



EXPLORING THE CHALLENGES OF PROCUREMENT IN HIGH-RISE CONSTRUCTION: A LITERATURE REVIEW

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Abstract

Any construction project's performance depends critically on the selection of the procurement method. Additionally, the choice of procurement method made by businesses in the construction sector determines a significant portion of their overall profitability and is crucial to the success of any building project. Construction firms evaluate several procurement methods and select the best one depending on critical characteristics such as available technology, money, topography, labour availability logistics, weather and services being rendered by vendors, suppliers, consultants. It's critical to understand the roles played by the parties involved in the building sector before examining the different types of procurement. A construction project typically involves five tasks: design, build, management, finance, and operation. Furthermore, the main parties involved in a construction contract include the Client, Consultant, and the Contractor, The conventional procurement framework has been in presence since the development of the building construction. It has worked its way up to the mark since its inception. However, in recent years, large and sophisticated undertakings have proven difficult to manage. The analysis of procurement frameworks and project success is intended to improve the viability of project procurement. Furthermore, hardly no research has been conducted in India to determine the relationship between procurement and project success or failure. This investigation fills this void because the use of its findings can improve and extend success in the Indian building business. The goal of this study was to investigate the effect of a procurement framework on the success of building jobs. Four significant discoveries were made as a result of the literature research and the investigation of the study findings, as follows. To begin with, despite its multiple limitations, the traditional procurement framework remains the most well-known and connected structure in the Indian construction business.

Keywords: *Procurement Process, Construction Project, Procurement framework building construction, Project Management.*

I) Introduction :

1.1 General: A procurement system is "an organisational system that assigns specific roles and authority to people and organisations while also defining the various elements in the construction industry." It is applicable not only to established market dynamics, but also to the development of construction industries in countries that are less developed. The procurement system assists the organisation in competently and professionally managing the procurement process in the construction industry. The system can assist an organization to achieve a successful outcome for their project with necessary guidance and support (Bhambulkar et al., 2023). It will also control the risks involved in the construction industry and minimize the cost variation problems. The procurement system in construction industry is useful in following ways:

- It helps in preparing tender documents and contracts.
- Selection of contractors and consultants based on their earlier records.
- This system includes a checklist for effective maintenance of the contract.
- It increases the efficiency and effectiveness of the management system by constant monitoring and reporting.
- The disputes arising are resolved with the help of this system.

Procurement advises on an acceptable contracting strategy, providing and preparing bidding papers, selecting experts and contractors, contract organization, and avoiding superfluous conversations.

1.1 Significance of Procurement System:

The goal of the procurement system is for successful implementation and

completion of the project. Some of the objectives are mentioned below:

- Enables best decision making in purchasing.
- Automated processes reduce cost, time, and resources.
- Procurement management helps companies achieve their goals by reducing expenses.
- Ensure project performance in terms of Time, Cost & Quality.
- Streamline processes, reduce risk, address schedule changes, adhere to budgets, and improve communication.
- Controls construction related dispute.

II) Literature Review: The past researchers research in all aspects is covered in this literature review.

a) Importance of Selection of Best Procurement Process

Abhijit N. Bhirud (2020) The research paper speaks about the importance of Quality Assessment aspect in high rise building constructions being taken up in Pune. The paper throws a light on consideration of exact quality requirement criterion & expectations during the design & procurement (i.e., tendering) stage in order to set up the expectation about end product quality (Vaibhav Prabhakar Mestry et al., 2023). The author emphasized the importance of Quality aspect whilst design & tendering stage as it develops a system with clearly defined strategies and practices to ensure that the end product meets or exceeds the project-specified quality requirements. The quality parameter is vital in high-rise building construction projects because it ensures that the project is completed within the budgeted time frame and with the best

possible resources. A adequate financial budget has been established for scheduled construction operations in order to reduce critical components influencing the quality of high-rise buildings. The author placed a strong emphasis on the expectation and implementation of the Project Quality Assurance plan in a structured manner by optimistically utilizing Manpower (Technical & Non-Technical), Machinery, Money (Project Budget), and quality Material to achieve project success within the Time Cost & Quality frame.

Mohammad Wahaj (March 2017) Although most clients and consultants know about the management and integrated works procurement frameworks, the conventional building procurement framework is still the best known and the most broadly utilized as a part of the Indian construction industry. This is on the grounds that it is comprehended by most client and they know their monetary responsibility on acknowledgment of the prescribed contractor's tender sum. Notwithstanding, the division of the design and construction process tends to encourage a 'them and us' state of mind between the clients and the contractors, which lessens the solidarity that is key for the fulfillment of client's development objective. The accompanying request includes the three primary essential achievement factors of any procurement framework: project production, project duration, and design quality. Most clients and their project team do consider all building procurement frameworks when beginning another project on the grounds that most respondents additionally trust that there is a relationship between building procurement framework and project success, in any case, the customer framework is chosen generally times (Bhirud, A. N., & Revatkar, B. M. ,2016) . The determination of a suitable building procurement framework adds to the

achievement of client's targets as for Time, Cost and Quality for construction project, subsequently, extend success. Integrated procurement frameworks will just work if project members see how to make it function and need to make it work.

Per Erik Eriksson (2013) The construction projects are most widely characterized by high complexity customization and uncertainty coupled with long duration. The aim of this paper is to examine how procurement process selection influences project performance. The study creates a testable procurement model for collaborative procurement methods. The construction sector is a major element of the economic spinal column in many nations, accounting for 7-10% of GDP. Procurement procedures is one factor improvement area and can contribute sustainability to project success(Bhirud, A. N., & Vasant, K. G. ,2015).

Laura Pekuri (2012) Problem of procurement may be in the fields of economics as well as engineering and construction management. Some words as budget, weak productivity, customer satisfaction, schedule delays. There are some implement technologies that are developed in the construction industry. It has been acknowledged in previous research that the clients can have a vital role in the way of construction industry. The problem of procurement in the economics sector is a lack of the cost of market information of items and also related to the uncertainty of design of project. Tadlis (2005) recommends that procurement problems should be essential after the project begins.

Shamil Noumn (2003) stated that various procurement procedures for projects like management contracting, project

management and design build over three decades. Researchers have investigated the standard of their selection and performance in terms of Time, Cost and Quality. In this paper it is inspect about the lean construction, supply chain, buildability, sustainability, and value management. It is important for construction management that a project may be successful if the building is completed as scheduled within budget with quality standards as well as attaining a high level of client satisfaction. A procurement system is an organized system that allocates responsibilities and power to people and organization structure (Isasare, A. S., & Bhirud, A. N. ,2018).

Love. P (1998) From the starting point of the project clients want to ensure that they can attain the solution they require within their established budget and by an acceptable date in the future. This may be best achieved if the client tries to find independent advice on these matters from the commencement stage of the project from an experienced construction professional, such as a consultant project manager (Patil, R. N., & Bhambulkar, A. V.,2020). In meeting the essentiality of the business case, where there is particular target on building function or running costs, or speed to completion or capital cost, an experienced liberated project manager can range these needs to an appropriate procurement strategy.

Al-Bahar And Crandall (1990) A successful project outcome depends on the development of a procurement strategy that defines and prioritizes the main project goals, considers risk factors, and specifies how the process will be organized (Al-Bahar and Crandall, 1990). Clients that choose to construct are always faced with a significant amount of risk since building projects are unique and personalised. These hazards include

finishing a project that does not fulfil the functional requirements of the company, delivering a project later than anticipated, or costing more than the customer can afford or fund. All of these hazards may collide with the client's primary business.

b) Analysing the Problem of Procurement in construction

Laura Pekuri (2014) analyzes whether the current conceptualizations of the problem of procurement are supportive of the LC view of construction projects as temporary production systems with the goals of transformation, flow and value generation. Firstly, two prevailing conceptualizations of the problem of procurement were presented; problem perceived as ex-ante information asymmetry related to construction costs and as ex-post adaptation due to uncertainties in the moment of signing the contract. Then these conceptualizations were analyzed through the lens provided by transformation-flow-value theory of production. The conceptualizations of the procurement issue that come from the domains of economics, engineering, and construction management were shown to be ineffective at directing procurement towards creating project delivery systems that could support all three viewpoints of production. It was suggested that the focus of procurement should be shifted away from the procurement situation itself in order to be more supportive for the production system to operate towards flow and value in construction projects.

R. E. Smith (2011) During these transitions, the client's role has evolved from that of a passive fund provider to that of an increasingly active participant and hands-on to management in some of the procurement agreements.

Water R. Jr. (2011) the management and arrangement of the project requirements and design are two main factors that

determine all subsequent procurement activities.

Morledge (2006) The acceptance of an appropriate project team to convey a project at the right time, for the right cost given the affect strategy is a vital role for the client, who again should take independent advice (*Morledge et al., 2006*). Superior results are obtained throughout the project team selection process when 'value' is evaluated in addition to the price for the service being supplied (Holt et al., 2000). Procurement strategies that allow for a high level of integration and communication among project team members are deemed ideal (Bhirud, A. N., & Revatkar, B. M. ,2016).

Petrick F. (2006) Construction management has been widely used in U.S and sometime in Australia. It is new procurement method for Asian countries. This system is based on an arrangement where a client appoints a Construction Manager (CM) on a fee basis to manage and co-ordinate the design and construction of a project. This paper examines the role of a Construction Manager (CM). It analyses the structure, responsibility of parties involved. Increasing complexity of buildings, there is need for a financial planning, need to reduce design and construction periods. Tam (2000) the buyer may use a simple option contract that essential suppliers have to pay an up-front fee. However, this may not be realistic if the firms have restricted liability or liquidity compel, so the buyer cannot charge considerable entry fees.

Kerzner (2001) Client requires the construction of many different facilities, (for example, structures, dams, streets) for different reasons. What is normal to all clients, notwithstanding, is that they require their activities to be finished interior determined time, budget and particular quality guidelines all together for the finished project to be satisfactory or

not or fit for use by the client or proposed end client.

c) *Construction Project Procurement Management*

P. Gopalakrishnan. (2014) Management methods can be used to complete construction projects. Planning, organizing, executing, monitoring, and controlling are examples of these procedures. The three interconnected aspects of time, money, and quality must be monitored and handled during each building project. For projects to be completed effectively, all resources must be properly managed. Materials management is supposed to increase productivity, resulting in cost savings. Procurement is the acquisition of commodities or services for the organisation at the lowest feasible ownership cost, in the proper quantity and quality, and at the suitable time and place(John, B., Khobragade, N., & Bhambulkar, A. V.,2023). Various challenges happen in material procurement at various phases of the project's life cycle, and the reasons of these difficulties are documented in the material procurement management system of the contracting organisation. Because materials are a major expense in construction, cutting procurement prices enhances the likelihood of lowering overall project costs.

Laura Pekuri, A. P. (2014) Clients have a crucial role in resolving the persistent issues facing the construction sector. The procurement processes used by the client have an impact on how a construction project is carried out because they change how the project delivery system is structured. For example, fundamental presumptions about the purpose of procurement will determine what kinds of procurement practices are considered sensible. In this study, the conceptualizations of the procurement

problem as it is currently understood by economists, engineers, and construction managers are examined.

Aki Aapaoja, H. H. (2013). Construction is presently being carried out in very demanding and sophisticated built contexts, with projects being carried out by coalitions of multiple stakeholders with competing interests, goals, and socio-cultural backgrounds [Loader, K. (2010)]. These efforts have challenges not just in locating and managing stakeholders, but also in addressing their demands. This research provides a framework to assist project managers with stakeholder management and requirement engineering, particularly at the project start phase [McCrudden, C. (2004)]. The framework optimises the value generation of the project through stakeholder identification, classification, and requirement engineering. The framework is also being used in two construction projects.

Paul Hong, H.-B. K. (January 2012). Businesses are focusing on procurement management in order to preserve a sustainable competitive edge in these difficult times. In today's dynamic market environment, the focus of procurement has evolved from short-term cost reduction to long-term value development and delivery, placing it as a critical integrative corporate function. In this paper, we evaluate a substantial corpus of procurement research and provide a methodology for hypothesising shifting patterns in firms' strategic procurement practises. This study of procurement management papers from major journals shows how the discipline has evolved from specialist functional emphasis to more integrative and strategic approaches. This article outlines the procurement literature in terms of its key components and emerging tendencies (Jadhav, O. U., & Bhirud, A. N., 2015).

NILSSON, E. (October 2012). This article explores the many ways to contracting for

infrastructure building and maintenance. The requirement to manage for user costs throughout an asset's life cycle is proved to be a critical part of contract design. The more likely it is that a particular problem in the present infrastructure may be solved in a variety of ways, the more strongly the tendering agency should examine novel design options such as performance contracts of Public Private Partnerships. It is also established that contracts that include both building and later maintenance must include bonuses and penalties to compensate or penalise the entrepreneur for delivering (or failing to supply) suitable infrastructure quality.

Hackett, M. Robinson, I., & Statham, G. (2007). Another advantage of the D&B contractual technique for the owner is that the project may frequently be finished in less time than with the usual three-party arrangement since work can begin before the whole designs and specifications are finalised. The time savings arise from planning the project in phases such that the contractor may begin work on the first phase of the project while the latter phases are being developed [Hankinson & Knutson, 2001]. This subsection is added to connect the aim with the purpose for studying this research. Before proceeding with the comparison, it is required to review the highlights of the benefits and downsides of the D&B contract procurement technique as stated by Hankinson and Knutson (2001). Even if the price of the design/build contract is likely to be relatively certain, extreme caution is required if increases in the cost of the work are contemplated in the contract, because violations in this type of situation will be more difficult to detect by the owner and its staff, and control will be far more difficult than in a traditional contract.

Chitkara K K (2005): Procurement Management encompasses the processes required to purchase or obtain items, services, or results from sources other than

the project team. Contract management and change control processes are required to create and handle contracts or purchase orders issued by authorised participants in the project. Project Procurement Management additionally encompasses the administration of any contract issued by an outside organisation (*the buyer*) to acquire the project from the performing organisation (*the seller*), as well as the administration of contractual duties enforced on the project team by the contract.

III) Summary: The primary objective of procurement definition is to specify what things will be acquired and under what conditions. Items that must be purchased for a project can occasionally be manufactured internally by an organisation. Additionally, procurement deadlines are typically determined by the project timeline and must be met by specific dates to ensure the timely completion of the project. These elements must be described, justified, and the requirements must be provided in this section. Any critical technical details should also be included. Individuals with responsibility may also be appointed to approve purchases in addition to or in the absence of the project manager. "A procurement system is an organisational system that allocates specific responsibilities and authorities to people and organisations and describes the relationships of the various elements in the construction of a project."

IV Conclusion

Procurement in the construction sector should be driven by major considerations such as time, cost, and quality. Procurement selection parameters are based on performance enhancements, and various procurement methods are used to minimise procurement-related challenges such as economic issues and construction management issues. Procurement in

construction sector is a primary and vital need of construction after the planning and designing process. In different procurement methods like construction management procurement method, management contracting method, traditional method, and E-procurement method, we analyze that the best method E-procurement and construction management method in which E-procurement most widely used in India. After analyzing both methods, E-procurement is a time saving method and it provides better efficiency.

References:

- 1) Abhijit N Bhirud, "Quality Assessment Factors for High Rise Buildings, Pune City- Review Paper", International Journal for Research in Engineering Application & Management, Vol-06, Issue-04, Page-218-232, July 2020
- 2) Yusoff, M. I., "The Behavior of Procurement Process as Described by Using System Dynamics Methodology", Hindawi, Vol: 2018 , Article ID 6721912,. April 2018
- 3) Mohammad Wahaj, S. D. , "A study of project success and procurement frameworks in Indian construction industry", International Journal of Civil Engineering and Technology, Volume 8, Issue 3, pp. 167–174, March, 2017
- 4) NgamMinchuan, Sivadas Thiruchelvam, Lee Choon Yong," A Conceptual Framework for Procurement Decision Making Model to Optimize Supplier Selection. ICARET , IOP Publishing IOP Conf. Series, Vol-32, Issue- 012034, Aug, 2016
- 5) Bako, S. S., "An Overview of Procurement Methods and Techniques for Effective Delivery of Construction

- Projects”, *International Journal of Advanced Research in Engineering*, Volume: 2 Issue: 3, Page: 06. July, 2016
- 6) Borg, L., “Procurement Contracts, Innovation and Productivity”, *Building & Real Estate Economics* Department of Real Estate and Construction Management School of Architecture and the Built Environment KTH Royal Institute of Technology, Stockholm, May, 2015
- 7) Marika Tuomela-Pyykkönen, K. A., “Procurement in the real estate and construction sector”, *Science Direct, (RECS). ELSEVIER*. Retrieved, Vol: 8th Nordic Conference on Construction Economics and Organization, Pages-264-270, Sep, 2015
- 8) Aki Pekuri, Laura Pekuri and Harri Haapasalo, “Business model and project selection in construction companies”, *Construction innovation*, Vol-15, Issue-2, Pg-180-197, Nov 2015.
- 9) Aki Aapaoja, H. H., “A Framework for Stakeholder Identification and Classification in Construction Projects”, *Open Journal of Business and Management-Scientific Research*, Volume-02, Pages- 43-55, January 2014.
- 10) Erik, E. P., “Effect on procurement on Construction project performance”, *Division of Entrepreneurship and Industrial Organization Luleå University of Technology 97187. Luleå, Sweden, May, 2013*
- 11) Paul C Hong, H.B. K., “Strategic Procurement: A Review and Prospect”, *International Journal of Procurement Management, ICRESAT*, Vol. 5, No. 4, Pg-452-469, January, 2012
- 12) R. E. Smith, A. Mossman, Stephen Emitt., “Lean and integrated project delivery”, *Special Issue- Lean Construction Journal*, pp.- 1-16, Jan 2011.
- 13) Albert P C Chan, Daniel W M Chan & Kathay S K Ho, Feb, 2003. “An Empirical Study of the Benefits of Construction Partnering in Hong Kong”, *Construction Management and Economics*, Volume: 21 Issue:- 05, Pages 523-533, May 2010.
- 14) Morledge, R., “A review of the value of the main contractor,” in *Proceedings of the Construction and Building Research Conference of the Royal Institution of Chartered Surveyors (COBRA '08)*. *Construction and Building Research Conference journal London, UK, September 2008*
- 15) Patrick, F., New York., “Multi-Project Constraint Management: the “Critical Chain” Approach”. In: Dinsmore PC, Cabanis-Brewin J. (Eds.), *The AMA Handbook of Project Management.. Amacom American Management*. Pg-45-53, Feb, 2006
- 16) Kerzner, H., “Project Management: A Systems Approach to Planning, Scheduling and Controlling.. New Jersey: John Willey & Sons publications”, Volume-10th, Pg- 839-868, July, 2006
- 17) Noumn, S., Charles Egbu, “Critical Review of Procurement Method Research in construction journals”, *Procedia Economics and Finance*, Vol-21, Pg-6-13, May, 2003
- 18) Figgins L, G. D. G. M. S. D. S. B., USA;. Unpublished graduate research paper on Oracle vs. SAP in E-procurement. *Duquesne University, John F. Donahue Graduate School of Business.. Pittsburg, Publications, Sep 2001*

- 19) Tam, C. M., 'Design and Build on a Complicated Redevelopment Project in Hong Kong: The Happy io Valley Racecourse Redevelopment', International Journal of Project Management., Vol-18, Issue-2, Pg-125-129, Apr 2000.
- 20) Ballard, G., Calif, USA,. "Improving Work Flow Reliability. Proceedings of the Seventh Annual Conference of the International Group for Lean Construction. Lean Construction, (IGLC-7) Berkeley. Mar, 1999
- 21) Robert H. Waterman, JR., Thomas J. Peters, And Julien R. Phillips "Structure Is Not Organization", Business Horizons. Business Horizons, Pg-14-26, Sep, 1998
- 22) P. Skitmore, M. a. E. G., "Selecting a suitable procurement method for a building project", Construction Management and Economics, Vol: 10.1080, Pg- 1-24, Oct, 1998
- 23) Al-Bahar and Crandahl, C., "Systematic Risk Management Approach for Construction Projects", Journal of Construction Engineering and Management, Volume:116, Issue: 3, Pages 533-546, September 1990.
- 24) Jadhav, O. U., & Bhirud, A. N. (2015). An analysis of causes and effects of change orders on construction projects in Pune. International journal of engineering research and general science, 3(6), 795-799.
- 25) Bhirud, A. N., & Revatkar, B. M. (2016). Effective implementation of ERP in infrastructure construction industry. International Journal of Technical Research and Applications, 4(2), 246-249.
- 26) Bhirud, A. N., & Patil, P. B. (2016). Application of building information modeling for the residential building project. International Journal of Technical Research and Applications, 4, 349-352.
- 27) Siddiqui, M. A. S., & Bhirud, A. N. EPS, OBS, Project Activities for Pune Metro Phase-1 in Primavera P6. Journal of Advances and Scholarly Researches in Allied Education, 15.
- 28) Bhirud, A. N., & Vasant, K. G. (2015). Analysis of critical success factors for application of public private partnership in real estate. International Journal on Recent and Innovation Trends in Computing and Communication, 3(2), 757-760.
- 29) Isasare, A. S., & Bhirud, A. N. (2018). Review on study of causes and impact of rework on construction project. Int. J. Eng. Sci. Res. Technol, 7(3), 1-4.
- 30) John, B., Khobragade, N., & Bhambulkar, A. V. SAP'S STRATEGY FOR DIGITAL TRANSFORMATION IN INDUSTRY 4.0. European Journal of Molecular & Clinical Medicine, 9(08), 2022.
- 31) Dr. Ashtashil Vrushketu Bhambulkar, Niru Khobragade, Dr. Renu A. Tiwari , Ruchi Chandrakar, & Anish Kumar Bhunia .(2023). DEPLETION OF GREENHOUSE EMISSION THROUGH THE TRANSLATION OF ADOPT-A- HIGHWAY MODEL: A SUSTAINABLE APPROACH. European Chemical Bulletin,12(1), 1-18. Retrieved from <https://www.eurchembull.com/fulltext/246-1674559389.pdf?1676012263>.
- 32) bhambulkar, A. V., & Patil, R., N., (2020). A New Dynamic Mathematical Modeling Approach of Zero Waste Management System. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 11(3), 1732-1740.
- 33) Vaibhav Prabhakar Mestry , Harshal Umesh Patil , Pratik Narendra Nhavi , Rutuja Suresh Mhaske, Yogesh Suresh Gaikwad . Prof. Abhijit N.

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APPROACH.European Chemical Bulletin,12(5), 128-135. Retrieved from [b82803ad3863480c0d6b56d0257862e6.pdf \(eurchembull.com\)](https://www.eurchembull.com/b82803ad3863480c0d6b56d0257862e6.pdf).