. So design team directly report to the client to ensure that quality control is maintained. In this case there is a chance of over-design and/or over-engineering.

In terms of time, more or less fully designed approach is more effective for traditional approach. In case before tendering, if the design is not fully completed, this can lead to the ‘design as being built’ process, which can be due to delays on the site programme period.

3.2. Designing and build:

The contractual worker both plans (finishes the plan) and works as indicated by the business’ updates and particulars. This permits the contractual agent to utilize its skill to decrease the expense of the building, without influencing the quality to the customer. This is once in a while alluded to as "turnkey" when the contractual agent likewise buys the spot and/or works from the site. It is utilized on around 25% of tasks, as per the NBS Survey (2012), so it is altogether less than the utilization of a conventional procurement procedure, however about ten times extraneous than any of the option management-based procuring strategies. (Webster P., 1990)

Designing and building comes in a wide range of pretences. The degree of the "design" completed by the business’ group decides the extent of design obligation which the contractual agent will embrace: Designing has been characterized as concocting a course of action, then determining the elements required to understand that game plan, and ultimately enumerating a technique for joining or raising those elements. Designing can be the general idea or type of the construction, it can identify with the segment parts together with pro establishments, or can be the consequence of conference indicated criteria for sturdiness, execution etc."A design
and building contractual agent can continue from blueprints, idea design or point by point details (Aho, Cornu, George, & Subria, 2010).

Hence the contractual agent may get a tender (bid) as per the complete design and construction roles or for building up the data given by the customer’s designing group. This can (and ought to) influence the contractual agent’s design commitments in the fundamental contract (Osipova, 2008).

"In this procurement procedure:
- the contractual worker’s risk for design might be restricted by the provisions of the agreement, in this manner invalidating or lessening the idea of the contractual agent being the only point of obligation for designing and building;
- The customer needs coordinate control onspecified parts.
of the design, thus on quality also

- The customer gets advantage of the contractual worker’s
  skill in buildability (Construction Excellence, 2014)
- The customer needs an autonomous contract manager to
  ensure his needs amid the completing of the works, has no
  cost specialist to help with assessment.
- The contractual worker assumes additional liability for
  fulfilment to time;

One noteworthy advantage of this sort of procurement is
that the dangers connected with giving the facilities are
exchanged to those who have the maximum capacity to deal with
those risks. To accomplish the venture’s aim, the yields that
the service is proposed to convey (as an after-effect of the
advancement) has to be characterized at the beginning phases
by the customer.

3.3. Management Procurement method

As per Tooley et al., (2011) Quite a lot of alternatives of
management procurement ways are present, which incorporate
- Management contracting,
- building managing and
- designing and managing

There are a few unpretentious contrasts among these
procurement techniques. On account of management contracts,
the contracting agent has straight contractual connections
with every one of the tasks contract based workers and is in
charge of the entire construction job. In construction
administration, a contractual worker is compensated a charge
to competently oversee, build up a system and direct the
outline and construction exercises, and to encourage joint
effort to enhance the undertaking’s constructability.

3.3.1 Strengths and weaknesses of management procurement

The key benefits of making use of a management technique
to procure are:
- the customer manages single business, which empowers
  enhanced harmonization and joint effort in the middle of
design-makers and constructors;
- Potential for saving the efforts & times for the general
  task as outline and construction exercises are overlying;
  (COIB, 2010)
- under a designing and managing structure, the temporary
worker accepts danger and obligation regarding the reconciliation of the designing with building;
- works bundles can be carried out aggressively at costs that are present;
- enhanced constructability by constructor contributed into the outline;
- responsibilities, dangers and roles regarding all teams are understandable; and
- adaptability for alterations in outline.

The fundamental drawbacks of utilizing a management way to deal with procurement are:
- Fixation of price is not accomplished until the last works bundle has been allowed
- Educated and positive customer is vital.
- poor fixing of pricing
- close time and data control is needed
- customer must give a decent quality update to the outline group as the configuration won’t be finished until assets have been focused on the task (Construction managing and management contracts); and
- Customer has no direct control of outline quality which is impacted by the constructors (planning and overseeing).

3.4.0 Frame work agreement

Partnering is one of the modern procurement method. It is a method that fosters sound relationships between all the involved parties and allows for better results come the end of the project. The Holyrood project was a massive one, and given that the government was the one behind the construction of the said facility, it had its hands on some good money for the activities of the project, and it also did know people who had established themselves. These could have been contractors and architects who were good at what they do, and people who could be trusted with the project. Partnering with them would have allowed the government to lock out any other contractors who had ill intent when it came to the project, and it could also have allowed for sound planning of the project. This would, in turn, have translated to fewer changes in the course of the project, something that would have saved the government and the people of Scotland a lot of time and money as well. (Rashvand, Majid, Yahya, Zin, & Zakaria, 2013)
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The above procurement method is all about the right relationships, the right approach to doing business and handling massive projects. It is often suited for projects that are bound to run for a long time, and it allows for the efficient service delivery of the involved parties, all while meeting the said requirements with regards to the quality of the project and the time that has been allocated for the same. This is often a long-term relationship between the contractors and those behind the project. It is based on trust, and a track record that the contractors may have maintained over the course of their doing business with the government. With this procurement method, the government could have maintained its costs at an all-time low, and possibly, the time that went into constructing the structure could have been lessened significantly. In addition, with the all, this method route also very effective in terms of risk sharing. (Simpkins, 2013)

This procurement method is very strongly focused on the win/win principal. This procurement method encourages effective completion and help to obtain the goods and services, with the emphasis being on the value for money. It is a method that solely relies on procedures and that happens to be both an advantage and a disadvantage. Some people feel that this method is not that suitable for large and complex projects, and this is due to the intense focus that is laid on the output process as opposed to the stringent obedience to the standards that ought to be met.
4. **Suitability of two most uses procurement methods:** —

In particular, the Procurement System for Construction supports:
- choice of fitting procuring and contracting systems, and deciding on a suitable key in contracts
- groundwork of tender’s reports and contracts in view of model structures
- choice of contractual agents and specialists with great execution in past
- successful management of contracts, including clauses, test letters and agendas
- upholding of a powerful performance management framework by reviewing and reporting
- declaration of contractual arguments and clashes

Selection of Procurement route is a very important part to make a project successful. The construction of project where client (trust body) constructing a spectacular new concert hall in the budget of around £70m, partly funded by the national lottery, has many options for selection of a procurement route. Out of widely common used procurement route, Traditional and Design and Build are the suitable options for the client are procurement route. (COIB, 2010)

<table>
<thead>
<tr>
<th>Procuring Way</th>
<th>Benefits</th>
<th>Drawbacks/</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional Contract</strong></td>
<td>Control on the procedure and Quality of Designing</td>
<td>Design has to be complete prior to tender process</td>
</tr>
<tr>
<td></td>
<td>Cost firmness at point of employing the service provider/ contracting party</td>
<td>Extended timescale</td>
</tr>
<tr>
<td></td>
<td>Customer keeps hold of nonstop contractual rapport with experts and chief Contractor</td>
<td>Contractors face lesser risks</td>
</tr>
<tr>
<td><strong>Design and Build</strong></td>
<td>Shifts the risk to Contractor for building deliverance &amp; design improvement</td>
<td>Customer has less control on the quality for designing and risks for expenses</td>
</tr>
<tr>
<td></td>
<td>Cost conviction</td>
<td>Alterations by customer are unsuitable—serious cost fines</td>
</tr>
<tr>
<td></td>
<td>Program is smaller in duration</td>
<td>Customers’ needs have to be entirely exhaustive prior to signing of the Contract</td>
</tr>
</tbody>
</table>

(Froud, 2003)
5. Conclusion

In the wake of researching the conventional procurement strategy, it was seen that customary technique is the most appropriate approach to be applied in this venture and would fulfil every one of the needs of the customer. It is essential to think about the possible issues turning out to be actual and rising up out of the beginning of the construction to the consummation of the building. Obviously, the dangers of utilizing traditional strategy have been considered. The arrangements were additionally examined.

By designating distinctive expert teams for various rationales, those advisors and temporary worker with an extensive variety of abilities could help to construct the new building which is agreeable to customer’s advantage. Aside from the arrangement of various teams, it is additionally vital to pick appropriate gatherings taking into account various standards by utilizing two phase specific tendering. Specialized and business components are a few criteria which have to be considered. Along these lines, this procedure is exceptionally appropriate for customers who wish to reduce their contact with the dangers of extravagance, defers or flaws.

References:

ARCHITECTURE,
CONSTRUCTION AND DESIGN