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Analyzing Factors that Influence Public Sector Procurement Reverse Auction System: A Review

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Abstract – *This study was performed to review the conceptualization and relationships among user behaviour, system quality and intention to use eBidding, an eGovernment auction system with user satisfaction as the moderator. From the theoretical framework, user behaviour and system quality factors have significant relationships with the adoption of information system (IS). Empirical evidence also shows that satisfaction has a significant moderating effect on the relationship between system quality factors with the adoption of IS. Given the significant impact of behavioural factors of officials in eBidding adoption and role satisfaction on the intention and use of eGovernment system, system managers could introduce key changes in the workplace to increase satisfaction to address the problems of low eBidding adoption among users.*

Keywords: eBidding, Online Procurement Auction, Electronic Government, eCommerce

1.0 INTRODUCTION

Electronic reverse auction system (eRAs) provides real-time internet transaction between a purchaser and multiple suppliers. In this type of auction, suppliers compete among themselves online using specific software by continuously offering lower-priced bids during a specified transaction cycle [1]. For the government, the system offers many compelling benefits in terms of cost and time savings, as well as increased offerings from various types of suppliers. These factors contribute to a more effective and transparent procurement process. From the perspective of the suppliers to the government, they can expect to increase market penetration and decrease transaction costs by using the system [2]. Reverse auctions are widely used in private sector but still in infancy in the realm of public sector, however, eRAs are beginning to replace traditional paper-based and manual transactions by governments globally [3,4].

eBidding is the Malaysian government's version of online procurement reverse auction system. It is part of the larger government online procurement system. eBidding allows suppliers to advertise and offer their goods and services to the public sector by connecting them to the buyer communities [5]. The system was first introduced in 2006 by the Ministry of Finance (MoF) to improve efficiency in public sector procurements. Since 2014, many government agencies have utilized eBidding for procuring supplies, products and services. These agencies procure goods

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and services provided by registered suppliers through eBidding system. The procuring authority for eBidding is the respective Secretary Generals of the Ministries and Heads of Departments of the agencies, while the monitoring agencies are the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU) and the ePerolehan Unit [5].

The system allows an option for the procuring agencies either to employ conventional procurement process or to use eBidding as the venue to source for goods and services. eBidding is suitable for agencies in procuring goods and services that cost RM50,000 or more, and also those that need complex technical evaluations. They have the option to buy the goods and services via tender evaluation process or through eBidding [5]. Since its implementation in 2006, the eBidding system is experiencing an issue of low usage among government officials and the suppliers [6]. This low usage possesses serious implications for the successful utilization and development of the system. It was reported that the low rate of adoption indicates inherent government officials' problem with eBidding rather than with the suppliers' side [7]. Not only this issue can result in the failure to increase efficiency in the government operations, but it can also lead to waste of huge investment dollars in the system development. Thus, this study attempts to fulfil this gap. The objectives of this study are to identify key factors that affect eBidding adoption by procurement officials in the Malaysian public sector, and also to understand the effect of these variables on their behavior in adopting the system.

2.0 LITERATURE REVIEW

As an introduction, the description of the Malaysia's eGovernment auction system is provided, followed by eBidding mechanism, then summaries of key factors important for this study, namely user behavior, system quality factors, and user satisfaction. Electronic literature review was conducted using Universiti Putra Malaysia's online journal resources such as Scopus and Proquest, followed by research papers and reference materials that are appropriate during the next stage. The search was conducted through the title or abstract of the paper using a combination of relevant search keywords such as "reverse auctions", "eGovernment", "user behavior factors" and "eBidding system". Content analysis was used to cover diverse areas such as business policy and strategy, information systems, management and marketing literature, organizational and managerial, research methods, as well as technology and innovation management to identify key factors influencing the intention to use or adopt an information system.

3.0 DEFINITIONS

3.1 User Behaviour

3.1.1 Performance Expectancy (PE)

The Unified Theory of Acceptance and Use of Technology (UTAUT) [8] outlines user behavioral factors influence individual user acceptance and utilization of information technology including performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). Performance expectancy refers to the notion that users utilize an information system to help them to complete their tasks [8]. PE is determined to have a significant effect on mobile service users [9]. It is shown to significantly influence behavioural acceptance in both voluntary and mandatory system adoption situations [8]. In the context of this study, PE refers to the perception that the procuring officials use eBidding in

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order to assist them to achieve certain outcomes, such as improving job performance and productivity in their working environment. When they perceive that using the system helps, the officials are more likely to have the propensity to utilize the eBidding system. It is posited that performance expectancy is significantly related to officials' adoption of eBidding.

3.1.2. Effort Expectancy (EE)

Effort expectancy is described as the degree of the system's ease of use. It is suggested to be an antecedent of behaviour adoption and use. There is a significant relationship between EE and technology adoption [10]. Previous researches also concur to the contention that lesser effort in learning and using a system will ultimately influence its acceptance [11]. In the context of this study, EE is the belief that using eBidding assists procuring officials to gain certain advantages, for example, improving job performance and increasing productivity in their work environment. As they increasingly become familiar with the use of the technology, less effort is needed in order to use eBidding. In other words, the more they feel that the system is user-friendly and the more skilful they become in using the system, the more inclination they have in using eBidding. It is posited that effort expectancy is significantly related to officials' adoption of eBidding.

3.1.3 Social Influence (SI)

The variable is described as the extent a user feels that other significant individuals (senior managers/peers) believe he or she should employ the innovation. Previous research indicates peers, superiors and other people who are important to a user often affect the user's behaviour towards adopting a system [12]. In this study's context, SI is referred to the extent in which officials' belief that their colleagues and superiors feel they should be using eBidding. The study posited that the more they believe the head of departments, superiors and others around them support their use of eBidding, the higher their propensity to use the system. It is suggested that social influence is significantly related to officials' adoption of eBidding.

3.1.4 Facilitating Conditions (FC)

Facilitating conditions refer to the extent a user perceives the technical supports provided by the organization would facilitate a system adoption [8]. The variables include characteristics of the technological or organizational conditions (e.g. regulations, incentives and training) that facilitate the use of the system. Prior literature indicates that FC significantly influences system acceptance behaviour [13]. In this study, FC refers to the perception of the users on the supporting infrastructure that is made available to them in using the information system. Availability of supporting infrastructure is important because without it, the officials may feel that it will be more difficult to conduct the auctioning process. It is posited that facilitating conditions is significantly related to officials' adoption of eBidding.

3.2 System Quality Factors

3.2.1 Information Quality (IQ)

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The Model of Information System Success (ISSM) identifies three system quality factors in determining the success of an information system namely information quality (IQ), system quality (SQ), and service quality (SVQ) [14]. Information quality refers to the user's belief on the quality of output generated by a system [15]. IQ is defined as information that is accurate, complete, up-to-date, and in the right format based on the user's perspective [16]. IQ is predicted to significantly influence users' perception of value, which increases their intention to use an information system [17]. In this study, IQ is defined as the procuring officials' perception that the output generated by eBidding is beneficial. When an official perceives that the information generated by the eBidding system is useful and accurate, he or she is likely to view the technology usage positively. It is proposed that information quality is significantly related to officials' adoption of eBidding.

3.2.2 System Quality (SQ)

System quality is described as the performance quality of the system. System quality is defined as useful system attributes, such as flexible, reliable, responsive, accessible, and integrative [16]. SQ is found to be associated with users' satisfaction of the system [15]. SQ is argued as a factor that affects users' participation in a virtual community, and significantly influences users' utilization of online learning [18]. In this study, if the officials perceive that the system is flexible, reliable, fast and accessible, the level of satisfaction with the usage of the system will be higher, resulting in a higher tendency to use eBidding. It is posited that system quality is significantly related to officials' adoption of eBidding.

3.2.3 Service Quality (SVQ)

Service quality (SVQ) is defined as the quality of support offered by the system provider [14], particularly in the dimensions of tangibility, reliability, assurance, and empathy provided by the system service providers [16]. SVQ is measured by attributes such as response to queries, problem solving, availability of transaction processes information, or capability to query on tenders [13]. Four key dimensions of SVQ are website design, website content, trustworthiness, promptness, and reliability of service and communication [19]. In this study, SVQ is described as the level of responsiveness and assurance provided by the service providers to the officials in helping to make their tasks completion more effective when using eBidding. The availability of support for the government users is imperative for the success of the eBidding system. The officials will be more inclined to use eBidding if they are satisfied with =service quality that is perceived as fast, and with high empathy and supportive service providers on their side. It is suggested that service quality is significantly related to officials' adoption of eBidding.

3.3 User Satisfaction

Satisfaction refers to how users feel throughout their transactions experience with the system [20]. User satisfaction has mediating effects on information, system and service qualities, and subsequently affects individual's adoption of the system [15]. Satisfaction is a confirmed mediator between perceptions of quality and behavioral intentions [21]. In this study, satisfaction is predicted to play a mediating role in the adoption of eBidding, particularly when the system involves new technology and complex process that require excellent web design, good services, and technical support. The more the officials believe in the output quality, the more likely they will adopt eBidding due to their higher user satisfaction. Similarly, if the officials have more positive perception of the services provided by the system providers, they will be more inclined to use eBidding due to their increased satisfaction. Moreover, if the

officials have a positive perception of the quality of eBidding performance, they will be more inclined to adopt the system due to their higher satisfaction. Hence, it is posited that satisfaction significantly mediates the relationship between information quality and eBidding adoption, system quality and eBidding adoption, as well as service quality and eBidding adoption.

4.0 CONCLUSION

Reverse auction adoption is a new and important area that warrants further research, especially in the realm of public sector information systems. Low adoption and use by government officials are detrimental to the success of eGovernment's implementation. These are to avoid losses in terms of development costs and transparency in government procurement. The study posited that user factors and system quality of eGovernment reverse auction systems are the critical success factors in successful government information system adoption mediated by user satisfaction. Identifying the key antecedents influencing the adoption of eBidding will enable stakeholders and policymakers to introduce remedial actions to increase the system usage.

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