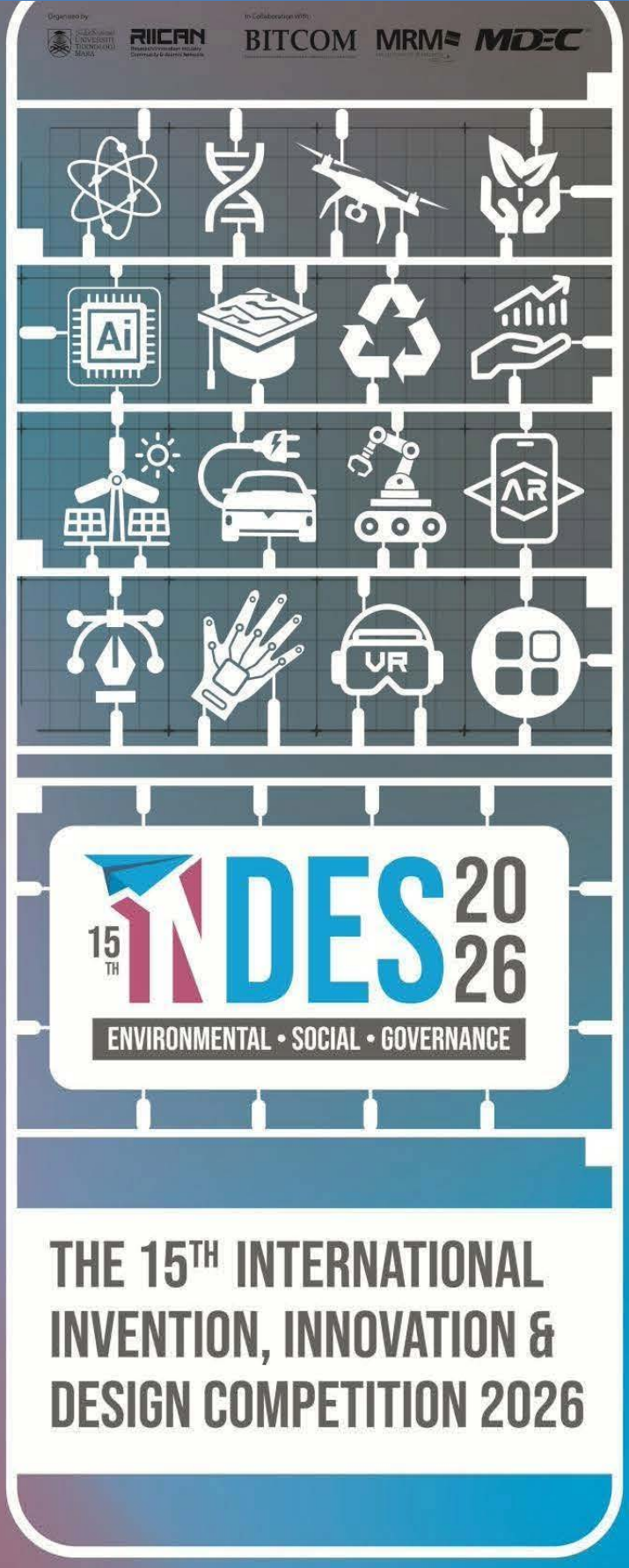


E-BOOK OF

EXTENDED ABSTRACT

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THE 15th INTERNATIONAL
INVENTION, INNOVATION &
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SMART eTSP – e-Tendering System Features Prototype Through User-Centric Platform

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ABSTRACT

Malaysia is a developing country that is progressing towards the digital transformation of its construction industry. This aligns with the goals of the 12th Malaysian Plan, which aims to enhance digitalisation in public administration. The Malaysian Public Works Department (PWD) has taken initiatives to digitise the procurement process through the implementation of an electronic tendering (e-tendering) system. PWD has developed and implemented its own e-tendering system which is known as JKR e-Tender (JET). The JET is designed to cover the tender process from tender advertisement to the submission of tender documents. The JET continues to evolve positively but requires significant improvements to achieve system maturity. Several areas for improvement have been identified such as system crashes, incomplete tendering process, insufficient user-friendly features, poor system quality and limitations in the exchange of information. This highlights the critical need for a more systematic and user-centric system design. Therefore, this study focuses on the development of a system features framework in e-tendering and visualize through prototype to address current limitations. It seeks to provide a comprehensive and standardised tendering processes, improve the system's usability, promote user-friendly features, and emphasise environmentally sustainable aspects. The guidance framework and prototype will assist the construction industry in implementing better system features and a well-structured e-tendering system.

Keyword: e-tendering, system features, user-friendly

1. INTRODUCTION

The electronic tendering (e-tendering) system is a digital platform developed to replace conventional methods. The implementation of this system continues to grow globally along with the progress of Industrial Revolution 4.0 (IR 4.0). The benefits of an e-tendering system include the shift from paper to digital formats, increased transparency, reduced corruption, efficient information exchange, and a reduction in both cost and time throughout the tender process. In Malaysia, the construction industry has responded to the government's initiative in the 12th Malaysia Plan by implementing advanced technology, including the e-tendering system for tender administration.

In Malaysia, both the private and public sectors have adopted e-tendering systems. The private sector has implemented e-tendering systems fitted to their needs and requirements. Meanwhile, the Malaysian Public Works Department (PWD) has launched its own e-tendering system, namely JKR e-Tender (JET). JET was introduced in 2022 and initially used in selected states (Public Works Department, 2023). The system was later expanded and fully implemented across all states in Malaysia by 2024.

Despite the increasing adoption of the e-tendering system, its implementation remains limited (Aziz, 2024; Singh & Chan, 2022). Previous studies have highlighted limitations in the e-tendering system, including inadequate security (Galadima & Waziri, 2022; Kajendran, 2022), system flaws (Hashim et al., 2020), reliance on paper-based tendering (Hashim et al., 2020), system complexity (Inusah et al.,

2025; Hashim et al., 2022), and ineffective communication (Inusah et al., 2025). As mentioned by Sunmola and Shehu (2020), the prioritisation and categorisation of system features still remain limited in e-tendering systems.

In addition to issues identified in previous studies, a preliminary survey involving 11 JET users was conducted to obtain an initial overview of the e-tendering system's implementation, followed by a larger interview session with 20 JET users who revealed various issues encountered during the implementation processes. The identified issues include system crashes, an incomplete tendering process, insufficient user-friendly features, poor system quality, and limitations in conveying tender-related information. These issues indicate that current e-tendering systems may insufficiently meet users' needs and requirements.

According to Sunmola and Shehu (2020), every system needs to be improved to satisfy the users. If the issues remain unaddressed, it may negatively impact users' performance, resulting in difficulty with tender submissions, challenges in understanding the tender process electronically, and leading to a negative perception of the system. Therefore, a system features framework and visualization through SMART eTSP is introduced, which aims to provide structured guidance enhancing system features to improve usability, strengthen process efficiency, and support effective e-tendering implementation. It will serve as a guideline to enhance system efficiency and meet user requirements.

2. METHODOLOGY

The development of SMART eTSP was carried out in five primary phases. The first phase involved obtaining information related to the e-tendering system through a literature review. It focuses on exploring current issues in the e-tendering systems, identifying problem statements and gaps, establishing the research aims, objectives, and data collection method. The journals, articles, and government reports were used as the primary references in the literature review.

The second phase is conducting a preliminary survey with selected contractors who have experience in utilising JET and individuals responsible for JET system administration. Semi-structured interviews were conducted to identify the current issues in the use of electronic tender, and the data were subsequently analysed via ATLAS.TI software.

The third phase focused on the main data collection through semi-structured interviews. This phase is designed for a wider scope of participants, involving selected developers from the private sector who have implemented the e-tendering system, selected contractors with experience in utilising JET, and PWD employees. The objective is to obtain an in-depth analysis of issues and challenges in using the e-tendering system. The data were then analysed using thematic analysis via ATLAS.ti software.

The fourth phase is conducting the focus group discussions. The main purpose was to validate findings obtained from the interview session. The study subsequently produces recommendations for essential system features required in the e-tendering system.

The final phase involved the development of a system features framework and visualization through a prototype for an e-tendering system to streamline the procurement process. It will serve as a guideline for the construction industry to address current issues and enhance the quality of the tendering process.

3. DEVELOPMENT OF SMART eTSP

The development of the SMART eTSP originates from an analysis obtained from interview sessions with the JET. The specifics of the originality and innovation of SMART eTSP were explained in the following sections a-d.

a) Product Description

The SMART eTSP was developed as a guideline to enhance the e-tendering system within the Malaysian construction industry. It is designed specifically to address issues and challenges in using the e-tendering system by introducing structured, user-centric, and efficient system features. SMART eTSP is created to improve transparency, security, user-friendliness, and support a more comprehensive tender process, commencing with the tender advertisement and ending with contract award.

b) Benefits to Society

The SMART eTSP serves as a guideline for the public sector to improve the current system while enhancing the private sector's trust in adopting innovative technologies. Besides, it will establish a standard foundation for the system features required in future e-tendering systems. Finally, the implementation of SMART eTSP is expected to improve users' satisfaction and experience in navigating this platform.

c) Novelty and Uniqueness

The development of SMART eTSP has been through several critical phases in its formation. It was developed based on feedback from users of the e-tendering system. The e-tendering system has become widely adopted across the globe. However, the user feedback-based system received limited attention. This results in the establishment of a framework that focuses on users' perspectives regarding the system features. Apart from system features, it integrates various elements into a single system, which are usability, procurement compliance, sustainability, and enhances user-friendliness. The framework and visualization through prototype are primarily designed for the Malaysian public sector, but they also can be applied to the private sector according to the needs and requirements.

d) Potential Commercialization

SMART eTSP has high commercial potential as a strategic framework for the development and enhancement of e-tendering systems. It serves as a practical guideline for public and private sectors to enhance existing systems in accordance with users' needs and requirements. The framework can be marketed through digital procurement implementation modules for organisations in adopting electronic procurement. This promotes potential for wider industry adoption and sustaining commercial value.

4. CONCLUSION

The development of the system features framework and visualization through SMART eTSP aims to address operational and functional limitations in the e-tendering system by proposing suitable features. It is produced based on interviews with users of JET and suggestions validated through focus group discussions. The framework can integrate various elements into a single system, which are usability, procurement compliance, sustainability, user-friendliness and process completeness of the e-tendering system. Finally, the system features framework can be used as guidelines for both the public and private sector in determining the appropriate features in order to achieve user needs and requirements.

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