



EVALUATING THE KEY FACTORS FOR STRATEGIC PROCUREMENT APPROACH IN HIGH-RISE CONSTRUCTION PROJECTS -A CASE STUDY OF PROJECTS IN HYDERABAD

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Abstract: Any construction project's performance depends critically on the selection of the procurement method. The choice of procurement method made by businesses in the construction sector is critical 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 construction technology, money (budget), topography, appropriate vendor selection, manpower (labour) availability, logistics, weather and services being rendered by vendors, suppliers, consultants. The conventional procurement framework has been in presence since the development of the building construction and has worked its way up to the mark since its inception. This investigation fills this void by investigating the effect of key factors on selection of best strategic procurement approach on a procurement framework which leads to the success of high-rise commercial building projects. Three significant discoveries were made as a result of the literature research and the investigation of the study findings, as follows: 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, Strategic Procurement

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 organization 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. 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 execution & maintenance of the contract.
- The importance of strategic ordering of long lead procurement items benefits project's time & cost parameter.
- 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 (In tandem with FIDIC guidelines), selecting expert consultants and contractors, setting up cost benchmarking, contract organization, and avoiding superfluous conversations.

1.2 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) NEED OF STUDY:

Procurement strategy is a process that examines an organization's whole supplier network with the goal of optimizing it. Strategic sourcing and strategic purchasing are other terms for the same thing: managing supplier relationships, minimising costs, and preventing risks within the cycle. The Covid-19 pandemic, Brexit in the UK, Russia-Ukraine war and the climate catastrophe have all impacted supply-chain markets in recent years, emphasising the crucial importance of procurement strategy. Also, the fluctuations in basic raw materials pricing is totally depends upon above mentioned global issues which in turn has an extensive impact on materials price, manpower (labor) price, delivery timelines & overall project completion timelines. So sourcing long lead materials/equipment, right vendor selection and project budget are the three key factors which needs to be studied on broader scale. This study aims to identify and study different aspects of procurement in construction industry by using the method namely RII. The study also shows the important aspects to be taken into consideration to strategize procurement in high-rise building projects.

III) OBJECTIVES:

- To investigate and analyse the procurement method in high rise commercial IT building.
- To define the best strategic procurement approach for a high rise building to deliver project in time and cost.
- To investigate & analyse the various procurement features such as Vendors selection, Budget framing, Contract administration and management and order control in construction project management of high-rise commercial IT building.
- To discover the merits and demerits of strategic procurement management in high rise buildings.

IV) 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. 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. 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. Regardless, the separation of the design and building processes fosters a 'them and us' mentality among clients and contractors, reducing the unity required to achieve the client's development goals. 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. 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.

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. Procurement procedures is one factor improvement area and can contribute sustainability to project success.

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.

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.

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.

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. 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 hypothesizing shifting patterns in firms' strategic procurement practices. 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.

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 authorized 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) DATA COLLECTION:

A preliminary questionnaires survey was employed to get a general overview of the characteristics of the procurement strategy implemented. A Criteria is defined that a personnel take into consideration while selecting procurement method and understand the process in selecting vendor/supplier. The exact key factors is to be found out from the RII method. Following steps were involved to find out procurement key factors:

1. Literature review from various research journals, previous research, and relevant data available on vendor/supplier selection.
2. Study of events occurring at construction site due to poor procurement process.
3. Factors affecting the vendor(s)/supplier(s) selection process.
4. Preparation of questionnaire using the factors affecting procurement process.
5. Conduct the questionnaire survey.

IV) DATA ANALYSIS:

Researchers have adopted relative importance index for analysis of data and ranking major factors. The same method is adopted in this study and data collected from respondents are converted into a five-point scale and then the five-point scale are transferred to relative importance index for each factor. These factors are ranked in order of importance based on the relative importance indices values.

The Relative Importance Index is calculated by using below formula:

Relative Importance Index,

$$RII = \sum W / (A \times N)$$

Where, W = Weight given to each factor by the respondents, ranges from 1 (low) to 5 (highest),
 A = Highest weight (i.e. 5 in this case) and
 N = Total number of respondents.

Higher the value of RII, more important was the reason for the consideration of factor in procurement. [Tarun Patel, Hiren Rathod et.al 2016]

Total thirty-six respondents have filled up the questionnaires for analysis of responses following steps are followed:

1. After getting of all thirty-six responses. Total Score is determined based on rating scale (1-5). Calculation is shown in Table-1 as stated below.

Table 1: Total rating score calculation sheet

Main Factor	Sub factor	Respondents																																				Total Score			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36				
Vendor Selection	The key to project success is appropriate vendor selection.	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	4	5	4	5	4	5	5	5	5	4	5	4	5	5	5	1	169		
	Vendor selection should include a peer assessment of his technical, financial, legal, quality, and cost-conscious attitude.	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	5	5	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	5	173	
	The performance of vendors on the project during the Covid-19 epidemic should be considered an evaluation criterion.	5	5	3	4	4	5	3	4	5	3	2	4	4	5	5	3	4	3	3	3	4	5	4	3	4	4	4	3	2	5	3	3	3	4	4	4	5	137		
	Prequalification of vendors shall be assessed using a rating/scoring system.	5	4	5	5	3	5	5	4	5	5	5	5	5	5	4	5	5	5	3	4	5	5	4	5	4	4	4	4	4	4	5	4	5	5	4	5	5	5	164	
	A competent vendor selection assures that 50% of the project will be successful.	5	5	5	5	4	5	5	5	5	5	5	5	5	5	3	5	4	4	5	4	5	5	3	5	5	3	5	5	4	3	3	3	4	5	5	2	159			
Project Budget	An appropriate budget is necessary for project success.	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	4	5	5	5	4	5	4	5	4	5	5	4	5	173		
	Budget preparation should take into account price inflation of at least 5% and as much as 10% relative to current market rates.	5	5	4	5	4	5	5	5	5	4	5	5	5	5	5	4	5	4	5	5	5	5	5	4	4	5	4	4	5	5	4	4	4	5	5	4	4	5	167	
	The project budget should be within +/-10% of the actual expenditure.	5	5	3	5	3	4	3	5	5	4	5	4	5	5	4	4	4	2	5	4	4	5	4	4	4	4	5	4	4	2	4	5	4	4	3	1	3	144		
	The bifurcation/grouping of tender packages has a significant influence on project budget.	5	4	5	5	3	5	5	5	5	5	5	4	5	5	4	5	4	2	5	4	5	5	4	4	4	4	2	4	3	4	4	5	3	4	4	5	5	5	155	
	The most effective technique for creating project budgets is to look for similar types of finished projects and compare their size, package grouping, timelines, and execution	5	5	3	5	3	5	5	4	5	4	5	5	5	5	5	4	4	5	4	4	4	5	3	4	4	4	4	5	4	4	4	4	4	4	4	5	4	5	5	158
Procurement order control sheet	In high-rise building projects, a long-lead items order control sheet is a necessity.	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	4	5	4	3	5	4	4	4	4	5	4	4	4	5	5	4	5	4	5	5	167			
	The absence of an effective order control sheet contributes to project cost overruns.	5	5	4	5	2	5	5	5	5	3	5	5	5	5	4	4	5	3	5	5	3	5	3	4	4	4	4	4	5	4	5	4	4	4	4	5	5	5	157	
	At the microlevel, the order control sheet should track the sailing/shipping time of imported items.	5	5	5	5	3	5	5	5	5	5	5	4	5	5	5	4	4	4	5	4	5	5	4	4	4	4	4	4	4	5	4	4	4	4	4	4	5	4	161	
	Order control sheet should have descending order of sequence with respect to delivery timelines.	4	5	3	5	4	5	5	4	5	5	4	4	5	5	3	3	4	3	3	4	3	5	4	4	3	4	3	4	4	4	4	4	3	4	5	5	5	147		
	The order control sheet must be captured in the project master schedule and tracked continuously by the PMC/client.	5	4	5	5	4	5	5	5	5	5	5	5	5	5	3	5	4	5	4	5	4	5	5	4	5	4	4	5	5	4	4	4	4	4	4	5	4	5	5	168
	The exact Vendor selection, Project Budget, and Order Control sheet are the three key factors that affect strategic procurement.	5	5	5	5	3	4	5	5	5	4	5	5	5	5	4	5	2	5	5	4	5	3	4	4	4	4	4	4	4	4	4	3	4	5	4	4	5	5	157	

2. Afterwards, Relative Importance Index for each factor is calculated by using Relative Importance Index (RII) Method. A calculation is shown in Table 2.

Table 2: Relative Importance Index Calculation sheet

Main Factor	Sub factor	Respondents																																				Total Score	RII			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36					
Vendor Selection	The key to project success is appropriate vendor selection.	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	169	0.94			
	Vendor selection should include a peer assessment of his technical, financial, legal, quality, and cost-conscious attitude.	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	5	5	4	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	173	0.96	
	The performance of vendors on the project during the Covid-19 epidemic should be considered an evaluation criterion.	5	5	3	4	4	5	3	4	5	3	2	4	4	5	5	3	4	3	3	3	4	5	4	3	4	4	4	3	2	5	3	3	3	4	4	4	5	137	0.76		
	Prequalification of vendors shall be assessed using a rating/scoring system.	5	4	5	5	3	5	5	4	5	5	5	5	5	5	4	5	5	5	3	4	5	5	4	5	4	4	4	4	4	4	5	4	5	5	5	4	5	5	164	0.91	
	A competent vendor selection assures that 50% of the project will be successful.	5	5	5	5	4	5	5	5	5	5	5	5	5	5	3	5	4	4	5	4	5	5	3	5	5	3	5	5	4	3	3	3	4	5	5	2	159	0.88			
Project Budget	An appropriate budget is necessary for project success.	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	4	5	5	5	5	4	5	5	5	4	5	5	173	0.96			
	Budget preparation should take into account price inflation of at least 5% and as much as 10% relative to current market rates.	5	5	4	5	4	5	5	5	5	4	5	5	5	5	5	4	5	4	5	5	5	5	5	4	4	5	4	4	5	5	4	4	4	5	5	4	167	0.93			
	The project budget should be within +/-10% of the actual expenditure.	5	5	3	5	3	4	3	5	5	4	5	4	5	5	4	4	4	2	5	4	4	5	4	4	4	4	5	4	4	2	4	5	4	4	3	1	3	144	0.80		
	The bifurcation/grouping of tender packages has a significant influence on project budget.	5	4	5	5	3	5	5	5	5	5	5	4	5	5	4	5	4	2	5	4	5	5	4	4	4	4	2	4	3	4	4	5	3	4	4	5	5	155	0.86		
	The most effective technique for creating project budgets is to look for similar types of finished projects and compare their size, package grouping, timelines, and execution methodology.	5	5	3	5	3	5	5	4	5	4	5	4	5	5	5	4	4	4	5	4	4	5	3	4	4	4	4	4	4	4	4	4	4	4	5	4	5	5	158	0.88	
Procurement order control sheet	In high-rise building projects, a long-lead items order control sheet is a necessity.	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	4	5	4	3	5	4	4	4	4	5	4	4	4	5	5	4	5	4	5	5	167	0.93				
	The absence of an effective order control sheet contributes to project cost overruns.	5	5	4	5	2	5	5	5	5	3	5	5	5	5	4	4	5	3	5	5	3	5	3	4	4	4	4	4	5	4	5	4	4	4	4	5	5	157	0.87		
	At the microlevel, the order control sheet should track the sailing/shipping time of imported items.	5	5	5	5	3	5	5	5	5	5	4	5	5	5	4	4	4	5	4	5	5	4	4	4	4	4	4	4	4	5	4	4	4	4	4	5	4	161	0.89		
	Order control sheet should have descending order of sequence with respect to delivery timelines.	4	5	3	5	4	5	5	4	5	5	4	4	5	5	3	3	4	3	3	4	3	5	4	4	3	4	3	4	4	3	4	4	4	4	4	3	4	5	5	147	0.82
	The order control sheet must be captured in the project master schedule and tracked continuously by the PMC/client.	5	4	5	5	4	5	5	5	5	5	5	5	5	5	5	3	5	4	5	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	5	4	5	5	168	0.93	
	The exact Vendor selection, Project Budget, and Order Control sheet are the three key factors that affect strategic	5	5	5	5	3	4	5	5	5	4	5	5	5	5	5	4	5	2	5	5	4	5	3	4	4	4	4	4	4	4	4	4	4	3	4	5	4	4	5	157	0.87

3. Based on Relative Importance Index, rearrangement of factors is done in descending order. The factors are ranked in order of importance based on Relative Importance Index. It is shown in Table 3.

Table 3: Ranking based on Relative Importance Index

Sr.No.	Main Factor	Sub factor	RII	Rank
1	Vendor Selection	Vendor selection should include a peer assessment of his technical, financial, legal, quality, and cost-conscious attitude.	0.96	1
2	Project Budget	An appropriate budget is necessary for project success.	0.96	1
3	Vendor Selection	The key to project success is appropriate vendor selection.	0.94	2
4	Project Budget	Budget preparation should take into account price inflation of at least 5% and as much as 10% relative to current market rates.	0.93	3
5	Order control sheet	In high-rise building projects, a long-lead items order control sheet is a necessity.	0.93	3
6	Order control sheet	The order control sheet must be captured in the project master schedule and tracked continuously by the PMC/client.	0.93	3
7	Vendor Selection	Prequalification of vendors shall be assessed using a rating/scoring system.	0.91	4
8	Order control sheet	At the microlevel, the order control sheet should track the sailing/shipping time of imported items.	0.89	5
9	Vendor Selection	A competent vendor selection assures that 50% of the project will be successful.	0.88	6
10	Project Budget	The most effective technique for creating project budgets is to look for similar types of finished projects and compare their size, package grouping, timelines, and execution methodology.	0.88	6
11	Order control sheet	The absence of an effective order control sheet contributes to project cost overruns.	0.87	7
12	Vendor Selection	The exact Vendor selection, Project Budget, and Order Control sheet are the three key factors that affect strategic procurement.	0.87	7
13	Project Budget	The bifurcation/grouping of tender packages has a significant influence on project budget.	0.86	8
14	Order control sheet	Order control sheet should have descending order of sequence with respect to delivery timelines.	0.82	9
15	Project Budget	The project budget should be within +/-10% of the actual expenditure.	0.80	10
16	Vendor Selection	The performance of vendors on the project during the Covid-19 epidemic should be considered an evaluation criterion.	0.76	11

4. The following graph shows the ranks and main factor by using the above analysis of RII method shown in Figure. 1

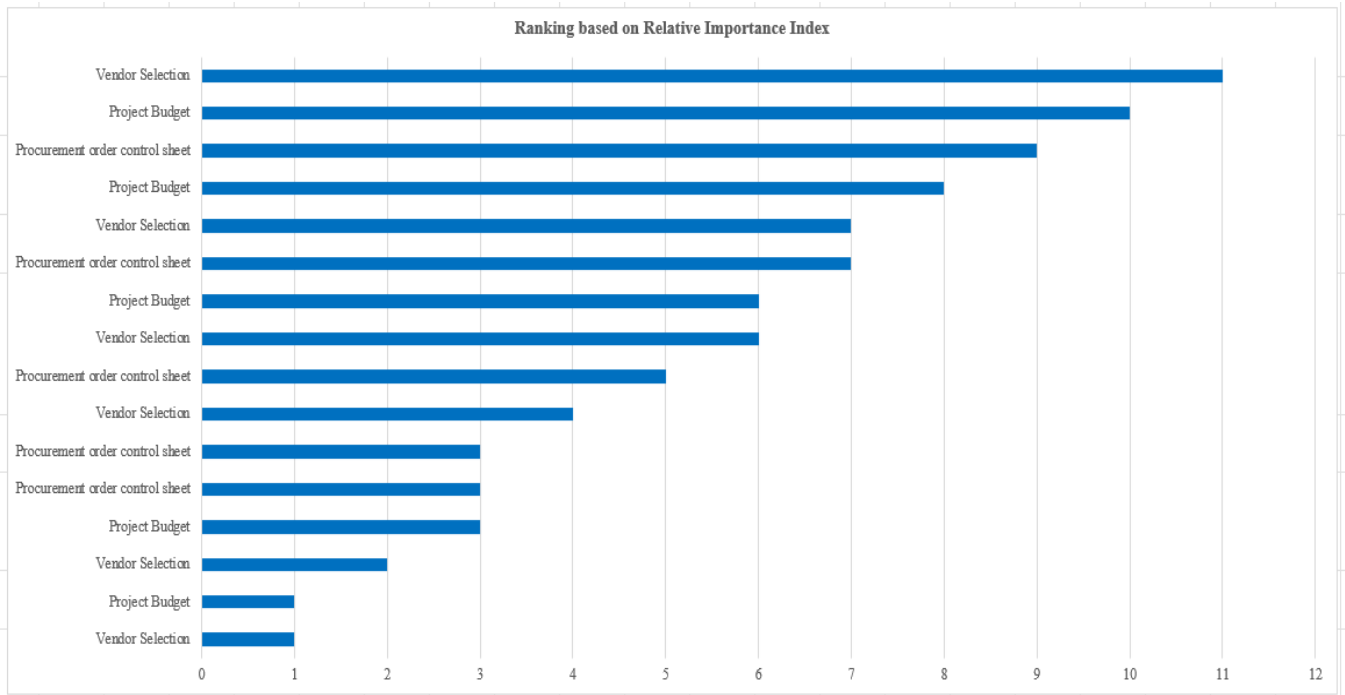


Figure 1: Ranking of procurement main factors.

5. **DEMOGRAPHIC DETAILS:**

The sample size of 36 high-rise commercial IT building experts to collect data related to implemented practices and lessons learnt during execution of high-rise commercial IT building projects to understand the awareness, usage, issues, and challenges about it. The researcher has analyzed the demographic data. The resulted data have been summarized in the following table 4.

Table 4. Demography of respondents based on high-rise commercial IT buildings handover experience.

Sr. No.	No. of Respondents	No. of years of Experience
1	3	1-5 Yrs
2	3	5-10 Yrs
3	6	10-15 Yrs
4	9	15-20 Yrs
5	7	20-25 Yrs
6	5	25-30 Yrs
7	1	30-35 Yrs
8	2	35-40 Yrs

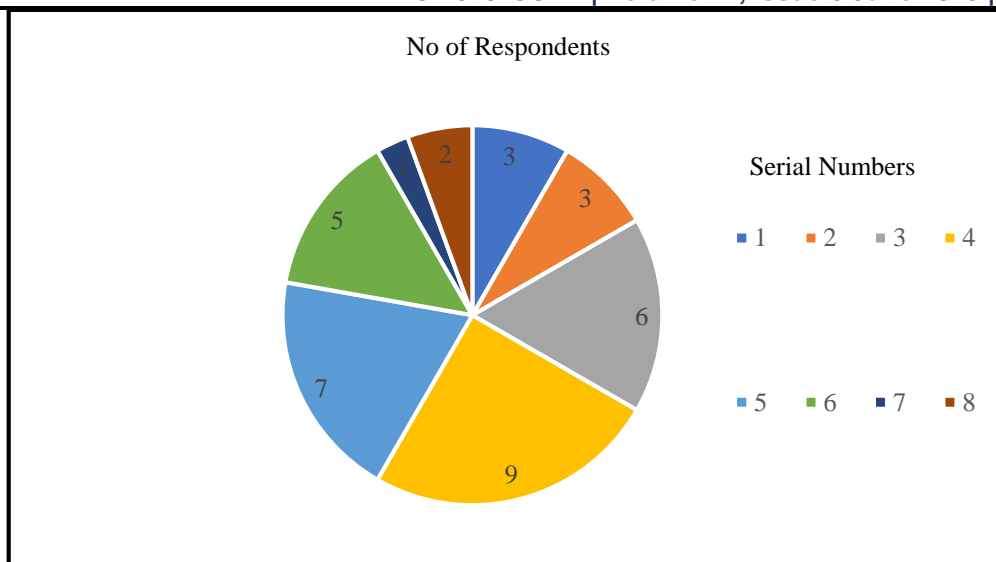


Figure 2: Pie chart of demography of respondents based on high-rise building projects official experience.

V) RESULTS AND DISCUSSION:

- As per the data collection through questionnaires survey; understood that three key main factors which are to be considered in procurement as Vendor Selection, Project Budget & Order Control sheet which plays vital role in project completion. So that same has been considered for in depth study.
- The important key factors have been selected as per RII & ranking as per the index as stated above in Table 3.
- As per the ranking stated in Table:3 it has been understood that Vendor selection requires in depth review during Pre-Qualification stage, Project budget must be set as cost benchmarking to anticipate overall project cost & long lead items to be taken into consideration by a dedicated Order Control sheet to track the delivery timelines of imported equipment/items/machinery.

VI) CONCLUSION, RECOMMENDATIONS AND FUTURE SCOPE OF WORKS:

Procurement in the construction sector should be driven by major considerations such as Time, Cost, and Quality. The project success is solely depending upon the right strategic approach towards procurement which governs the key aspects of project management such as Design, Procurement strategy, Construction monitoring & control, project funding & cashflow. So, from the above analysis we can conclude that the major attention is required on 3 key factors of procurement which are appropriate vendors selection, project cost benchmarking (Budget) & appropriate ordering of long lead items, & involvement of client, project managers, vendors in actual procurement process.

Particularly in recommendation the following points can be taken into consideration by any client/project managers to strategize the project procurement & management process.

Sr. No.	Key Activities
1	Project Design Closure (Methodology closure)
2	Work Packages Identification
3	Work Packages Grouping or Bifurcation
4	Project Cost Benchmarking
5	Project Master Schedule Closure
6	Potential Vendor(s) Selection
7	Contract Documentation frame working
8	Determination of Long Lead Items
9	Preparation & Implementation of Order control Sheet
10	Track of vendor onboarding, cost, long lead items delivery from initiation to closure phase.

Further the scope for the future research study has been restricted to Hyderabad city. In future it can be extended to other metro & super cities of India also. As Hyderabad city is in growing stage of IT/ITeS, real estate & general infrastructure development mission being carried by Telangana government, hence this research work will give crisp detailing about key factors to be considered in strategic procurement aspect for optimum utilization for indian/foreign investments, revenue and employment generation opportunities by keeping good control on completion timelines. The outcome of this research will give future scope of

work to investigate & evaluate vendors selection criterion, cost benchmarking methods & procurement sequencing for long lead items with the help of any software platform.

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