AN EXPLORATIVE STUDY FOR THE DEVELOPMENT OF AN AUTOMATION TENDER PROCESSES: A CASE OF KWAZULU-NATAL (KZN) DEPARTMENT OF PUBLIC WORKS

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Abstract

The standard operation procedure establishes an infrastructure delivery management system comprising processes, procedures, and methods within the institution for the delivery or maintenance of infrastructure in a staged, systematic, disciplined, uniformly integrated, and auditable manner. This study aims to investigate factors that militate against tendering processes with the view of developing an automation system for tendering processes at the KwaZulu-Natal (KZN) Department of Public Works (DPW), South Africa. The study was conducted at the KZN DPW. Simple random and convenience sampling techniques were adopted A total of 50 architects, 50 quantity surveyors, 100 contractors and 100 construction managers were surveyed. The findings reveal that "corruption militates against effective tendering system and political and unethical practices are the factors causing poor tendering at KZN DPW. Additionally, time constraints and increased costs impede the automation of the tendering process the most. The *benefit of automated tendering is a reduction in corruption and transparency. The study recommends that the tendering system for the procurement of projects be automated as this will enhance delivery of projects in relation to their benefits.*

Keywords

Tendering, corruption, public works, projects.

1. Introduction

Tendering refers to the process of selecting a contractor to construct a building (Edquist, Nicholas, Vonortas & Zabaka 2014). Tendering systems can be categorized as public and private tendering system, further broken down into selective and nominated tendering, open tendering and negotiated tendering for the purposes of building, management, and collaboration. The characteristics of these systems, along with tender methods commonly used, are described (Edquist, Nicholas, Vonortas & Zabaka 2014). A construction project consists of complex processes involving stakeholders, long project durations, and long contractual relations (Oyegeke and Dickson, 2020). Oyegeke and Dickson (2020) This ranged from the lowest-cost, best-value procurement method to a revised agenda for delivering broader policy goals related to environmental sustainability. However, tendering has not been given adequate attention in project management in KZN PWDs, and the entire South African construction industry has been flooded by corruption (Oyegeke and Dickson, 2020). Tendering is a process that creates, manages, and fulfils contracts between parties. It can be described as a succession of logically related actions occurring or being performed in a definite manner that culminates in the completion of a major deliverable or the attainment of a milestone (International Organization Standardization, 2018). Processes, in turn, are underpinned by methods like a documented, systematically ordered collection of rules and procedures, like the formal steps to be taken in the performance of a specific task, which are informed and shaped by the policy of the organization (IOS, 2018). The need for tendering should serve as the defining criteria for the process and cease when the transaction is completed. There are six

principles of tendering as follows: Determine the requirements for procurement, choose tendering strategies that align with the contract, pricing and targeting strategies, and the procurement procedure.
Ask for tender offers, assess tender offers, and award tenders. Administrate the contract and confirm if all requirements are met. Supply chain operational policies must be followed to implement the tendering principles. Normally, construction projects begin when the client briefs the team on the designs he requires. The architect and engineers prepare designs in conjunction with a quantity surveyor who advises on the cost implications of design variables (Babatunde, Opawole and Ujaddughe, 2010). The supply chain must maximize economic efficiency, promote competition, and allow for fair treatment of competitors during tendering stage. It should maintain integrity in the promotion and fairness of procedures, increase transparency and accountability of procedures, and increase the confidence of the service providers bidding for service delivery (Njeru and Nzau, 2014). South African procurement departments have defaulted in the way they conduct their tendering processes. The fault lies in the manipulation of Personal Protective Equipment (PPE) quotes included in tenders. Currently, the supply chain departments in SA bear responsibility for the mismanagement of R500 billion earmarked for alleviating COVID-19-related. This loss arose due to corruption related to the tendering processes. Based on these findings, the study is initiated to explore methods to automate the tendering process to mitigate against corruption and other associated problems.

2. Literature Review

2.1 Tendering planning

Policy makers, managers, professionals, and academics acknowledge the importance of tender planning for construction projects, spanning across both developed and developing nations. (Basheka, 2008). The development of a tender plan must take into consideration the changing nature of demand requirements and spot market prices (Bonser and Wu, 2009). Bonser and Wu (2001) state that the tendering method must be able to both convince the pre-negotiated contract quantity commitments and take advantage of favorable spot market prices.

Tendering planning refers to the process implemented by companies or public institutions to plan the required activity for a specific duration (Ogubala and Kiarie, 2014). In the construction industry, annual tendering planning can have two basic approaches, namely, myopic planning and static planning (Zhao and Liu 2009). According to Zhao and Liu (2009), a myopic planning approach is a tendering decision that is made at the last moment, which allows managers to take into consideration up-to-date demands and spot market price information. Zhao and Liu (2009) further explain that the static planning approach refers to the detailed planning at the beginning of each year to determine the monthly tendering plan. There is a need for tendering planning as it assists procurement entities or departments to fulfil their requirements and needs in terms of tendering and hence achieve their service delivery objectives (Onyongo, 2014). The KZN DPW, as a public organization, is required to provide its mandated services effectively, efficiently, and reliably (Standard Operational Procedure 2013). The following factors affect tender planning: value of the tendering process, type of procurement, strategic significance to the tendering process and nature of the tender.

2.2 Competency of professional team

The South African local government sector and construction industry have not received good publicity since the establishment of the supply chain management framework in 2003. Currently, the DPW adopts supply chain management in the procurement of projects. The incompetence of the supply chain management officials, due to lack of training, unethical conduct, and lack of political leadership to enforce compliance has regularly been cited as the primary cause for non-compliance with supply chain management policies management policies (Matolong, 2015). Matolong (2015) revealed that in most cases, the supply chain management officials were non-compliant, as it had been found that they conspired with suppliers to purchase overpriced products and services, resulting in the South African Government losing between R25 billion and R30 billion annually. Supplier evaluation is a significant process for any organization intending to do a construction project, mainly because, on average, products or services that are created account for between forty and sixty percent of service delivery (Chemjor, 2015). Hence, the tendering of the construction project requires a competent team to procure the project. Supplier evaluation is one of the activities executed by tendering staff, and its effective execution determines the success or failure of the tendering performance. Chemjor (2015) further stated that many factors contribute to staff incompetence in choosing the right service provider. Some of these factors are “lack of supply chain training, poor ethics within the tendering team and tendering code, ineffective communication and coordination, and information sharing”.

2.3 Effectiveness of tendering process in KZN department of public works

Tender quality control systems are specific operational techniques and activities aimed at monitoring a process and eliminating causes of unsatisfactory performance in the supply chain at a relevant stage of the quality loops to produce economic effectiveness or tendering performance (Siongok & Ismail 2016). Supply chain procurement refers to the collection and processing of deliveries from individual producers, which should be done at high quality. Quality control systems play a crucial role in enhancing tendering performance in the construction supply chain (Siongok & Ismael, 2016). Effective tendering is defined as the standardized purchasing of commodities and the contracting of construction works with careful consideration given to factors such as time, cost, safety, and quality (Gita, 2014; Woolham & Benton, 2013; Noble, 2014; Ambe & Weiss, 2012; Elisana & Weder, 2010). Corruption and misconduct are like pervasive viruses that negatively impact the public domains of many countries around the world (Palozzi, Chirico, Trenta & Romaneli 2019). Corruption could be considered the greatest barrier to economic and social development (Palozzi, Chirico, Trenta & Romaneli 2019). The process of construction tendering is susceptible to a significant risk of engaging in misleading behaviors, which could undermine access to the services and their quality of tendering (Palozzi, Chirico, Trenta & Rommaneli 2019). The implications of corruption in the tendering of construction projects are mainly represented by the acquisition of low-quality and ineffective products that are not aligned with industry (Palozzi, Chiroco, Trenta & Rommeneli 2019).

2.4 Corruption Constrains militating against effective tendering system for the delivery of construction project.

The construction industry's tender awarding processes will require more time since all tender documents should be reviewed and some standard procedures are to be followed (Mohemad, Handam, Othoman and Noor 2010). Public government departments procure a large variety and number of projects from private entities to carry out their normal operational responsibilities and to implement various plans and policies (Padhi and Mohapatra, 2011). Padhi and Mohapatra (2011) further state that many factors affect tender awards, such as the nature of bids, bid vectors, bids divisible, bundle of bids allowed, reserve price, number of bid evaluation stages. and pre-bid meeting.

2.5 The political constraints and unethical practices.

The political constraints hinder the popular support for the tendering process in an economy that is rising and falling with unemployment and a lack of job creation (Dasia & Olofsgard 2019). Empirically, however, the link between the economic effects of reforms and the level of support for the delivery of the construction project gets implicated as unethical practices in the process can be influenced by unethical political decisions. During the tendering process, political influences must be avoided as they can be the main drivers o unethical conduct on the tendering team, such as money laundering, conflict of interest, corruption, and bribes (Dasia & Olofsgard 2019). These are political influences that do not benefit individuals and do not bring freedom to the delivery of the construction project.

2.6 The benefits of automating processes

Automating the KZN DPW process and integrating and seamlessly integrating it into the available tendering system within the enterprise can yield considerable added value and benefits, including cost reduction, competitiveness through enhanced transparency, equality, proportionality, and non-discrimination. Furthermore, such integration enables workflow optimization, boosts performance and throughput, enhances efficiency and effectiveness and ensures total transparency (Wasiew 2021). The introduction of an automation system for construction tender processes results in faster tendering processes, a reduction in the use of paper, ease of documenting transactions, increased level of accountability, ease of accessibility to tendering documents, an increased level of transparency in the process, a reduction in the cost of tendering, increased competition among tenders, increased innovation and creativity, and reduced corruption (Adedeji, Adele, Raphel, Apeyemi & Damilola 2017).

3. Research Methodology

Both qualitative and quantitative studies were undertaken. A case study of the KZN DPW on tendering and procurement practices was conducted. The sample frame consists of professionals working for KZN DPW. The population comprised contractors (100), architects (50), quantity surveyors (50) and construction managers (100). The age range of most of the sample surveyed is between 30 to 50 years old. The years of experience most of the sample surveyed were between 10 and 15 years, with the highest qualifications being B-Tech and a diploma, each having a representation of 21.4 %. The most common types of projects handled are new projects (commercial offices and high rise structures) having a representation of 42.7 %. The population of the professionals that constitute the samples is small; therefore, all samples were selected (Leedy and Ormrod, 2015). Contractors and construction managers have a large sample size, simple random probability selection techniques were used in the selection of respondents. Descriptive statistics was used in the analysis of data. The Cronbach Alpha value for the two construction are above .70 indicating that the factors for the each construct have internal consistency. Based on the discussion above, the respondents for the study were deemed to have adequate knowledge of the construction processes.

3.1 Data Presentation and Analysis

Table 1. Factors causing poor tendering in KZN Department of Public Works.

Factor	Mean Score	Standard Deviation	Weighted Mean	Ranking
Corruption constrains militating against effective tendering system	4.1	1.0	4.09	1
Political constrains and unethical practices	4.1	1.0	4.06	1
Poor tender planning	3.4	0.9	3.37	3
Competency of professional's teams	3.3	0.8	3.31	4
Effective of tender process	3.3	0.8	3.31	4
Benefits of automating processes	2.8	1.3	2.85	6

Table 1 above presents the factors responsible for poor tendering in the KZN DPW. It could be observed that all factors that constitute the construct have an MS (mean score) above 2.5, which is the midpoint of the measuring scale. This indicates that all the factors have a moderate to high influence on causing poor tendering processes. The factors of corruption, political challenges, and unethical practices (MS= 4.1) are the most rated influencing poor tendering processes in the KZN DPW. The likely reasons for these occurrences are the enrichment of the tendering team through corruption and the unfair awarding of contracts to politically connected contractors, thereby enabling the political group to benefit from the contracts as well. These ultimately lead to poor quality work production. Poor tender planning is ranked second with the Mean Score of 3.4. Concerns over the planning and competency of the professional team were raised when projects were delivered late, with budget increases and poor quality suggesting that respondents recognize that internal processes and the skills of the teams are critical areas for improvement. Competency of the professional team members and effectiveness with the MS=3.3. and same standard deviation of 0.8, are ranked fourth. A, MS of 3.3 indicates a moderate or high influence on the factors that can negatively influence the tendering process. Regarding competency, it may be related to the knowledge of the tendering process that may be inadequate and for the effectiveness of the tender process, the tender process may not be able to capture critical information for the vendors assessments.

The lower importance given to the benefits of automation (MS = 2.4) may be due to a lack of exposure to or an understanding of how technology can be leveraged to improve tender processes. There might also be concerns about the implementation costs, resistance to change, or doubts about the feasibility of automation within the current system.

Each of these insights can be valuable for informing decisions about where to focus efforts to improve the tendering system in the KwaZulu-Natal Department of Public Works.

Table2. Effect of lack of automation tender processes in KZN department of public works

Factor	Mean Score	Standard Deviation	Weighted Mean	Rank
Time	3.4	0.8	3.39	1
Cost	3.3	0.7	3.25	2
Quality	3.0	0.8	2.95	3
Safety	2.4	0.9	2.44	4

Table 2. illustrates the effect of a lack of automation on tendering processes at the KZN DPW. It was observed that all factors that constituted the construct have an MS above 2.5 except the last factor, which is safety, with an MS of 2.4. Its MS is very close to the midpoint of the scale, which is 2.5.

The factor time with an MS of 3.4 is the most rated among factors of advice effect on the lack of automation. This was likely the result of projects being delayed lately, with associated factors such as rework and poor workmanship leading to cost increases in projects.

Cost is rated as the second factor adversely affecting the lack of automation of the system, with an MS of 3.3. Mistakes in paperwork, corruption, and political influences result due to the lack of automation of the system. Ultimately, this may lead to the selection of unqualified vendors who deliver projects of poor-quality requiring, continual repetition of work leading to cost increases.

The lowest-rated factor, which is safety, has an MS of 2.4. The MS of this factor is about the midpoint of the measuring scale, which indicates a notable influence regarding the lack of automation of the tendering system.

Table 3. Benefits of automation tendering system for the delivery of construction project in KZN PWD

Factor	Mean Score	Standard Deviation	Weighted Mean	Ranking
Reduced corruption	4.3	0.9	4.33	1
Reduction in the use of paper	4.3	1.0	4.29	2
Competitiveness enhancement by providing transparency	4.2	0.9	4.22	3
Efficiency	4.0	1.0	3.98	5
Reduction in cost of tendering	4.0	1.1	4.00	4
Cost reduction	3.7	0.9	3.65	7
Proportionality	3.5	0.9	3.52	9

Table 3. reveals the benefits of automating the tendering system for the delivery construction project in the KZN DPW. Notably, all factors have an MS above 3.5, which means that they all have moderately high to high benefits from the automation of the tendering system. The factor that reduces corruption has an MS of 4.3. Essentially, automating processes lessens the likelihood of corruption, thereby enhancing the effectiveness and efficiency of the system.

The second rated factor regarding the benefits of automation of system is the reduction in paperwork. This has a positive impact on the overall cost of the process. Furthermore, embracing paperless practices in business in this digital era is advocated, not only for compliance but also to contribute to the preservation of forests for the benefit of future generations.

The third benefit of automation of processes is that competitiveness is enhanced by providing transparency. People do not believe in a system that is not transparent. Transparency may lead to competitiveness, engendering high-quality products, and the delivery of projects within time, cost, and safety due to the selection of the rightly qualified vendor for the project.

The factor with the lowest ratings performance, with an MS of 3.5. Despite being ranked lowest in terms of benefits; it holds significance. Transparency due to the automation of the aforesaid tendering system may lead to the selection of performing vendors by procuring projects without delay and of high quality.

According to the research findings, the KZN DPW must consider adopting an automated tendering system to improve the current tendering processes. It is recommended that the KZN DPW consider upgrading the manual tendering system to automated tendering systems to move with the times as the world is progressing to digital systems. The automation of the tendering system at the KZN DPW will lead to the following:

- The elimination of corruption in the tendering system.
- A reduction in the cost of the tendering process.
- Provide transparency in the system.
- Stakeholders (contractors and others) will be encouraged to participate more in construction.
- The efficiency of the system will be enhanced.
- Ensure delivery of the project by the eliminating project abandonments through the careful selection of qualified contractors.

4. Discussion

The study finding on corruption and politics as factors contributing the most to poor tendering processes agrees with Phiri and Smallwood's (2010) finding that corruption is rooted in poorly functioning institutions as well as in policies that undermine free trade and competition in South African tendering processes.
The influence of politics on tendering processes is not a unique occurrence in KwaZulu Natal and South Africa at large, as many third world countries are or have had similar experiences of political incitement in the awarding of public tenders (Chilunjika 2022).
Time and cost increases are found to have the most effect on poor tendering processes. This finding complements the finding of the study by Redzuan and Rahman (2018), which further states that in most cases, the failure of a project is mainly related to the influence of the quality of tendering. The effects of delays are costly to all parties concerned, and very often they will result in disagreement, cost overruns, arbitration, litigation, total abandonment, and project infeasibility. This therefore suggests a need for automated tendering.
This study finds that the automation of the tendering process at the KZN DPW may lead to benefits such as reduced corruption and paper, enhanced competitiveness, and transparency. This is in alignment with the study by Wasiew (2021), which states automated tendering can improve the lack of transparency and bias in the construction industry.

5. Conclusions

The study concludes that, in relation to the factors causing poor tendering, corruption, political constraints and unethical behavior are the topmost. Time and cost increases are the effects of a poor tendering system, and among the benefits that can accrue due to automating processes, the reduction of corruption and transparency are the topmost.

6. Recommendation

According to the research findings, the KZN DPW must consider adopting an automated tendering system to improve the current tendering processes. It is recommended that the KZN DPW consider upgrading the manual use of automated tendering systems to move with time as the world is moving to digital systems. The automation of the tendering system at the KZN DPW will lead to the following:

- Elimination of corruption in the tendering system.
- Reduction of the cost of the tendering process.
- Provide transparency in the system.
- Encourage stakeholders (contractors and others) to participate more in construction.
- Enhance the efficiency of the system.
- Afford delivery of the project by the eliminating project abandonments caused by the selection of qualified contractors.

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