Exploring Challenges in the Implementation of the E-Tender System Application in Malaysian Construction Public Procurement

Danial Ezryafif Nor Ashikin[1], *Kharizam Ismail[2], Nor Suzila Lop[2] and Muhammad Imran Zin Zawawi[3]

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Abstract: The electronic tendering system (e-tendering) has replaced the traditional processes in carrying out the tendering process in Malaysia's construction procurement. However, issues, such as a lack of system capability and insufficient important features in the system, have arisen in the adoption of the e-tendering system, which causes users' dissatisfaction with the system's capabilities and performance. Thus, the objectives of the research were to identify the current issues and challenges in implementing the e-tendering system in Malaysian public construction procurement. The research objectives were attained by applying a qualitative approach via semi-structured interviews. A total of 11 participants representing contractors and public authorities, including the Public Works Department (PWD) with experience in using e-tendering systems, were involved. The data collected was transcribed and analysed using ATLAS.ti qualitative software. The research findings indicated that users encountered issues such as poor performance of the system, frequent website crashes, difficulties utilising Microsoft Excel as tender documents and issues getting notifications regarding addenda. These issues made the system difficult to operate and disrupted the tendering process. The findings of this research can provide a foundation for the establishment of a good and efficient e-tendering system to enhance user satisfaction in Malaysia's construction procurement.

Keywords: Challenges, Construction public procurement, E-tendering system, Issues, Preliminary survey

INTRODUCTION

The electronic tendering system (e-tendering) replaces the conventional tendering process. According to Kajendran (2022), Riadi (2022), Galadima and Waziri (2022) and Elias (2021), e-tendering is the procedure used for selecting a qualified contractor on an electronic platform that is accessible to all registered tenderers. The process is implemented electronically via online and internet. The system is created as one of the tools to assist practitioners in contract management and change the way of working to be

[1]Postgraduate Studies, Department of Built Environment Studies and Technology, Faculty of Built Environment, Universiti Teknologi MARA, 32610 Seri Iskandar, Perak, MALAYSIA
[2]Department of Built Environment Studies and Technology, Faculty of Built Environment, Universiti Teknologi MARA, 32610 Seri Iskandar, Perak, MALAYSIA
[3]Public Works Department of Malaysia (PWD), Menara Tun Ismail Mohamad Ali, Jalan Raja Laut, 50350 Kuala Lumpur, MALAYSIA
*Corresponding author: khari511@uitm.edu.my

more systematic (Galadima and Waziri, 2022). A study in Indonesia found that the implementation of an e-tendering system improved transparency in the process of tendering and reduced stress among workers (Nurdin and Pettalongi, 2022). Its implementation in Indonesia brings advantages to industry players through less, more organised and systematic workload. Besides, the new work process depends on the information technology facilities, the internet, the digital network and software.

According to Mehdipoor et al. (2022), Nizakat et al. (2022) and Budianto, Rarasati and Nursin (2021), the additional advantage of implementing an e-tendering system is reducing the time and costs during the tendering process. Cost efficiency is achieved by eliminating the need to print out tender documents for purchase purposes by simplifying the process to physically generate these documents. Eliminating physical tender documents significantly decreases paper usage, thus encouraging environmentally friendly practices. It is supported by Mehdipoor et al. (2022) and Sunmola and Shehu (2020), who have highlighted that minimising paper consumption and reducing printer toner usage are actions that contribute to a more environmentally sustainable approach. An additional benefit that may be obtained in implementing an e-tendering system is enhanced communication among participants during the tendering process. Khahro et al. (2021) state that effective communication in tender management can be achieved by delivering consistent and equitable information to all industry players, regardless of location. Effective communication will optimise the efficiency of the tendering process while ensuring fairness by providing tenderers with accurate and unbiased information. As mentioned by Kajendran (2022), clear communication can be accomplished by integrating an e-tendering system.

In general, Betts et al. (2006) state that the tendering process begins with the registration of tenderers and concludes with the signing of the legal agreement for the awarded tender. Delima and Dachyar (2020) reveal that the e-tendering system has five primary processes: (1) commencing in planning, (2) preparation for procurement, (3) preparation towards selection, (4) selection process and implementation of a contract and (5) handing over the project to the successful contractor. Meanwhile, Sunmola and Shehu (2020) describe that the e-tendering system begins with the announcement of the tender, purchase tender, submission of the bid and tender award. It describes that the tendering process begins at the initial stage and continues until the tender is awarded. The aforementioned process pertains to the functions of the e-tendering system for the clients, while the functions for the tenderers commence with user registration and end with the signing of the letter of award.

Previous studies revealed a variety of issues and challenges encountered in the implementation of e-tendering systems, including poor system capabilities (Akmal and Ahmad Dahlan, 2022; Abdullahi et al., 2019) and features (Sunmola

and Shehu, 2020; Al Yahya et al., 2018). According to Akmal and Ahmad Dahlan (2022), frequent website crashes pose a major issue in the utilisation of the e-tendering system, negatively impacting the system's performance throughout the tendering process. Furthermore, practitioners encounter issues with the complexity of utilising the e-tendering system (Husin et al., 2019). The system should enhance user-friendliness and facilitate efficient management. As noted by Sunmola and Shehu (2020), performance of the system, ease of use and effectiveness of the system are the determining factors in user satisfaction. Additionally, practitioners face challenges due to a lack of clear guidelines for implementing the e-tendering system. Al Yahya et al. (2018) support this by noting the insufficiency of guidelines for implementing the system. The lack of guidelines in the development of the e-tendering system will result in a shortage of system features. As mentioned by Sunmola and Shehu (2020), the classification and significance of required features have yet to be prioritised in the e-tendering system.

The issues and challenges associated with e-tendering have persisted since it was first introduced and most of them remain unresolved to this day. Consequently, an in-depth analysis of issues related to e-tendering is essential to ascertain the main causes and develop effective solutions to ensure the success and future viability of the e-tender system. Moreover, previous studies on the e-tendering system are general; thus, a study focusing on the Public Works Department's (PWD) JKR e-tender (JET) system is necessary. Hence, the preliminary survey was executed to identify the current issues and challenges related to the implementation of an e-tendering system in construction public procurement and to suggest enhancements to the system in Malaysian public procurement.

Implementation of E-Tendering System

The worldwide construction industry is embracing e-tendering systems as an innovative way to perform procurement processes. Several prior studies have shown the worldwide adoption of the e-tendering system. Notably, Akaba et al. (2020) conducted a study in Nigeria, Kajendran (2022) in Sri Lanka, Nizakat et al. (2022) in Pakistan and Sunmola and Shehu (2020) in the United Kingdom and found the challenges faced by the construction industry in implementing the e-tendering system. Akaba et al. (2020) conducted studies in Nigeria and found that despite the development of e-procurement, the conventional process was still being utilised. Similar findings by Kajendran (2022), the industry players in Sri Lanka were opposed to the proposed changes and advocated for the conventional process. Despite the advancement of electronic technology, industry players continue to adhere to traditional practices. According to Kajendran (2022), the full execution of the e-tendering system still has not been completely embraced due to potential vulnerabilities to cyberattacks and system crashes. The issue is related to the quality of

the security system provided by the platform. Akaba et al. (2020) state that industry players are hesitant to switch from the conventional process to an e-tendering system due to concerns over security. Enhancing the security of the system must be prioritised to gain the trust of industry players and encourage the adoption of technological advancements.

Besides, the complexity involved in managing the e-tendering system poses a limitation to its adoption (Nizakat et al., 2022). As supported by Kajendran (2022), the implementation of various systems within a country poses challenges for industry players in adopting this new technology. As a result, the standardisation of suitable features to operate the e-tendering system is necessary to facilitate industry players. As mentioned by Sunmola and Shehu (2020), the categorisation and importance of required features have yet to be adequately prioritised in the e-tendering system. The research conducted by Akaba et al. (2020) revealed that the e-tendering system remains incompletely implemented, leading to many critical phases of the tender process not being executed digitally. This issue is reported annually; therefore, a comprehensive analysis is required to ascertain whether the reported issues have been addressed, enabling the development of system features that can mitigate challenges in e-tendering.

Issues of Implementation of E-Tendering System in Malaysia

Malaysia has been exposed to the new technology of electronic procurement (e-procurement) for more than two decades. Singh and Chan (2022) observe that e-procurement was initially launched in Malaysia in 1999. There are various types of e-procurement, including electronic tendering (e-tendering), electronic informing (e-informing), electronic auction (e-auction) and electronic sourcing (e-sourcing) (Nizakat et al., 2022; Elias, 2021; Al Yahya et al., 2018). Malaysia is currently in the process of implementing an e-tendering system, which is one of the types of e-procurement technologies.

In Malaysia, the public sector has launched an e-tendering system known as the JET system. Other than that, the private sector has utilised e-tendering systems, such as Petronas (SMART GEP) and Sime Darby (Procore). As reported by Petroliam Nasional Berhad (2024), the implementation of the tendering process in the SMART GEP system starts with user registration until evaluation and award. Similar findings by Sime Darby (2019), the Procore system initiates the tendering process by initially registering vendors, then selecting and sourcing, before finally managing tenders and contracts.

PWD launched JET system in the year 2022 and it was fully utilised in 2023. Nevertheless, JET system failed to comprehensively integrate the whole process of procurement as practiced conventionally. It was supported by the PWD (2022). JET system only facilitates the tendering process, encompassing

user registration until the announcement of the successful contractor. Meanwhile, the issuance of a tender award is still executed as a conventional process practice. It shows that there is a deficiency in JET system, as it does not comprehensively cover the tender process according to conventional practices. This gap in the process highlights the need for a fully integrated e-tendering system to ensure transparency, efficiency and comprehensive digital transformation in public sector tendering. According to Sunmola and Shehu (2020) and Qusef et al. (2019), the full cycle of the tendering process needs to be simplified to enhance the entire performance of the e-tendering system.

Apart from the concerns regarding the tendering process, the Malaysian construction industry faces challenges in terms of providing infrastructure technology. Specifically, Malaysia faces a shortage of internet connectivity, particularly in rural areas (Hashim et al., 2020). In addition, it is essential to emphasise that Malaysia is one of the 40 countries worldwide with limited internet access in rural regions. The findings by Khahro et al. (2021) indicate that the world is advancing with the widespread adoption of 5G internet connectivity, but certain particular areas still only have access to 3G. In addition, the research conducted by Hashim et al. (2020) found Malaysia to rank 40th globally in terms of weaknesses in its security systems and inadequate internet connection. The data causes a lack of trust among industry practitioners to accept the e-tendering system, thus negatively impacting Malaysia.

In short, previous studies have identified various challenges in the adoption of e-tendering systems. A thorough look is required to determine whether the Malaysian construction industry currently continues to face the same unresolved issues. Therefore, identifying issues and challenges in the implementation of the e-tender system in Malaysia is very important to ensure that improvements to the system's performance can be made.

RESEARCH METHODOLOGY

This research gathered the findings from the preliminary survey conducted between February 2024 and June 2024. A qualitative approach using semi-structured interviews was adopted. The semi-structured interview aimed to identify the issues and challenges of user experience in utilising the e-tendering system in construction public procurement in Malaysia. This research focused on JET system utilised by PWD. It is due to public procurement processes adhering to a standardised tender process, whereas the private sector follows a tender process that might vary based on their convenience and preferences. A semi-structured interview was selected because it combines two different types of questions, namely structured and open-ended questions (Sarantakos, 2012).

The research focused on contractors who had experience with JET system and PWD who handled and managed JET system. To ensure the acquisition of varied perspectives, contractors who won the projects through JET system at the beginning, intermediate and recent stages were selected for this study. A total of 11 participants, representing PWD and contractors, were interviewed. Their feedback was crucial in gaining a deep understanding of the real issues and challenges associated with JET system execution. The data obtained through interview sessions were subsequently analysed by using ATLAS.ti qualitative software.

The step before conducting the interviews was to list potential participants who met the specified interview criteria, such as those with experience using e-tendering systems in public procurement. This semi-structured interview was conducted through three methods, which are face-to-face, telephone call and e-mail. The questions provided were presented in the format of an interview. The distributed interview form began with a front page, followed by two sections that participants were required to complete. Section A gathered the demographic background, specifically the background of the participants. While Section B included a combination of structured and open-ended questions intended to capture the users' feedback in the adoption of the system, issues and challenges faced by users in utilising the electronic system in Malaysian public construction procurement. The analysis made was based on the interview with the participants classified as P = Participant and Q = Quote (P:Q) for data interpretation.

FINDINGS AND DISCUSSIONS

Demographic Background

The demographic background of participants consists of participants' types of stakeholders and the designation of participants. Table 1 demonstrates the summary of the demographic background of the interviewed participants.

As indicated in Table 1, the stakeholders involved in this preliminary survey were two PWD and nine contractors. The data indicated that all participants (100%) were in upper management and practitioners (i.e., directors, quantity surveyors, engineers, architects and others) who actively utilise the e-tendering system. It showed that the selected participants met the requirements of the target participants for the preliminary survey, namely, users of JET system. According to Sunmola and Shehu (2020), the efficacy of the system's features is reliant on the feedback obtained from its users. The result indicated that most of the interview participants met the specified requirements for participating in the interview session. Thus, the obtained data were reliable, as they were from the most suitable participants.

Table 1. Demographic background of interviewed participants (n = 11)

Items	Sub-items	Frequency (n)	%
Stakeholders	Public client	2	18
	Contractor	9	82
Designation	Director	1	9
	Engineer	–	–
	Quantity surveyor	9	82
	Architect	–	–
	Others	1	9

Implementation of JET system

Figure 1 demonstrates the network relationship based on users' feedback on the implementation of JET system. The three main topics discussed in the implementation of JET system were: (1) participants' feedback on the adoption of JET system, (2) participants' acceptance of JET system and (3) the significance of the system.

Based on Figure 1, most of the participants were satisfied with the adoption of JET system (i.e., P1:Q1, P2:Q1, P3:Q1, P4:Q1, P5:Q1, P6:Q1, P7:Q1, P8:Q1, P1:Q1, P10:Q1 and P11:Q1). As stated by P5:Q1, "JET system saves time and money" which gives advantages in its adoption. As mentioned by Mehdipoor et al. (2022), Nizakat et al. (2022) and Budianto, Rarasati and Nursin (2021), the adoption of an e-tendering system provides the advantage of minimising both time and costs in the tendering process. Besides, most of the participants agreed on the acceptance of utilising JET system. This coding was substantiated by P1:Q1 and supported by P2:Q2, P3:Q2, P5:Q2, P6:Q2, P9:Q2, P10:Q2 and P11:Q2. However, P4:Q2 mentioned that improvements were needed in the adoption of JET system and it was agreed by P7:Q2. According to Sunmola and Shehu (2020), a way to enhance the efficiency of the e-tendering system, it is necessary to simplify the whole tendering process.

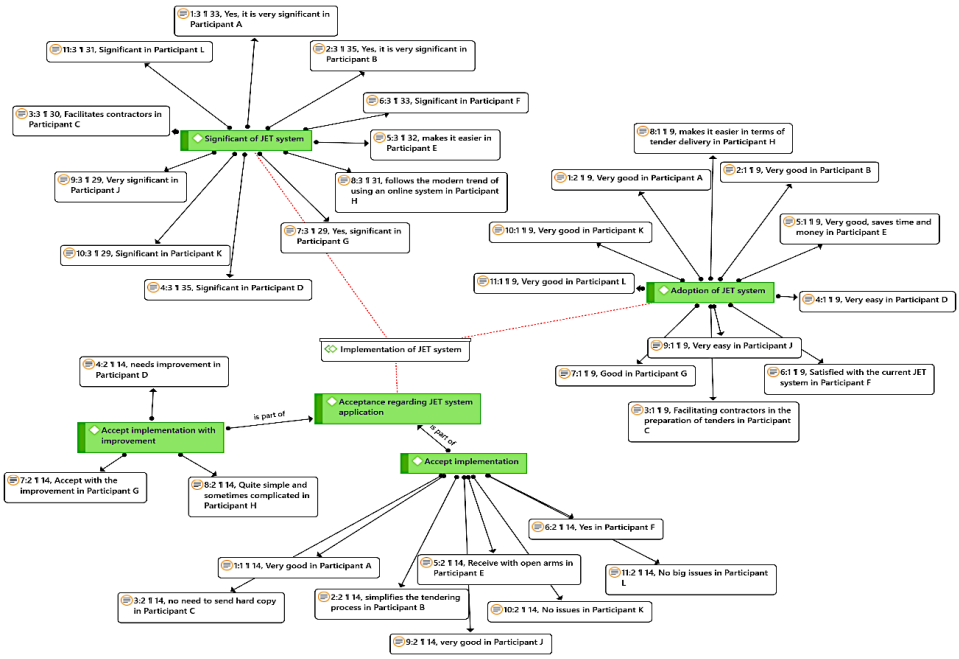

Figure 1. Implementation of JET system

Furthermore, JET system is significant to be implemented as an e-tendering system replacing the conventional method of tendering. P1:Q3 stated, "JET system is very significant", and it was verified by most of the participants involved in the interview session (i.e., P2:Q3, P3:Q3, P4:Q3, P3:Q3, P6:Q3, P7:Q3, P8:Q3, P9:Q3, P10:Q3 and P11:Q3). It was supported by Betts et al. (2006), similar to the conventional tendering methods, the e-tendering system should include the processes of registration, tender invitation, tender submission, tender evaluation and tender award. In the construction industry, the adoption of an e-tendering system must surpass the efficiency of conventional tendering methods.

The findings from all the interview sessions with the participants showed that most participants agreed and accepted the use of JET system as a new tendering process to replace the conventional process. Nevertheless, improvements in operating JET system needed to be made to facilitate the users (i.e., contractors) during the tendering process. According to findings by Al Yahya et al. (2018), the existing e-tendering system fails to meet the requirements, including the full implementation cycle of the procurement process. Thus, Sunmola and Shehu (2020) suggest further research in e-tendering features to be undertaken extensively to increase satisfaction with the adoption of the system.

Issues arising in the use of JET system

The participants were asked open-ended questions regarding the issues they faced in utilising JET system. Figure 2 presents the findings from the interviews on current issues in using JET system.

According to Figure 2, the issues faced by participants in utilising JET system include insufficient suitable features, poor performance of the system, poor quality security of the system and a limited tendering process in the existing system. In addition, the issues regarding insufficient suitable features in the system were verified by P2:Q11, "addendum is delivered via e-mail," and supported by P4:Q14, P5:Q9 and P6:Q13. The problem that arises related to insufficient suitable features was caused by the lack of medium communication. P6:Q13 indicated that an "e-mail error in receiving information related to the addendum" could be solved by providing notifications directly through the system, eliminating the necessity for e-mail as an intermediary. Additional features, such as addendums being delivered through system notifications instead of e-mail, could enhance communication. The lack of effective communication medium features may hinder the distribution of information related to the tender, negatively affecting the tenderers and potentially resulting in project acquisition failure.

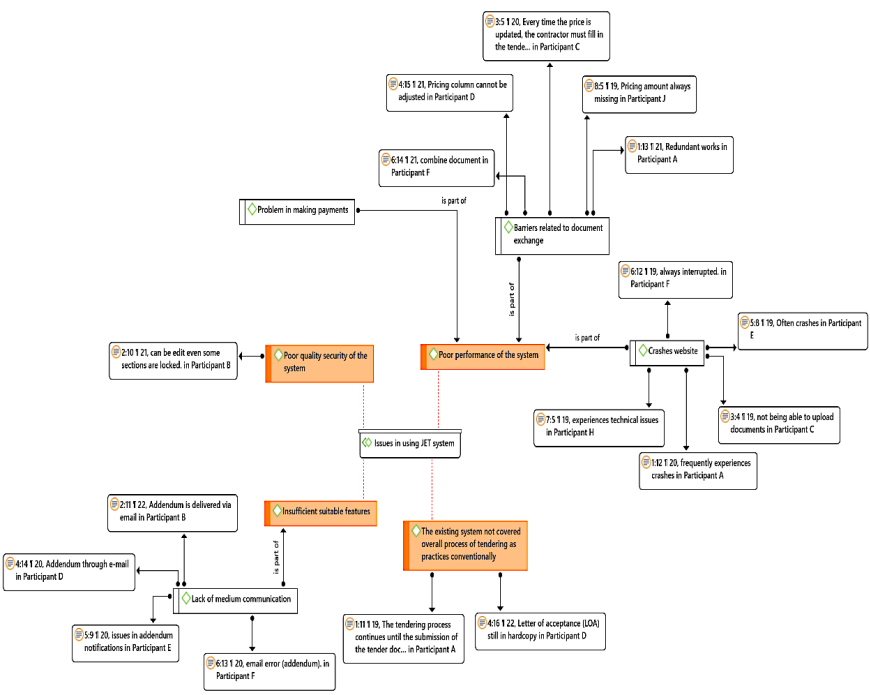

Figure 2. Issues arising in the use of JET system

The findings of the current study were in line with those in Sunmola and Shehu (2020), specifically that e-tendering operates as a digital platform that facilitates the online process of submitting, receiving, communicating, publishing and accessing all information and documents relevant to tenders. As stated by Qusef et al. (2019), the feature that must be included in the system is the easy communication between tender issuers and participants to allow for effective delivery. This highlights the need for communication tools like a notification feature to facilitate the delivery of all information related to the system and the tender. Introducing the notification feature in JET system could overcome the issue of a lack of communication between clients and tenderers.

Besides, participants faced barriers due to the poor performance of the system. Problems arising from poor system performance were barriers related to document exchange and website crashes. The coding of barriers related to document exchange was discovered by P1:Q13, P4:Q15, P8:Q5, P3:Q5 and P6:Q14. Participants encountered issues with Microsoft Excel, including the frequent disappearance of the pricing column, the need for repetitive data entry and margin complications. According to Kajendran (2022) and Kajewski and Weippert (2004), performance in acquiring the tender document and submitting the tender within the specified timeframe is essential for tenderers. These issues would adversely impact users, resulting in incomplete documentation of the asked-for requirements and the failure to submit proposals within the specified timeframe. It can be addressed by adding features that allow users to input prices and upload necessary documents directly through the system, eliminating the requirement to re-download the Microsoft Excel file for tender completion.

Furthermore, the issue regarding using e-payment was only mentioned by P2:Q9. The use of a suitable platform for e-payment was required to ensure smooth transactions for tender purchases. Another issue in using JET system was website crashes (P1:Q12, P3:Q4, P5:Q8, P6:Q12 and P7:Q5). This supported the findings in the studies by Akmal and Ahmad Dahlan (2022) and Abdullahi et al. (2019). Sunmola and Shehu (2020) and Ren and Kamarudin (2016) also agree that the system's vulnerabilities may affect its overall performance. The findings demonstrate that problems related to website crashes often occur when using the system. It is imperative to address this issue to ensure the effectiveness of the system and avoid any disruptions during the tendering process. This issue needs to be addressed immediately to ensure the effectiveness of the system and prevent any disruption during the tender process, as it could potentially affect the user experience and cause unnecessary delays.

Another issue in using JET system was poor quality security of the system, which was highlighted by P2:Q10, "where tender documents can be edited, even some sections have been locked". The industry players raised concerns over the vulnerability of security systems, including exposure to hacking, ease of virus infiltration and the potential theft of data and information pertaining to tenders (Abdullahi et al., 2019; Galadima and Waziri, 2022; Husin et al., 2019; Kajendran, 2022; Mehdipoor et al., 2022). Mehdipoor et al. (2022), therefore, suggest that tender documents must be distributed in portable document format (PDF) because the format delivers improved efficiency and increased high security. PDF is a better alternative for document exchange compared to using Microsoft Excel. This method is a step to improve the quality security system related to the tender document.

Moreover, JET system faced issues because the existing system failed to cover the overall tendering process, as practiced conventionally. This was identified by P1:Q11 and supported by P4:Q16. According to the PWD (2022), JET system provided functionalities that cover the tendering process, commencing with user registration and continuing until tender evaluation; however, the issuance of the award letter was not included in the system. As mentioned by Participant 2, "Not fully implemented tendering process is due to a lack of programmers to structure databases, applications, schematic designs and proposed suitable features for the system". Khahro et al. (2021) and Ren and Kamarudin (2016) stated that Malaysia's e-tendering system still follows traditional methods for awarding tenders. According to Sunmola and Shehu (2020), Qusef et al. (2019) and Kajewski and Weippert (2004), the e-tendering system needs to implement the full cycle of the tendering process. System enhancements must be executed in order to ensure adherence to the standard tendering procedure. Furthermore, it is essential to prevent any discrepancies in tender administration that may adversely affect the efficiency and transparency of the process.

The outcomes of the interview with the participants indicated that they experienced various issues, such as a lack of a medium of communication, issues in document exchange by using Microsoft Excel, the system's not fully implementing tendering processes and website crashes. To enhance user experience and satisfaction, it is imperative to address and resolve these issues. Sunmola and Shehu (2020) state that the performance of the system affects user satisfaction and dissatisfaction. Thus, to enhance the performance of an e-tendering system, it is necessary to determine the criteria for system features. A good system fulfils the criteria of system features (Sunmola and Shehu, 2020). Table 2 summarises the findings of the study regarding issues of JET system and comparison with previous studies related to the e-tendering system.

Table 2. Summaries of the findings and comparison with previous studies

Themes	Sub-themes	Findings	Previous Studies	Similarities/Differences
Performance of system	Document exchange	Issues related to using Microsoft Excel as a document exchange.	Performance in acquiring the tender document and submitting the tender (Kajendran, 2022; Kajewski and Weippert, 2004).	Previous study: Performance related to downloading and submitting tender documents. New study: Performance of features (Microsoft Excel).
	E-payment	The use of a suitable platform for e-payment.	–	New study: Platform selection of e-payment.
Security of the system	Quality of security	Microsoft Excel can be edited even some sections are locked.	Tender documents must be distributed in PDF version (Mehdipoor et al., 2022).	Previous study: Suggesting the use of PDF for document exchange. New study: Quality security of tender document in using Microsoft Excel.
Suitable features	Medium of communication	The addendum is delivered via e-mail.	Easy communication is a criterion in e-tender (Qusef et al., 2019).	Previous study: Only mentioned criteria of e-tender. New study: Additional features, such as addendums being delivered through system.
Tendering process	Implementation of the tendering process	The not fully implemented tendering process is due to a lack of programmers to structure databases, applications, schematic designs and proposed suitable features for the system.	Malaysia's e-tendering system follows traditional methods for tender awards (Khahro et al., 2021; Ren and Kamarudin, 2016).	Previous study: Mentions in general. New study: Specific the tendering process in JET system.

Challenges faced in using JET system

Users' issues in utilising JET system led to several challenges that should be addressed. These challenges affected the quality performance of the system and reduced the users' satisfaction. Figure 3 presents the challenges faced in using JET system.

Based on Figure 3, a total of six significant challenges were identified by participants in utilising JET system. A major challenge faced by participants was website crashes, including that "the system cannot support high volume of users" (P1:Q9, P6:Q9 and P11:Q2). According to Nizakat et al. (2022), Mohungoo, Brown and Kabanda (2020) and Ren and Kamarudin (2016), the website crash was due to poor performance of the system that negatively impacted the system's execution. Thus, the system's performance was crucial for providing the effective operation of the tendering process in an e-tendering system.

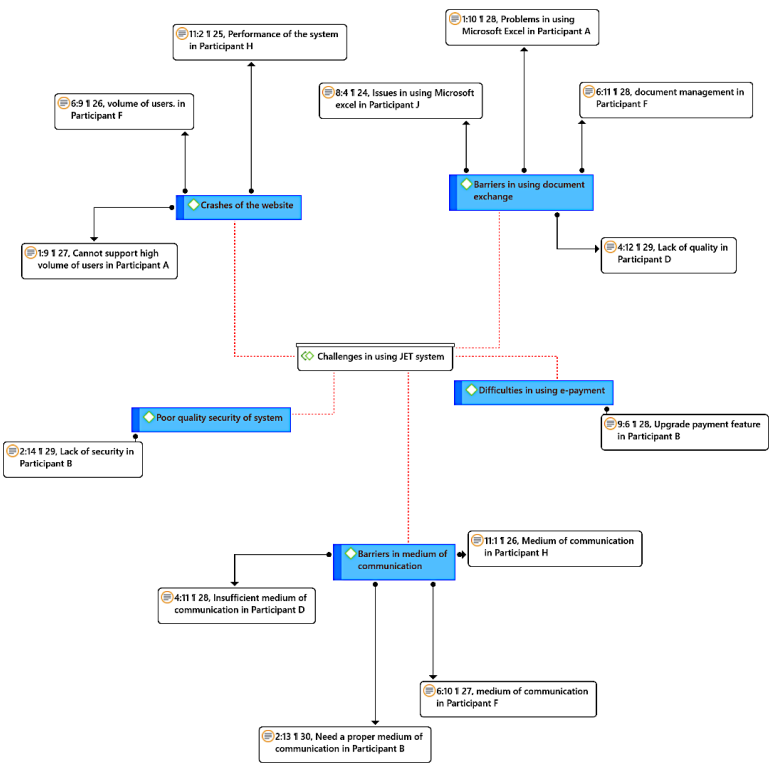

Figure 3. Challenges faced among users in using JET system

Furthermore, participants encountered difficulties when utilising JET system due to barriers in the medium of communication as indicated by P2:Q13, P4:Q11, P6:Q10 and P11:Q1. As mentioned by Kajendran (2022), effective operation of the e-tendering system relies on clear communication. Hence, JET system must enhance its communication methods to facilitate the transmission of all relevant information, whether it pertains to the system itself or to the tender process. The communication challenges may prevent tenderers' understanding of instructions and the submission of accurate information, consequently interrupting the efficiency and precision of the tender process.

Moreover, the JET system faced a poor quality of the security system. This was mentioned by P2:Q14 that "Microsoft Excel is easily editable by anyone, which contributes to the transparency of the tendering process". Besides, barriers in document exchange, which used Microsoft Excel as a tender document, were the challenges faced by the participants during the tendering process. This coding was confirmed by P1:Q10, P4:Q12, P8:Q4 and P6:Q11. Mehdipoor et al. (2022) state that a quantity surveyor is responsible for creating tender documents by utilising a combination of Microsoft Word and Microsoft Excel, which are subsequently converted into a PDF format for a digital document. It suggests that converting the tender document to a PDF version as a digital document is more recommended than using Microsoft Excel for pricing document purposes. Consequently, it is recommended to convert the tender document into PDF format as a digital document rather than utilising Microsoft Excel for pricing the tender document. In addition, P9:Q6 was the only participant who had difficulties with e-payment.

The findings revealed that participants encounter challenges when utilising the JET system. These challenges need to be addressed to improve the quality performance of the system. As mentioned by Sunmola and Shehu (2020), the performance of the system affects user satisfaction and dissatisfaction. They also mentioned that the categorisation and importance of features still have not been prioritised in the e-tendering system. The selection of appropriate system features that align with the services provided and the requirements of users must be established. Therefore, establishing appropriate system features to be adopted in the e-tendering system is important to improve the system's efficiency and performance.

CONCLUSION

This article applied the qualitative approach to explore the challenges of the application of the e-tendering system in Malaysian public construction procurement. The findings revealed that users faced difficulties in utilising the e-tendering system, such as frequent system crashes, problems in using Microsoft Excel as a tender document and the incomplete implementation of the tendering process within the system. Therefore, the establishment of system features in the e-tendering system was necessary to improve the system's overall performance and ensure user satisfaction. Besides, the establishment of system features through this study could assist technology developers, especially PWD, in upgrading their systems to enhance user satisfaction. Apart from technology developers, tenderers could gain advantages from this study due to the creation of more user-friendly features, which will facilitate their comprehension and utilisation of this system.

However, this study has limitations as it includes only participants with prior experience utilising the JET system. It is due to the research objective, which is to pinpoint the challenges encountered when using e-tendering systems and establish the system features that can alleviate these issues for users, thereby enhancing their experience with the JET system. The future study should focus on developing user-friendly system features that enhance user satisfaction and mitigate challenges associated with utilising the e-tendering system.

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