

An Evaluation of Automated Tendering Systems as a Solution to Challenges in Traditional Tendering Processes

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Abstract

Traditional tendering processes are frequently associated with prolonged procurement timelines, high administrative costs, limited transparency, and vulnerability to human error and corruption. Although digital procurement and e-tendering have received increasing attention, there remains limited integrated analysis of how automated tendering can address the operational and governance weaknesses of traditional tendering while accounting for the conditions that shape successful implementation, particularly in developing contexts. This study evaluates automated tendering systems as a digital solution to challenges in traditional tendering processes and examines the main barriers that may limit their effectiveness. A qualitative exploratory research design was adopted using a structured systematic literature review and thematic content analysis of peer-reviewed journal articles, conference papers, policy documents, and practitioner-oriented sources relevant to e-procurement, e-tendering, digital transformation, and procurement performance. The literature was examined through recurring themes concerning procurement efficiency, transparency, accountability, technological readiness, human capacity, regulation, and organisational change. The findings indicate that automated tendering can reduce manual intervention, improve procurement efficiency, strengthen transparency and accountability, and improve access to procurement information. However, these benefits are constrained by inadequate technological infrastructure, limited digital literacy, regulatory uncertainties, and resistance to organisational change. The study's novelty lies in integrating these technological, human, institutional, and organisational dimensions through the Technology Acceptance Model (TAM), rather than treating implementation barriers as isolated factors. The study therefore contributes an integrated perspective showing that successful automation depends not only on the availability of digital systems, but also on users' perceptions, institutional readiness, and the wider procurement environment. The study concludes that investment in infrastructure, regulatory support, capacity development, and change management is required to realise the full benefits of automated tendering.

Keywords: automated tendering, e-procurement, procurement efficiency, transparency, digital transformation, technology acceptance

1. Introduction

Tendering is a fundamental component of procurement, functioning as the formal process through which organisations invite, evaluate, and award contracts for goods, services, and works (Waruguru, 2015). Traditionally, tendering has relied heavily on manual and paper-based processes involving physical document submission, administrative checking, evaluation, and contract award. Although such processes remain widely used, they have been associated with inefficiencies, prolonged timelines, high administrative costs, human error, and opportunities for bias and information asymmetry (Waruguru, 2015). These weaknesses are particularly important in construction procurement, where delays in tender evaluation and award can affect project mobilisation, contractor participation, and overall procurement performance.

Digital innovations in procurement, particularly automated tendering systems, provide an alternative to many of these limitations (Nicoletti, 2018). As part of broader e-procurement systems, automated tendering platforms can digitise and automate activities such as tender advertisement, bid submission, document handling, evaluation, communication, and contract award. Centralising these activities on digital platforms has the potential to reduce administrative overhead, standardise procurement workflows, improve data accuracy, and strengthen auditability through electronic records and traceable processes (Emenogu & Adedokun, 2025).

The potential benefits of automation, however, should not be interpreted as evidence that digital systems are automatically successful once introduced. Studies of e-tendering and e-procurement adoption identify inadequate technological infrastructure, resistance to organisational change, limited digital literacy, and regulatory uncertainty as important implementation

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barriers (Mohungoo, Brown & Kabanda, 2020; Uhaila et al., 2025; Inusah, Kazaz & Ulubeyli, 2025). These factors indicate that procurement digitalisation is both a technological and organisational transformation. A system may offer sophisticated functionality, but its value can be reduced if users cannot access it reliably, lack the skills to use it, or do not operate within a supportive institutional and legal environment.

1.1. Research gap and rationale

Existing literature has contributed substantially to understanding e-procurement adoption and the barriers associated with digital tendering. However, much of the discussion focuses on individual barriers or on the technical benefits of digital procurement. Less attention is given to the way technological, human, organisational, and regulatory conditions interact to determine whether automated tendering can actually resolve the inefficiencies and governance weaknesses of traditional tendering. This is particularly relevant in developing contexts, where infrastructure constraints, skills shortages, institutional capacity, and regulatory uncertainty may influence technology adoption simultaneously.

The gap addressed by this study is therefore not simply the absence of literature on e-tendering, but the limited integrated evaluation of its potential benefits and implementation constraints. The study responds to this gap by synthesising the available literature around the major operational and implementation themes and interpreting their relationships through the Technology Acceptance Model (TAM). This provides a more integrated view of automated tendering in which technology acceptance is considered alongside infrastructure, skills, regulation, and organisational readiness.

1.2. Aim and objective

The aim of the study is to critically evaluate automated tendering systems as a solution to challenges in traditional tendering processes. The specific objective is to evaluate the effectiveness of automated tendering systems in addressing inefficiencies associated with traditional tendering and to identify the key challenges affecting their implementation.

2. Literature Review

The literature review focuses on the main factors that influence the implementation and effectiveness of automated tendering systems. Rather than treating these factors as independent technical problems, the review examines their relationships and considers how they influence the acceptance and actual use of digital tendering.

2.1. Inadequate Technological Infrastructure

Automated tendering depends on reliable internet connectivity, appropriate information and

communication technology (ICT) infrastructure, secure digital platforms, and dependable systems for electronic submissions, evaluation, communication, and document storage. In many developing economies, these requirements are not consistently available. Unreliable connectivity, high infrastructure costs, and unstable power supply can therefore limit the practical operation of e-tendering systems (Uhaila et al., 2025).

The literature also indicates that infrastructure is broader than internet access alone. Limited broadband coverage, outdated ICT systems, and incompatibility between legacy systems and newer procurement platforms can prevent organisations from obtaining the full benefits of automation (Inusah, Kazaz & Ulubeyli, 2025). Research on digital government similarly identifies infrastructure gaps and technological incompatibility as constraints on effective digital service delivery (Mangai & Ayodele, 2025).

Critically, these findings suggest that infrastructure should be understood as an enabling condition rather than simply another implementation cost. Where users experience unstable access or system failures, the perceived ease of use of an automated tendering system is likely to decline. Thus, infrastructure can influence technology acceptance as well as the technical availability of the system. Investment in hardware and connectivity without corresponding attention to system usability and organisational capacity may therefore produce limited returns.

2.2. Resistance to Change

Resistance to change represents a significant organisational barrier to the adoption of automated tendering systems. Procurement professionals, contractors, and other stakeholders accustomed to paper-based procedures may perceive digital platforms as complex, risky, or disruptive to established practices. Uncertainty about new technology and concerns about changes to existing responsibilities can contribute to reluctance to adopt new systems (Uhaila et al., 2025).

Literature reviews of public e-procurement also identify organisational culture, leadership attitudes, stakeholder behaviour, and organisational politics as factors that influence implementation (Mohungoo, Brown & Kabanda, 2020). However, the literature does not necessarily support the view that resistance is permanent. Adequate training, awareness, leadership support, and user involvement can reduce resistance and increase acceptance. This distinction is important because it shifts the interpretation of resistance from an inherent weakness of automated tendering to a transitional management issue that can be influenced by implementation strategy.

2.3. Limited Digital Literacy

Limited digital literacy among procurement officials, suppliers, and contractors can restrict the effective use

of automated tendering systems. Users require sufficient ICT skills to navigate procurement portals, upload and retrieve documents, complete electronic submissions, and respond to system requirements. The literature indicates that shortages of skilled personnel can affect system configuration, maintenance, troubleshooting, and secure data management (Inusah, Kazaz & Ulubeyli, 2025).

Digital literacy is therefore closely connected to perceived ease of use. A platform may be technically capable of simplifying procurement, but users with limited digital confidence may experience the same platform as difficult to operate. Research on digital public services similarly shows that insufficient training and limited exposure to digital technologies can reduce user confidence and discourage adoption (Mangai & Ayodele, 2025). Capacity building should consequently be regarded as part of the implementation system rather than as an optional activity after the technology has been procured.

2.4. Regulatory Uncertainties

Regulatory and legal uncertainty is another important challenge. Effective e-tendering requires procurement rules that recognise electronic documentation, digital signatures, electronic communication, online evaluation, and the evidentiary value of digital records. Where procurement regulations were developed primarily around paper-based procedures, uncertainty may arise regarding the legal status of electronic transactions and the management of disputes (Inusah, Kazaz & Ulubeyli, 2025).

The regulatory environment can therefore influence confidence in automated tendering beyond the functionality of the technology itself. Clear policies, standards, and procedures can strengthen trust and institutional readiness, whereas unclear rules may discourage adoption even where appropriate ICT infrastructure exists. Research on public e-procurement similarly identifies the policy and regulatory environment as an important condition for digital procurement adoption (Mohungoo, Brown & Kabanda, 2020; Inusah, Kazaz & Ulubeyli, 2025).

2.5. Critical synthesis of the literature

The four themes identified in the literature are interconnected rather than mutually exclusive. Infrastructure determines whether a system can be accessed reliably; digital literacy influences whether users can operate it effectively; regulation determines whether electronic processes are supported by a legitimate governance framework; and organisational change affects whether users are willing to incorporate the system into routine procurement practice. The literature therefore suggests that implementation success depends on the interaction between technical capability and the environment in which the technology is introduced.

There is also an important distinction between the existence of an automated tendering platform and the realisation of its intended benefits. A digital system may reduce paperwork and create electronic audit trails, but these advantages can be weakened by poor connectivity, low user competence, unclear procedures, or resistance. Conversely, infrastructure investment and training may increase the perceived usefulness and ease of use of the technology, strengthening users' willingness to adopt it. This interrelationship provides the basis for applying TAM as the theoretical lens for the study.

2.6. Theoretical framework: Technology Acceptance Model

This study is underpinned by the Technology Acceptance Model (TAM), which explains technology adoption through constructs including perceived usefulness and perceived ease of use. The model is relevant to automated tendering because procurement officials, contractors, and other users are more likely to accept digital procurement platforms when they perceive them as useful, accessible, and capable of improving their work.

As illustrated in Figure 1 (Appendix 1), perceived ease of use and perceived usefulness influence users' attitudes and behavioural intention to use the system, which in turn supports actual system use. The framework in this study extends the interpretation by positioning inadequate infrastructure, resistance to change, limited digital literacy, and regulatory uncertainty as external conditions that can influence these TAM constructs. For example, limited digital literacy can reduce perceived ease of use, while evidence that automation improves efficiency and transparency can increase perceived usefulness. Regulatory uncertainty and organisational resistance can affect attitudes and behavioural intention, even where the technology itself is functional.

3. Methodology

3.1. Research design

The study adopts a qualitative exploratory research design to evaluate automated tendering systems as a solution to challenges inherent in traditional tendering processes. An exploratory approach is appropriate because automated tendering continues to evolve and its effectiveness is shaped by contextual, organisational, technological, and institutional conditions. The design enables the study to synthesise findings from existing empirical research, conceptual analyses, policy literature, and documented procurement experiences rather than reducing the issue to a purely statistical assessment.

3.2. Data collection and literature selection

The study relies primarily on a systematic literature review of secondary sources. The source base comprised peer-reviewed journal articles, conference papers, policy documents, and practitioner reports relevant to e-procurement, automated tendering, digital transformation in procurement, and public-sector digitalisation. Sources published within the previous 15 years were prioritised to capture contemporary developments in digital procurement, while seminal earlier works were retained where they were conceptually important.

The selection process was guided by relevance to the study objective. Literature was considered when it examined automated tendering, e-tendering, broader e-procurement systems, limitations or inefficiencies in traditional tendering, digital transformation in public or private procurement, or implementation conditions such as infrastructure, regulation, and user readiness.

3.5. Trustworthiness and rigour

Trustworthiness was addressed through the use of multiple categories of secondary sources, including scholarly literature, government and policy material, and conference publications. The use of different source types provided an element of triangulation and reduced reliance on a single perspective. In addition, the inclusion and exclusion criteria provided a consistent basis for determining relevance, while thematic coding was applied systematically to maintain coherence between the literature, the identified themes, and the interpretation of findings.

The study also maintained conceptual consistency by relating the thematic findings to the TAM constructs. Where literature presented different interpretations, these were considered during synthesis rather than assuming that all sources reached the same conclusion. This was particularly relevant to resistance to change, where the literature suggests that resistance may

Inclusion criteria	Exclusion criteria
Studies focusing on automated tendering, e-tendering, or broader e-procurement systems.	Articles unrelated to procurement or digital tendering.
Research examining limitations or inefficiencies in traditional tendering.	Studies focusing exclusively on supply chain management or logistics without a procurement component.
Publications discussing digital transformation in public or private procurement.	Highly technical ICT papers that do not address process-level procurement outcomes.
Studies addressing implementation challenges such as infrastructure, regulation, and user readiness.	

3.3. Inclusion and exclusion criteria

3.4. Data analysis procedure

The selected literature was analysed using thematic content analysis. The analysis proceeded through four interrelated stages. First, relevant literature was reviewed to identify evidence concerning the performance and implementation of automated tendering. Second, recurring statements and findings were coded according to their substantive meaning, including efficiency, transparency, accountability, infrastructure, digital skills, regulation, and organisational readiness. Third, related codes were grouped into broader themes. Finally, the themes were compared across the selected literature to identify dominant patterns, areas of convergence, and relationships between implementation conditions and expected procurement outcomes.

The analysis was interpretive rather than statistical. The purpose was to establish patterns across the literature and explain how the identified factors may interact. The final themes were then interpreted through TAM so that the findings could be connected to perceived ease of use, perceived usefulness, attitude, behavioural intention, and actual system use. This analytical step strengthens the link between the literature review and the theoretical framework.

decrease when training and leadership support are provided.

3.6. Ethical considerations

Ethical clearance was not required because the study relied exclusively on secondary information obtained from publicly available scholarly literature and policy documents and did not involve human participants or the collection of personal data. Nevertheless, academic integrity was maintained by acknowledging the original sources and presenting the reviewed literature accurately. The study does not claim to have collected primary participant data.

3.7. Limitations of the methodology

The study is limited by its reliance on secondary literature and therefore does not provide primary empirical evidence from procurement officials, contractors, or clients. The findings should consequently be interpreted as an integrated synthesis of existing knowledge rather than as a direct measurement of the performance of a specific automated tendering platform. In addition, differences in procurement environments across countries may limit the direct transferability of individual findings. These limitations also provide a basis for future research using interviews, surveys, case studies, or

comparative evaluations of operational e-tendering systems.

4. Findings

The thematic analysis identified four major implementation themes: inadequate technological infrastructure, limited digital literacy and skills, regulatory and institutional uncertainty, and resistance to organisational change. At the same time, the reviewed literature indicates that automated tendering can improve procurement efficiency, transparency, accountability, and access to procurement information. The findings therefore show a dual relationship: automation provides potential performance benefits, but those benefits depend on the conditions under which the system is implemented.

4.1. Summary of thematic findings

Theme	Core finding	TAM interpretation	Implication
Inadequate technological infrastructure	Poor connectivity, unreliable power, outdated ICT systems, and system incompatibility can constrain implementation.	Infrastructure can reduce perceived ease of use and limit actual system use.	Infrastructure investment is a foundational requirement for automation.
Limited digital literacy and skills	Insufficient user competence can reduce confidence and effective utilisation of digital tendering platforms.	Limited skills may reduce perceived ease of use and behavioural intention.	Training and continuing support should accompany implementation.
Regulatory and institutional uncertainties	Unclear legal and policy frameworks can create uncertainty around electronic procurement processes.	Uncertainty can weaken confidence, attitudes, and willingness to use the system.	Digital tendering requires supportive and clearly defined governance arrangements.
Resistance to organisational change	Stakeholder reluctance can delay adoption and reduce effective integration into procurement practice.	Resistance can negatively affect attitude and behavioural intention.	Change management, leadership support, and stakeholder engagement are required.

4.2. Procurement benefits of automation

The literature reviewed indicates that automated tendering can address several weaknesses associated with traditional procurement. Digital workflows can reduce manual intervention and administrative handling, shorten processes, and improve the availability of procurement information. Electronic records can also strengthen transparency and accountability by providing traceable information about tender activities and decisions (Nicoletti, 2018; Emenogu & Adedokun, 2025).

These benefits correspond closely with the perceived usefulness construct in TAM. Where users can see that an automated system reduces paperwork, improves

access to information, or makes procurement activities more efficient, the perceived value of the technology is strengthened. The benefit is therefore not simply the replacement of paper with electronic documents; it is the potential improvement of procurement processes and governance.

4.3. Implementation barriers and their interrelationship

Technological infrastructure emerged as a dominant implementation concern. However, the analysis indicates that infrastructure cannot be separated from the human and institutional dimensions of adoption. For example, an unstable digital environment can make a system difficult to use, while limited digital skills can make an otherwise functional platform appear complex. Similarly, regulatory uncertainty may reduce confidence in electronic processes, while organisational resistance can prevent users from incorporating the system into routine work.

The findings therefore indicate that implementation barriers operate cumulatively. Addressing one factor in isolation may not be sufficient. This supports an integrated implementation approach in which technology, skills, regulation, and organisational change are planned together.

5. Discussion

The findings reinforce the view that automated tendering can improve procurement performance, but they also show that the introduction of technology does not, by itself, guarantee successful digital transformation. The main value of the findings is

therefore in demonstrating the relationship between procurement benefits and the conditions required to realise them.

5.1. From technological solution to socio-technical transformation

Traditional tendering problems are often framed as process inefficiencies that can be solved through digitisation. The reviewed literature suggests a more complex position. Automation can improve process speed, reduce manual handling, and strengthen transparency, but these outcomes depend on the surrounding socio-technical environment. This means that automated tendering should be treated as an organisational transformation rather than simply an ICT procurement exercise.

This interpretation extends the discussion of infrastructure. While infrastructure emerged as a dominant barrier, its importance is partly derived from its effect on users and processes. A reliable platform can support ease of use and actual use, whereas unreliable access can undermine both. The finding consequently supports the TAM proposition that perceived ease of use matters, while showing that ease of use is also shaped by conditions outside the software itself.

5.2. Human capacity and technology acceptance

The findings on digital literacy demonstrate that human capacity is central to procurement digitalisation. Users who lack confidence in navigating digital platforms may be less likely to perceive the technology as easy to use, regardless of its technical capabilities. This provides a direct connection between the literature on digital skills and TAM. Training is therefore not merely an implementation support activity; it is part of the process through which users develop confidence and willingness to adopt the technology.

The same argument applies to resistance to change. Rather than treating resistance as evidence that users reject technology in principle, the literature indicates that resistance may be influenced by uncertainty, inadequate training, leadership, and organisational culture (Mohungoo, Brown & Kabanda, 2020; Uhaila et al., 2025). This suggests that implementation strategies that involve users, communicate benefits, and provide sustained support may improve attitudes and behavioural intention.

5.3. Regulation, trust and governance

The regulatory findings highlight an additional dimension that is not fully captured when e-tendering is viewed only as a technical system. Procurement decisions operate within legal and governance frameworks. Where rules do not clearly recognise electronic submissions, signatures, records, and evaluation procedures, uncertainty may reduce

institutional confidence in automation. Regulatory clarity is therefore a prerequisite for translating technical capability into legitimate procurement practice.

This also connects with the governance benefits associated with automated tendering. Electronic audit trails and standardised processes can strengthen transparency and accountability, but these benefits depend on stakeholders trusting the system and understanding the rules under which it operates. Automated tendering therefore has the potential to strengthen governance, but governance readiness is itself necessary for successful automation.

5.4. Extending existing knowledge through an integrated TAM perspective

The study extends the existing discussion by bringing together factors that are often examined separately. Infrastructure, digital literacy, regulation, and resistance are not simply four independent barriers; they interact with the technology acceptance process. Infrastructure and skills influence perceived ease of use, the efficiency and transparency benefits influence perceived usefulness, organisational resistance influences attitude and behavioural intention, and regulatory conditions influence confidence in actual system use.

This integrated interpretation helps explain why organisations may experience different outcomes from similar automated tendering technologies. The technology may be broadly comparable, while the surrounding conditions of implementation differ. The contribution of the study is therefore the synthesis of technological, human, organisational, and institutional factors into a single interpretation of successful automated tendering adoption.

6. Contribution to Knowledge

The study contributes to procurement and construction management literature in three related ways. First, it provides a consolidated evaluation of automated tendering by considering both its potential benefits and the conditions that constrain implementation. This moves the discussion beyond a simple comparison between manual and digital processes.

Second, the study provides a theoretical contribution by applying TAM to automated tendering while explicitly linking technology acceptance to external implementation conditions. The framework shows how infrastructure, digital literacy, organisational resistance, and regulatory uncertainty can influence perceived ease of use, perceived usefulness, attitudes, behavioural intention, and actual system use.

Third, the study offers a practical and contextual contribution by emphasising that successful digital procurement requires coordinated action across

technology, people, organisations, and institutions. This is particularly relevant to developing procurement environments where infrastructure and institutional constraints may influence adoption alongside the technical characteristics of the system.

7. Conclusion

This study evaluated automated tendering systems as a solution to challenges associated with traditional tendering processes. The review indicates that automation has the potential to improve procurement efficiency, reduce manual intervention, improve access to information, and strengthen transparency and accountability. However, the realisation of these benefits depends on the environment in which the technology is implemented.

Four interconnected barriers were identified: inadequate technological infrastructure, limited digital literacy and skills, regulatory and institutional uncertainties, and resistance to organisational change. The findings show that these barriers should not be considered in isolation. They influence users' perceptions and willingness to adopt the technology and can ultimately determine whether an automated tendering system is used effectively.

Using TAM as an analytical lens, the study demonstrates that successful adoption requires more than technical functionality. Users need to perceive the system as useful and easy to use, while organisations need to provide the infrastructure, skills, leadership, governance arrangements, and regulatory certainty required for sustained use. The study therefore concludes that automated tendering represents a practical opportunity for improving procurement, but its effectiveness depends on an integrated implementation strategy.

8. Recommendations

8.1. Investment in technological infrastructure

Governments and organisations should prioritise reliable digital infrastructure to support automated tendering. This includes improving internet connectivity, upgrading ICT systems, addressing system compatibility, and ensuring dependable power supply. Infrastructure planning should be treated as a prerequisite for reliable system use rather than as an activity undertaken after procurement software has been acquired.

8.2. Capacity building and digital skills development

Training programmes should be implemented for procurement officials, contractors, and suppliers. Continuous professional development should cover platform use, electronic documentation, digital submission procedures, and relevant cybersecurity

practices. Training should continue beyond initial implementation so that users can develop confidence and respond to system changes.

8.3. Strengthening legal and regulatory frameworks

Policymakers should review and update procurement regulations to accommodate electronic procurement processes. Legal frameworks should clearly recognise electronic submissions, digital signatures, online tender evaluation, electronic records, and procedures for resolving disputes arising from digital procurement.

8.4. Change management and stakeholder engagement

Organisations should implement structured change-management strategies to address resistance to automated systems. Awareness programmes, stakeholder consultations, leadership support, user participation, and pilot implementation can help users adapt to new procurement processes and increase confidence in the technology.

8.5. Continuous monitoring and system improvement

Organisations adopting automated tendering should establish mechanisms for monitoring system performance and collecting user feedback. Continuous evaluation can identify operational problems, usability issues, training needs, and emerging regulatory requirements, allowing the system to remain responsive to procurement needs.

9. Areas for Future Research

Future studies should complement this literature-based analysis with primary empirical research involving procurement officials, contractors, consultants, and clients. Interviews or surveys could be used to examine how the identified TAM constructs operate in practice. Case studies of implemented e-tendering platforms could also compare procurement outcomes before and after automation. Comparative research across developing and developed procurement environments would further help determine how infrastructure, institutional capacity, and regulatory conditions influence the effectiveness of automated tendering.

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Appendix 1

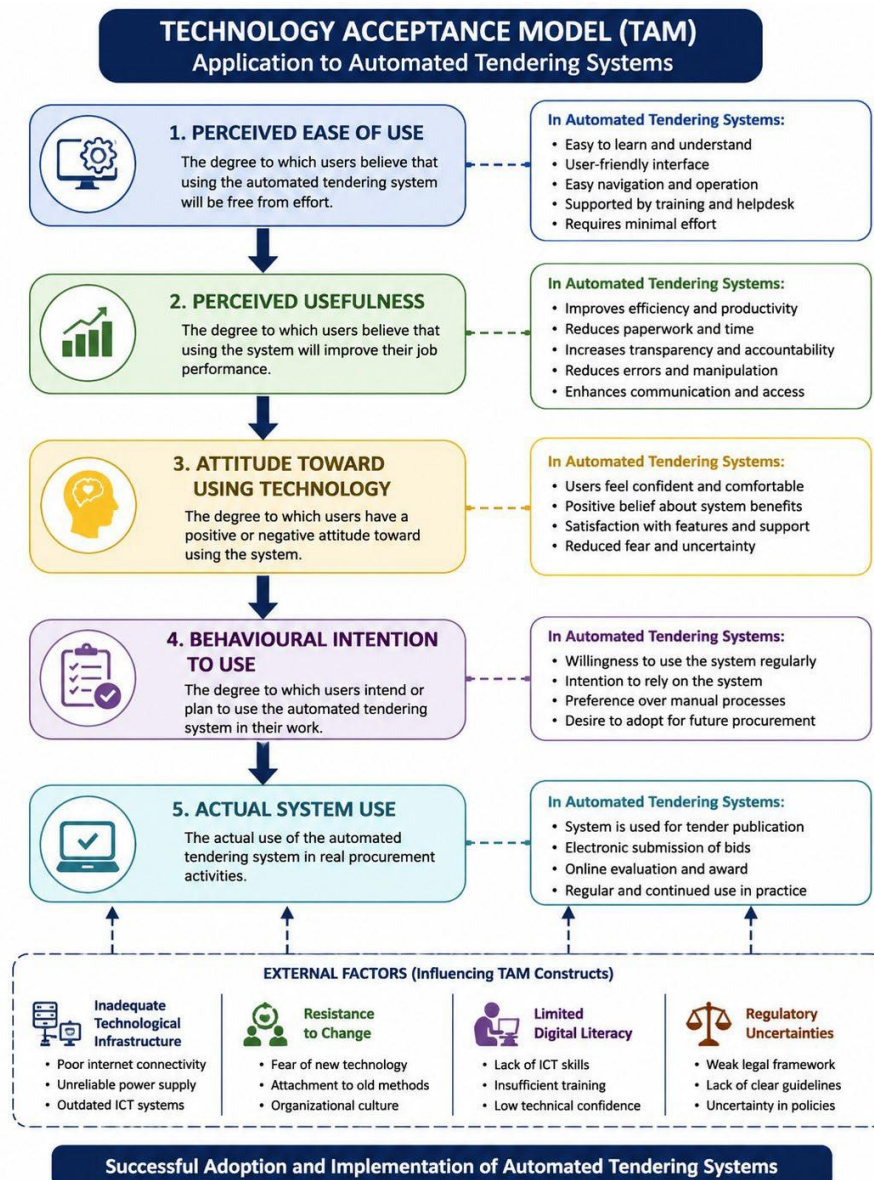


Figure 1: Theoretical Framework – Technology Acceptance Model applied to Automated Tendering Systems