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To study the procurement process and develop a conceptual framework model for Pakistan's construction industry.

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ABSTRACT. *Procurement of equipment and materials in any construction project holds a tremendous significance for the project to be completed on time and within the budget. In this research, procurement in the Pakistan's construction industry has been studied and a conceptual framework in terms of e-procurement portal has been suggested to smoothly execute the process of e-procurement by mitigating the barriers involved in the concerned process. A questionnaire survey form has been developed and 100 responses have been recorded to take the input from industry experts on the proposed procurement framework. A total of 84 respondents out of 100 thought that the proposed framework will be a better way to solve the problems that come up during the procurement process. Furthermore, it was also found that the main reason for procurement delays in construction projects is lack of communication and coordination among different departments within an organization, to which the suggested framework can be used as a potential tool to deal with.*

Keywords: E-procurement, Project delays, E-procurement tools and technologies, Pakistan's Construction industry, Procurement Process

1. INTRODUCTION

This research is about investigating the procurement process in Pakistan's construction industry and developing a conceptual framework model for e-procurement. Procurement is one of the main processes upon which the successful completion of any project relies and procurement activities continue throughout the project period [1]. However, in the construction industry, there comes a lot of issues pertaining to the procurement that ultimately affect the project timeline. One of the important reasons is the communication among the stakeholders [2]. Therefore, in this research, a conceptual framework is suggested to channelize the procurement process within an organization.

1.1 Electronic-Procurement

The traditional communication and coordination among the departments of same organization for procurement purposes can be improved by utilizing the technology. To deliver the inventory from the manufacturer to the desired construction site, electronic procurement is a beneficial method that can be utilized to save the time and cost of a project [3]. There are various types of e-procurement tools available in the market that can be utilized as a support in the construction procurement activities [4]. However, in Pakistan's construction industry, there are a lot of barriers in the way of adoption of e-procurement, for instance, lack of the infrastructure, resistance to change, lack of knowledge etc. [5].

1.2 Need for Electronic Procurement

In a quantitative study, the variables affecting Pakistan's e-procurement practices are investigated. To determine the impact of internal organizational support, integration with supplier's electronic systems, supplier's willingness, perceived improvements to purchasing activities, and supplier's pressure on e-procurement intention, a sample of 319 respondents was chosen. E-procurement intents are highly influenced by internal organizational support, supplier's willingness, and anticipated improvements to purchasing activities, according to the results information. Integration with suppliers' electronic systems and supplier pressure, however, have no appreciable influence on the inclination to use electronic procurement. The conclusion advises firms to implement an e-procurement system to streamline their present procurement procedures [6]. It can be fairly expected that e-procurement technology will play a large part in supply chain management despite the industry's resistance to change and that the adoption rate will quicken as early adopters share their findings [7].

2. METHODOLOGY & FRAMEWORK

Most of construction projects face significant delays due to delays in the delivery of key items causing delays in the installation of said items critical for execution and subsequent completion of projects. Thus, projects frequently suffer from cost and schedule overrun [8]. The cause of the said problem arises from the fact that there exist coordination and communication issues between different departments of a certain construction firm, for instance, the Design Department, QAQC Department, Contracts Department, Procurement Department, and most importantly the site team itself.

Table-1: Dummy model for e-procurement e-portal

Sr. No	1	2
Item	Ceiling	Kitchen Exhaust Hood
Specifications	Painted Gypsum High Quality	As per the Interior Drawings and MEP Requirements
Material Finalization Date	20 th August 2022	19 th September 2022
Imported/ Local	Local	Imported (China)
Selection of Material	27 th August 2022	26 th September 2022
Material Approval	1 st September 2022	1 st October 2022
Prequalification of Vendor (CS Prep)	15 Days	15 Days
Award of Contract to Vendor/ Supplier	16 th September 2022	16 th October 2022
PO Issuance Date	19 th September 2022	19 th October 2022
Lead Time/ Fabrication Time	30 Days	60 Days
Material Delivery Date	19 th October 2022	19 th December 2022
Material Installation Start Date	26 th October 2022	25 th December 2022
Material Installation Finish Date	5 th January 2023	10 th February 2023
Duration of Activity	71 Days	45 Days

Following the detailed literature review & after considering the importance of the existing issue in the construction industry, it can be safely concluded that an integrated e-procurement portal must be established in construction firms

to avoid any possible delays in construction activities. The e-portal must be designed such that any department in a construction firm is able to quickly access and track the procurement of certain material, update the procurement status of the said item, and notify all the relevant stakeholders about any progress made in the procurement of the said item in consideration and most importantly communicate about any possible delay in the delivery of the said item. Therefore, an 'E-Procurement portal' is suggested where each department responsible for a specific step of the procurement process can update the completion date of said step and at the same time see the overall impact of that particular step on the construction activity completion date. Table 1 provides the basic framework for an e-procurement portal and depicts the mechanism that how procurement activity should be carried out by integrating various stages and departments in a certain supply chain. For instance, for a particular item say 'Kitchen Exhaust Hood, the editing and updating authority of the section of 'Item and Specification' must be given to Design Department as well as the Quantity Surveying Department. The updating authority for material finalization date must rest with Design Department as well as the QAQC Department while Procurement Department is responsible for material sampling and subsequent selection as per the drawings and technical specifications are given by the Design Department.

After the selection of material, the material approval shall only be conducted by the QAQC Department after which the prequalification and CS Preparation (Comparative Statement) will be conducted by the Contracts Department. Once all the requisites for contract award have been completed, the contract may be awarded to one of the bidders by following the standard procedures.

The Contracts Department will then move forward with the PO Issuance (Purchase Order) and Procurement Department will initiate the procurement process. The vendor will then require the lead time/ fabrication time, the tracking of which is the responsibility of the Procurement Department. Once the material is delivered on-site, the site team will then move forward with the execution of the related construction department. It is pertinent to mention here that the role of the Planning & Projects Control Department is critical in this process as it helps in coordination and communication between each of the departments and tracks the progress of each procurement step in an independent & impartial manner.

Once we determined the basic framework for the proposed 'E-Procurement Portal', a structured questionnaire survey was carried out and a total of 102 responses were received of which 100 responses were considered through selective sampling approach where the target audience was construction industry professionals who are well versed in the procurement of critical construction items ranging from MEP Equipment to Finishing Items. The said audience was asked about the challenges being faced in the procurement process at their respective construction firms, the need for communication and collaboration between each of the departments in construction firms, and the need for an effective 'E-Procurement Portal'.

3. RESULTS AND DISCUSSIONS

The research survey had a total of 102 responses out of which 100 responses were taken into consideration due to their authenticity. It was found that the main reason for procurement delays in the construction is the lack of communication and coordination among different departments. A total of 98% of professionals agreed with this

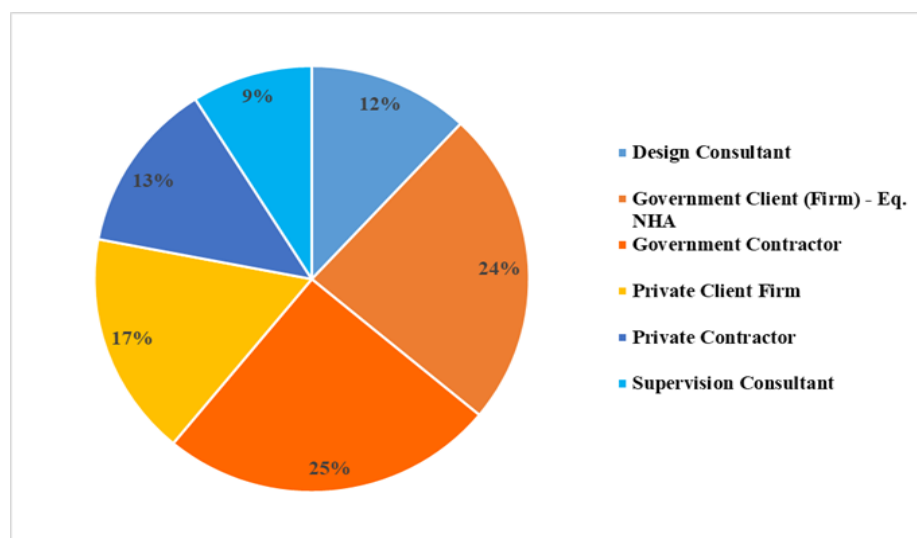


Fig-1: Demographic information of the respondents

statement. The people surveyed belonged to various organizations and firms. Figure 1 represents the variety of firms

employing the people surveyed, for instance, the people belonging to consultants and contractors' firms, whereas the experience of the respondents is shown by Figure 2. Moreover, the procurement matrix shown in Table 1 was also presented to these individuals and the survey results dictate that most of the professionals believe that the proposed procurement matrix is well suitable and will resolve the issues that are persistent in the industry.

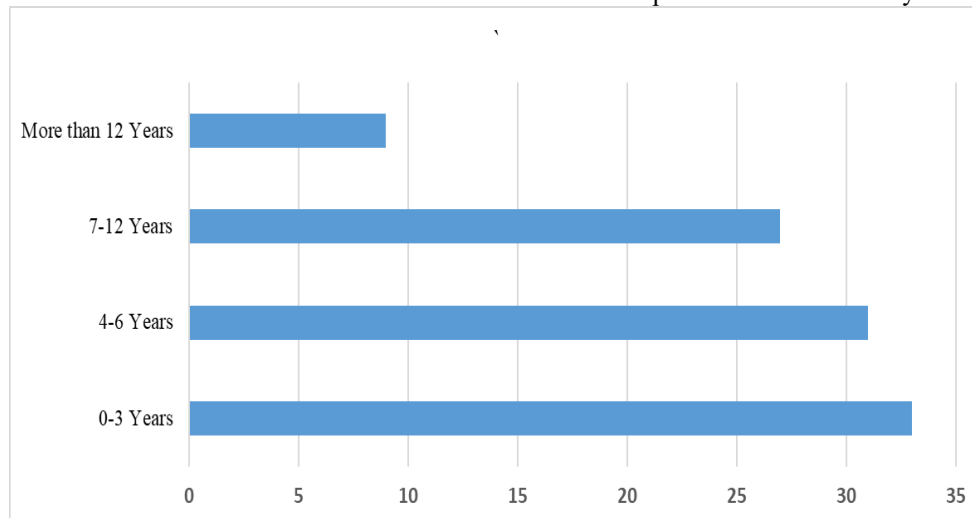


Fig-2: Industry experience of the respondents

Figure 3 shows that a total of 84 respondents out of 100 thought that this matrix will be a better way to solve the problems that surround our industry. This study also suggests that the integration of the portal with suppliers will enhance coordination and allow for faster tracking of procurement. This clearly outlines the importance of the presented procurement matrix.

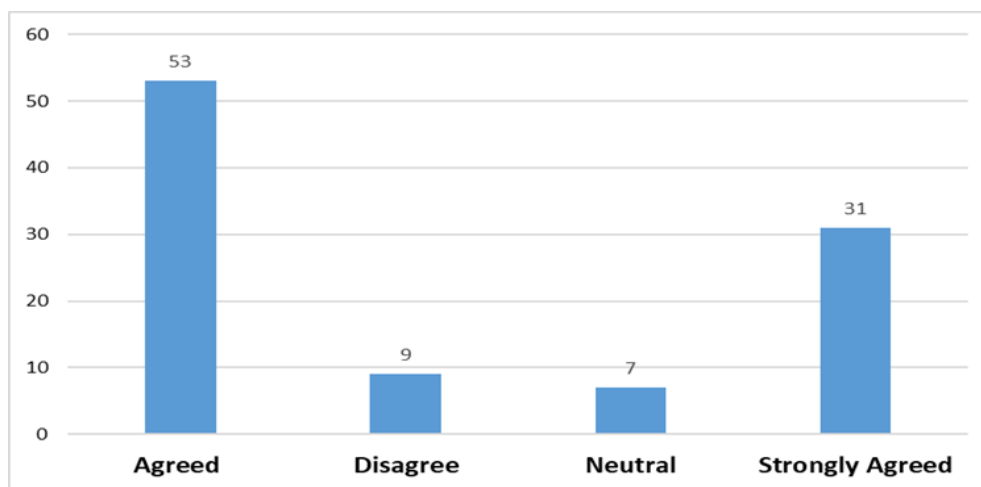


Fig-3: Response against the effectiveness of e-procurement matrix

4. CONCLUSION AND FUTURE RECOMMENDATIONS

This paper has studied the implementation of the e-procurement process in the construction industry of Pakistan. A conceptual framework in the form of an e-portal is suggested. It is revealed through a questionnaire survey that the lack of proper coordination and communication among the intra-organizational departments causes delays in the procurement process. Therefore, by creating an e-portal that tracks the status of procurement items by input from all the departments can help reduce the delays. For future research, the researchers may develop an app that integrates the potential suppliers and the procuring agencies to work at the inter-organizational level apart from the intra-organizational level.

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