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Evaluation of Effective Tendering Process for Contractors

Mrs. Pooja R. Bhirud [1] , Dr. Pankaj P. Bhangale[2]

[1] MTech Student, Civil Engineering Department, Shri Sant Gadge Baba College of Engineering and Technology, Bhusawal (M.S), India.

[2]Professor, Civil Engineering Department, Shri Sant Gadge Baba College of Engineering and Technology, Bhusawal (M.S), India.

Abstract :*The tendering process is crucial in the construction industry, ensuring the selection of the right contractor with the lowest bid. This study examines the tendering process adopted by CPWD in detail. Through extensive literature review and data collection via a structured questionnaire, the research identified the significance of the 10cc clause, ranked highest by contractors. The Relative Importance Index (RII) method revealed a range from 0.906667 to 0.613333. The study emphasizes the benefits of e-tendering, advocating for enhanced focus on pre-tender preparation, team formation, document management, bid strategy development, cost estimation, proposal writing, quality assurance, submission process, and post-submission follow-up. This research provides civil engineers with a comprehensive understanding of the tendering process from the contractors' perspective.*

Index Terms: *Tenders, RII Method, Tendering Process*

1. INTRODUCTION:

The tendering process is a pivotal step in the construction project lifecycle, playing a critical role in ensuring that the right contractor is chosen for a project, which in turn is essential for the project's success. For civil engineers, understanding the intricacies of the tendering process is vital as it impacts various aspects of project execution and management. This study delves into the tendering process adopted by the Central Public Works Department (CPWD), highlighting its significance, challenges, and areas for improvement. The tendering process promotes competition by allowing multiple contractors to bid on a project, driving down costs and ensuring the best value for money. This competitive environment fosters transparency, allowing all stakeholders to have visibility into the project's progress and be aware of any potential issues. Moreover, a robust tendering process helps prevent fraudulent bids, ensuring that only qualified contractors are awarded contracts. This, in turn, protects taxpayers by reducing overall costs and enhancing the quality of work delivered.

For civil engineers, studying the tendering process is crucial for several reasons. It aids in effective project planning by ensuring all necessary permissions and licenses are obtained before commencing work. A thorough understanding of the tendering process also enhances project quality, as it ensures that the chosen contractor possesses the required expertise and resources to complete the project successfully. Furthermore, it reduces the risk of cost overruns and delays by ensuring that the contractor can meet the agreed-upon timeline and budget. Additionally, a well-managed tendering process improves client relationships by selecting the contractor best suited for the project, leading to better outcomes and increased satisfaction. Despite its importance, the construction industry faces inefficiencies in the tendering process, often resulting in delays, cost overruns, and subpar project outcomes. These inefficiencies highlight the need for a comprehensive study to identify and address critical factors in the tendering process. This research focuses on the CPWD's tendering process, employing a detailed questionnaire to gather data, which is then analyzed using the Relative Importance Index (RII) method. The study emphasizes the benefits of e-tendering and provides recommendations for enhancing various aspects of the tendering process.

The construction industry is plagued by inefficiencies in the tendering process, leading to delays, cost overruns, and poor project outcomes. Despite the tendering process's crucial role in ensuring successful project delivery, there is a need to study and identify the critical factors affecting this process. The objectives of the study are fourfold: to study the types and processes of tenders, discuss e-tendering and its applications, review perspectives from different classes of contractors, and analyze the data to provide recommendations for improvement. By addressing these objectives, the study aims to offer a comprehensive understanding of the tendering process and its challenges.

The study of the tendering process is significant as it directly impacts the success of construction projects. A well-planned and executed tendering process ensures the right contractor selection, resulting in better project outcomes, reduced costs, and improved stakeholder satisfaction. Conversely, a poorly managed tendering process can lead to delays, cost overruns, and disputes, adversely affecting overall project performance. By understanding the tendering process and its challenges, this study aims to provide valuable insights and recommendations for improvement, ultimately contributing to the success of construction projects and the satisfaction of stakeholders. In conclusion, this research aims to offer a comprehensive understanding of the tendering process from the contractors' perspective, utilizing the CPWD's process as a case study. By addressing the identified challenges and providing actionable recommendations, the study seeks to enhance the efficiency and effectiveness of the tendering process in the construction industry.

2. LITERATURE REVIEW:

The key findings by the researchers are summarized bellow,

The review of literature on the tendering process and procurement in the construction industry reveals several key findings that highlight the importance and challenges associated with these procedures. Akenroye (2013) appraised the use of competitive tendering procedures in Nigeria's public sector, emphasizing that while competitive tendering promotes transparency and fairness, it also faces challenges such as bureaucratic inefficiencies and corruption, which can undermine its effectiveness . Similarly, Doloi (2012) examined the impacts of time and cost-related construction risks on the operational performance of Public-Private Partnership (PPP) projects, finding that these risks significantly affect project outcomes, underscoring the need for robust risk management strategies during the tendering process. Eadie, Perera, and Heaney (2010) identified drivers and barriers to e-procurement adoption among UK construction organizations. Their study highlighted that while e-procurement can enhance efficiency and transparency, its implementation is hindered by factors such as resistance to change and the lack of technical expertise . In a similar vein, Ng, Skitmore, and Lam (2002) developed a multicriteria evaluation model for supplier selection in the Hong Kong construction industry, demonstrating that effective supplier selection is crucial for project success and should consider factors beyond just cost, including quality, reliability, and past performance .

Barriers to the implementation of Public-Private Partnerships (PPPs) in the Saudi Arabian construction industry were explored by Al-Yahya and Panuwatwanich (2018). Their findings indicated that cultural resistance, lack of expertise, and regulatory challenges are significant obstacles that need to be addressed to leverage the benefits of PPPs . Additionally, Zavadskas, Turskis, and Tamosaitiene (2010) focused on risk assessment in construction projects, emphasizing that a systematic approach to identifying and mitigating risks can significantly improve project outcomes and reduce uncertainties .In Turkey, Topcu (2004) proposed a decision model for construction contractor selection, highlighting the complexity of the selection process and the need for a comprehensive approach that incorporates various evaluation criteria to ensure the best contractor is chosen . Love, Skitmore, and Earl (2008) discussed the selection of suitable procurement methods for building projects, arguing that the choice of procurement method has a profound impact on project success and should be tailored to the specific requirements of each project .

These findings collectively underscore the complexity of the tendering and procurement processes in the construction industry. They highlight the need for a multifaceted approach that considers transparency, risk management, and the incorporation of technological advancements to enhance efficiency and project outcomes.Shen et al. (2010) highlighted the importance of conducting comprehensive project feasibility studies to ensure the successful implementation of sustainable and socially responsible construction practices, which can significantly enhance project outcomes and stakeholder satisfaction .Sourani and Sohail (2019) investigated the benefits and challenges of e-procurement in the construction industry. Their study indicated that while e-procurement can lead to increased efficiency and cost savings, it also presents challenges such as the need for technological infrastructure and resistance

to change among industry professionals . Palaneeswaran, Kumaraswamy, and Ng (2019) developed a framework for risk management in public construction procurement, emphasizing that proactive risk management practices are essential to mitigate potential issues and ensure project success .

Marzouk and Enaba (2019) examined the impact of digital transformation and Building Information Modeling (BIM) on the construction industry. They found that digital technologies and BIM can significantly improve project planning, coordination, and execution, leading to enhanced efficiency and reduced risks . Molenaar, Javernick-Will, and Harper (2020) conducted a case study on transparency in public construction procurement, demonstrating that increased transparency can lead to better decision-making and trust among stakeholders .Darko et al. (2020) discussed the drivers and challenges of sustainability practices in the construction industry, noting that while there is growing awareness and implementation of sustainable practices, challenges such as cost implications and lack of expertise still persist . Rajeh, Emad, and Nasir (2020) addressed biases in tender evaluation processes, emphasizing the need for objective and transparent evaluation criteria to ensure fair contractor selection and project success .

Kaliba, Muya, and Mumba (2021) investigated the causes and mitigation strategies for cost overruns in road construction projects. Their study highlighted common causes such as inaccurate cost estimates and project scope changes, and recommended measures like thorough planning and effective contract management to mitigate these issues . Khosrowshahi and Fagbenle (2021) focused on post-project contractor performance evaluation, suggesting that systematic performance evaluation can inform future tendering decisions and improve overall project outcomes. Collectively, these studies underscore the importance of transparency, sustainability, risk management, and technological integration in the tendering and procurement processes. By addressing these key areas, the construction industry can enhance efficiency, reduce risks, and improve project outcomes, ultimately leading to greater stakeholder satisfaction and project success.

Recent research continues to shed light on various aspects of the tendering and procurement processes in the construction industry, highlighting both challenges and best practices. Laryea and Hughes (2021) explored strategies for streamlining public procurement, emphasizing that enhancing efficiency in procurement processes can significantly improve project delivery times and outcomes. They advocate for reducing bureaucratic red tape and implementing more straightforward procedures to facilitate quicker decision-making and project initiation. Ghanem, Hadidi, and Al-Hussein (2022) focused on optimizing procurement strategies in construction projects. Their study revealed that tailored procurement strategies that consider project-specific variables can lead to improved efficiency and cost-effectiveness. They suggest that a one-size-fits-all approach is less effective than customized strategies that align with the unique requirements of each project .

Qian, Ma, and Wang (2022) examined the barriers faced by Chinese contractors in international tendering. They identified several key obstacles, including cultural differences, regulatory challenges, and intense competition, which hinder Chinese contractors from successfully securing international projects. Addressing these barriers requires a deep understanding of international markets and the development of strategies to navigate these complexities. Hossain and Rahman (2022) studied the impact of digital procurement systems on construction project management. Their findings indicate that digital procurement systems can significantly enhance project management by improving data accuracy, increasing transparency, and facilitating better communication among stakeholders. However, they also note that the successful implementation of digital systems requires overcoming resistance to change and ensuring adequate training for users .

These studies collectively emphasize the importance of efficiency, strategic customization, international market navigation, and digital transformation in the procurement process. By addressing these critical areas, the construction industry can improve procurement outcomes, leading to more successful project completions and enhanced stakeholder satisfaction.

The contractors already enlisted in composite category in class I(Super), I(AAA), I(AA), I(A), and I are also allowed to bid for infrastructure works, as an interim measure up to 31.12.2021. The tendering limit of these composite category (now named as building category) contractors for infrastructure works shall be as given in

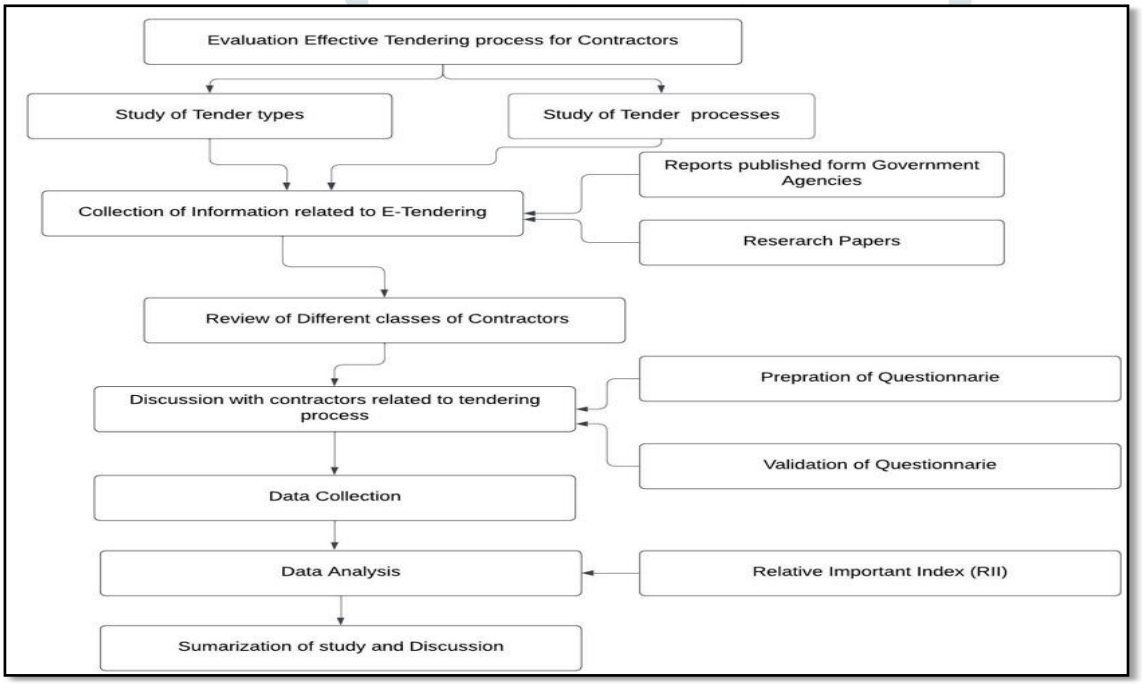
Table 1.

Class	Tendering limit for infrastructure works (Rs.incrore)
Building, I(Super)	260
Building, I(AAA)	104
Building, I(AA)	65
Building, I(A)	33
Building, I	20

Table 1:Tendering limit of building category contractors for infrastructure works

3. METHODOLOGY

For this study, Data was collected personally from the construction sites. For this questionnaire was prepared based on the discussion with the contractors.



4. DATA COLLECTION AND ANALYSIS:

To start collection of data, it is essential to meet the contractors physically and to get the information about the experience and number of works completed by them. This also helps us to understand the process they adopted for getting the tender from various agencies. The details about the same are summarized in the following figure No.2

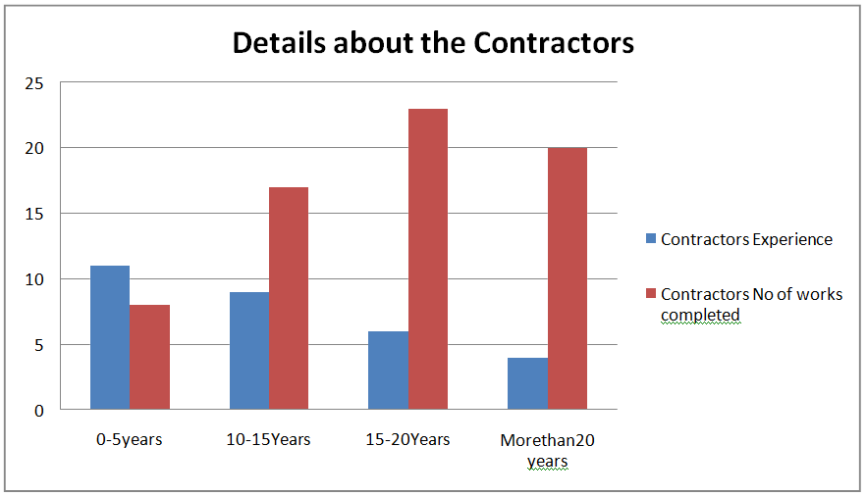


Figure No.2 Details about the contractor

4.1 Relative Importance Index (RII) method

The Relative Importance Index (RII) method is a statistical technique used to determine the relative importance of various items or factors in a surveyor study. It is commonlyused in fields like construction management, social sciences, and marketing to prioritize issues, challenges, or preferences based on the respondents' feedback.

How RII is Calculated

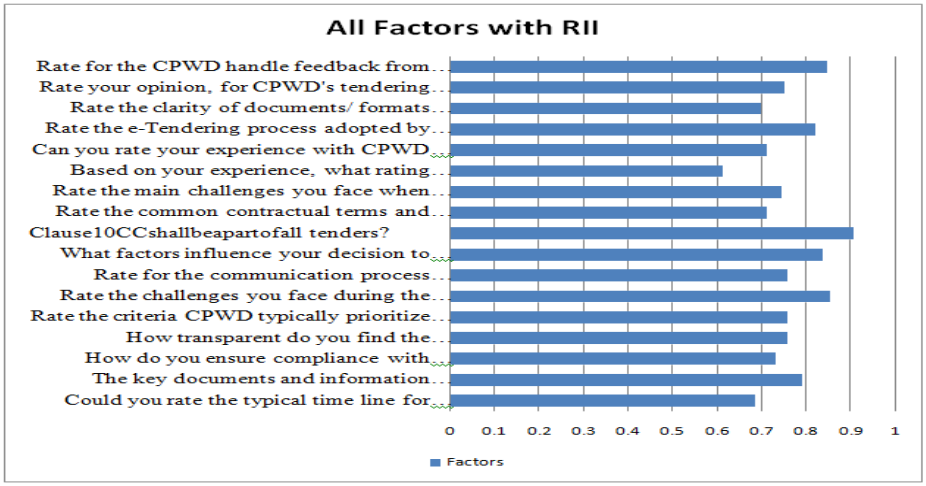
The RII is calculated using the following formula:

Where:

$$\mathrm{RII} = \frac{\sum W}{A \times N}$$

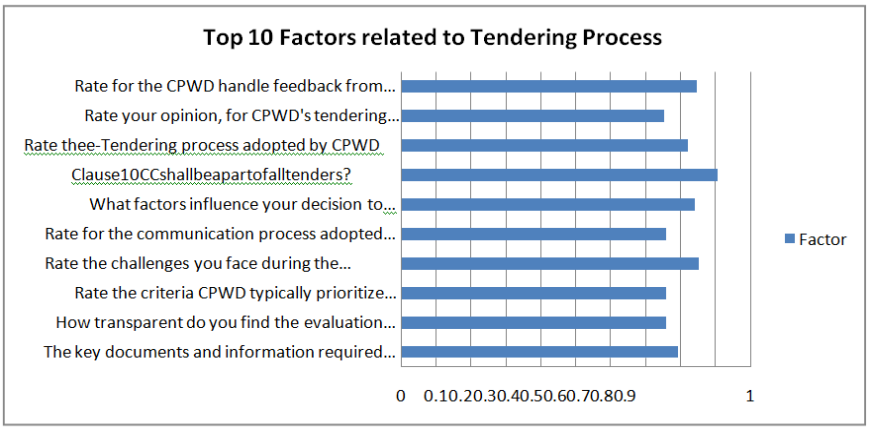
- ∑W is the sum of the weights given to each factor by the respondents.
- A is the highest weight (i.e.,if using a Likert scale of 1to 5,A would be 5).
- Nis the total number of respondents.

Data were collected from 30 respondents and RII method is used for the analysis.



FigureNo.3 Factors and their respective RII Value

Top10 Factors related to tendering process are summarized in,(FigureNo.4)



FigureNo.4 Top10 factors in tendering process

The questionnaire was divided into six subsections. The details are summarized in figure no 5.

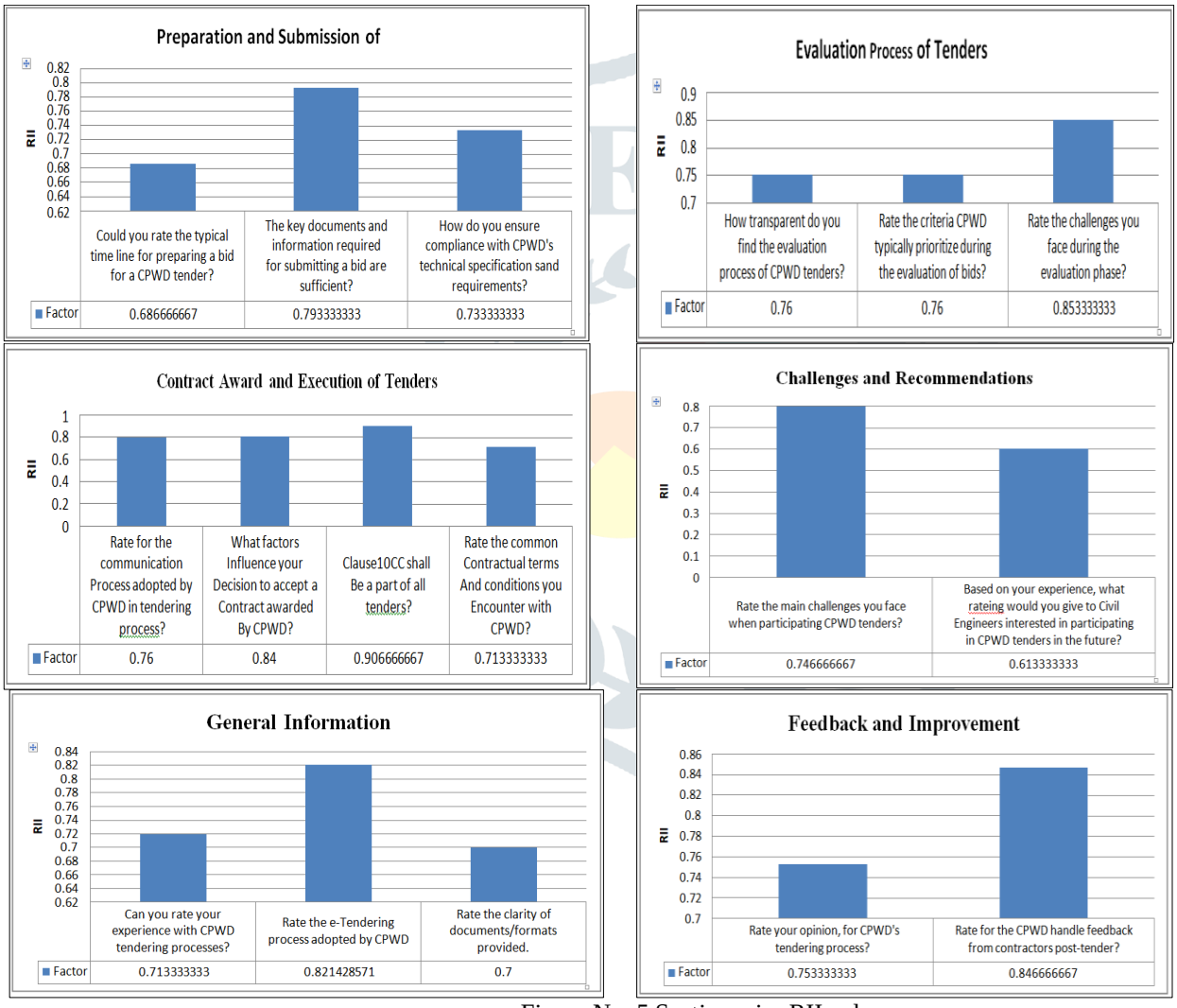


Figure No. 5 Section wise RII values

CONCLUSION:

1. **Efficiency and Transparency**:
   - The high RII rating of 0.8214 for e-Tendering processes highlights their efficiency in streamlining operations and enhancing transparency.
   - Transparency in the evaluation process, rated at 0.76, supports fairness and accountability in bid assessments.

2. **Challenges and Improvements**:
    - Significant challenges during the evaluation phase (RII 0.8533) and overall participation (RII 0.7467) indicate areas needing improvement to reduce barriers and enhance participant success rates.
    - Clarity in contractual terms (RII0.7133) and technical specifications (RII 0.7333) is essential for effective bid preparation and compliance.
3. **Stakeholder Engagement and Satisfaction**:
    - Positive ratings for handling post-tender feedback (RII 0.8467) and communication processes (RII 0.76) reflect effective stakeholder engagement and satisfaction.
    - Overall participant satisfaction (RII 0.7133) and factors influencing contract acceptance (RII 0.84) underscore the importance of responsive and clear communication channels.
4. **Recommendations for Future Research and Policy**:
    - Addressing identified challenges and leveraging successful aspects of CPWD's processes can enhance procedural clarity and stakeholder satisfaction.
    - Future research should focus on refining evaluation criteria (RII 0.76) and nurturing interest among Civil Engineers (RII 0.6133) to ensure sustained engagement and expertise in CPWD tendering processes.
5. **Implications for Public Procurement Practices**:
    - Insights from this study can inform policy development aimed at optimizing public procurement practices within the construction sector.
      By enhancing transparency, efficiency, and stakeholder satisfaction, CPWD can foster a more competitive and equitable bidding environment.

This study provides a structured analysis of CPWD tendering processes, offering actionable recommendations to improve efficiency, transparency, and stakeholder engagement in public procurement practices.

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