

THE APPLICATION OF PAPERLESS CONCEPT IN MALAYSIAN CONSTRUCTION E-TENDERING SYSTEM, FROM QS CONSULTANTS' PERSPECTIVE

Nurulhuda Hashim
School of Architecture, Building & Design
Taylor's University, Malaysia
Email: Nurulhuda.Hashim@taylors.edu.my

Michelle Yee Seen Man
School of Architecture, Building & Design
Taylor's University, Malaysia
Email: michelleseenman.yee@sd.taylors.edu.my

Dr. Myzatul Aishah Hj Kamarazaly
School of Architecture, Building & Design
Faculty of Built Environment, Engineering, Technology & Design
Taylor's University, Malaysia
Email: MyzatulAishah.Kamarazaly@taylors.edu.my

Sr. Loo Seong King
School of Architecture, Building & Design
Taylor's University, Malaysia
Email: SeongKing.Loo@taylors.edu.my

Sr. Shirley Chin Ai Ling
School of Architecture, Building & Design
Taylor's University, Malaysia
Email: ShirleyAiLing.Chin@taylors.edu.my

Sr Azrina Md Yaakob
School of Architecture, Building & Design
Faculty of Built Environment, Engineering, Technology & Design
Taylor's University, Malaysia
Email: Azrina.MdYaakob@taylors.edu.my

ABSTRACT

E-tendering is the smart solution and change agent in enhancing the efficiency and productivity of construction industry in this digitalised era; the first step towards going paperless. By offsetting drawbacks of the paper-based tendering system, governments around the world have been investing and encouraging the use of e-tendering in their construction industries, respectively, for the sake of adopting ICT and reducing carbon footprint. The same goes to the local governing bodies, namely the Construction Industry Development Board of Malaysia (CIDB) Malaysia Public Works Department (JKR) and some local authorities, where they initiate the use of e-tendering in public projects. However, there were several drawbacks in the implementation of e-tendering systems reported globally and locally. The concerns of parties involved in the tendering process vary in the aspects of security, legality, transparency, convenience, cultural issues etc. Previously, the level of usage of e-tendering concept in our local construction industry is reported to be medial and only from the perspectives of Contractors and Developers. None of the previous Malaysian researchers have focused on the paperless concept of e-tendering. Hence, this study wishes to address the current issues faced by the Malaysian construction industry in implementing paperless e-tendering and the possible recommendations to tackle these challenges, whilst updating the latest data on the usage level, from the perspectives of QS consultants. Purposive sampling was used in the selection of respondents for the interview, and the results obtained revealed the respondents' lack of exposure towards e-tendering, and cultural issue as the main barrier in its application. This study has indicated that there is still room for improvement in adopting paperless e-tendering system by the Malaysian construction industry, and the government plays a significant role in breaking the engraved mindset of construction players towards paperless e-tendering system.

Key words: E-tendering, paperless, challenges, recommendations

INTRODUCTION

A modern definition of e-tendering is explained as the inclusion of all project members in an electronic platform to exchange information throughout the execution period of the project from commencement until the hand-over stage (Alyahya, 2017). It allows the users to upload and download tender documents through the same web server, with increased functionality based on its sophistication level (Brook, 2016).

The history of e-tendering could be traced back to the discussions that arose among the Construction Industry Institute due to the exclusive characteristics of the construction industry in 1978 (Vitkauskaitė & Gatautis, 2008). Developing from a dial-up modem-to-modem computer access to an elaborated Internet based tendering system, e-tendering has evolved immensely over the past few decades (Mastor & Azizan, 2006).

As there is a variety of researchers focusing on e-procurement, it is important to note that e-tendering is merely a sub-family of e-procurement (Adzroe & Ingirige, 2018; Alyahya, 2017; Olukayode & Adeyemi, 2011). The intention of adopting an electronic tendering system comes from the presence of many drawbacks in the traditional paper-based tendering process, including weak appraisal system, intensive paper usage and storage, time consumption, poor security and slow document processing (Elias et al., 2003).

Based on the findings of numerous researchers, e-tendering has the benefits of being a streamline system with improved security, resource saving features including the reduction of lithography charges, efficiency and productivity, document handling features and transparency (Chilipunde, 2013; Olukayode & Adeyemi, 2011; The Australian Cooperative Research Centre for Construction Innovation, 2001a; Tindsley & Stephenson, 2008).

From the aspect of being paperless, reduced paper usage decreases waste, pollution and carbon footprint that would be impactful to the environment (Stevenson, 2013). Generally, going paperless in offices brings similar advantages to that when implementing the paperless concept of e-tendering (Bradwell, 2009; Tiwari et al., 2017).

PROBLEM STATEMENT

There is still a lack of adoption of “smart” systems generally (Stevenson, 2013). Although several reports have mentioned the local governmental solution of National e-Tendering Initiative (NeTI), the website seems to be unreachable at the moment (Lou, 2007; Tan & Kamarudin, 2016). Nonetheless, several public departments have initiated their own e-tendering solution, where interested tenderers could seek out favoured projects on their websites (Universiti Kebangsaan Malaysia, n.d.; CIDB Malaysia, 2020). Other than Aconex, the private platforms used by Malaysian construction industry remained unknown and unrevealed (The Australian Cooperative Research Centre for Construction Innovation, 2001a).

The readiness of Malaysian construction industry to adopt ICT and e-tendering was reported optimistically back in 2006 (Alsagoff et al., 2006). Since then, other researchers have focused on the usage level of e-tendering in Malaysia. It was until almost a decade later that some researchers have an updated findings (Ashaari et al., 2018; Tan & Kamarudin, 2016).

A UK study had reported the distinctive reviews on e-tendering from the consultants (quantity surveyors, architects, engineers), client and contractor (Tindsley & Stephenson, 2008). In Malaysia, e-tendering experience from the contractors’ and developers’ perspectives was reported in a few studies (Ashaari et al., 2018; Tan & Kamarudin, 2016). The contractors and developers have different priorities when it comes to the reasons in implementing e-tendering. Moreover, there were no researchers studying e-tendering experience from the consultant quantity surveyors’ perspectives in Malaysia, not to mention the paperless concept. According to the e-tendering effectiveness model, People and Policy were the main barriers in implementing e-tendering, while investment in Process and Technology were deemed to be adequate (Alsagoff et al., 2006).

On the ethical concerns of e-tendering, respondents in a study have unanimously felt that e-tendering is not transparent (Zakaria et al., 2014). This raises a worry over the ethical usage in application of e-tendering systems, as the abuse of e-tendering has also been reported in India (Naveen, 2019; NewsClick, 2018; Singh, 2018).

Given the above reasons, the aim of this research is to study the implementation of e-tendering system where paperless concept had become its prime criteria. The focus will be challenges faced by Malaysian construction industry in implementing e-tendering system and potential improvements that will allow higher paperless adoption with better efficiency.

The research objectives are (1) to study the current level of e-tendering application in Malaysian construction industry; (2) to identify the challenges faced by Malaysian construction industry in implementing paperless concept in the e-tendering system; and (3) to recommend possible solutions that can overcome the challenges towards adopting total paperless concept in the e-tendering system.

LITERATURE REVIEW

USAGE LEVEL OF E-TENDERING

Research on e-tendering adoption level have varied in terms of time and geographical areas. Governmental efforts on different countries have their own initiative in encouraging e-tendering usage as well.

GLOBAL USAGE

Table 1: International e-tendering solutions (The Australian Cooperative Research Centre for Construction Innovation, 2001a)

Australia	Queensland	Queensland Department of Public Works / Services	Project Services eTender System
	New South Wales (NSW)	NSW Department of Public Works and Services (now NSM Department of Commerce as of 2003)	NSW Department of Commerce's eTendering System
		Commonwealth Government (now Australian Government)	Commonwealth Electronic Tender System (CTS)
	Victoria	Victorian Government	eTenders Victoria
United Kingdom	Suffolk	Suffolk City Council's Procurement and Commissioning department	ELTON (Electronic Tendering Online)
		UK Office of Government Commerce (OGC)	TenderTrust
	Europe	Business Information Publications Ltd	DELTA e-Tendering Suite
United States of America		Department of Transportation	Bid Express

Table 1 demonstrates the regional e-tendering solutions applied by the construction industries respectively (The Australian Cooperative Research Centre for Construction Innovation, 2001a). Other than the above-mentioned, other countries with governmental e-tendering solutions include CORONET from Singapore and an unnamed Nigerian governmental system (Olukayode & Adeyemi, 2011; Seah, 2004).

Since the updated level of e-tendering acceptance reported by RICS in 2009, there has not been any updates from RICS's side (Lavelle & Bardon, 2009). In 2011, low level of e-tendering experience and awareness was reported in Nigeria (Olukayode & Adeyemi, 2011). In 2019, e-tendering usage was still reported on the low side in Germany (OECD, 2019).

MALAYSIAN USAGE

The contractor's level of e-tendering usage was reported in 2016 where more than half of the respondents surveyed had experience in e-tendering (Tan & Kamarudin, 2016). Other than that, another similar study conducted from the developers' perspectives recorded an increase implementation of e-tendering, and a relatively high awareness on e-tendering systems (Ashaari et al., 2018). Apart from this two research, there were no other publications on the level of adoption of e-tendering in Malaysia.

In an electronic readiness study, Malaysia was ranked in the top-40 among countries which is relatively low due to poor internet coverage in rural areas, traditional mindset, and security issues. Yet, the same report disclosed Malaysia as being "ready" to implement e-tendering with the available ICT at that time (Alsagoff et al., 2006). Nonetheless, improvements in ICT development in Malaysia was demonstrated in a recent report (International Telecommunications Union, 2019; Solarin et al., 2019).

National eTendering Initiative (NeTI) was reported in several research as being the government initiative to encourage e-tendering among players in the Malaysian construction industry (Lou, 2007; Mastor & Azizan, 2006; Tan & Kamarudin, 2016). A more updated initiative by Construction Industry Development Board (CIDB) of Malaysia (2020) could be accessed at <http://eiklan.cidb.gov.my/tender>. However, none of the Malaysian reports had mentioned on the private platforms used by the construction sector.

It was interesting to note that in the e-tendering decision-making process, all the parties, namely top management (of respective organisations), government bodies and senior quantity surveyors, had almost equal say in making that decision. However, the final decision maker would still be the client, as they are the paymaster (Ashaari et al., 2018).

CHALLENGES IN IMPLEMENTING E-TENDERING

THE VARIED PERSPECTIVES OF CONSULTANTS, CONTRACTORS AND DEVELOPERS

Studies had reported that different parties in the tendering process went through varied experiences in the application of e-tendering systems. In a UK study, most of the consultants were in favour of e-tendering and gain most benefits in terms of cost savings. The

study further revealed that at the time, the challenges reported include flaws in the system, unfamiliarity, higher time consumption and the need to still issue certain documents in hard copy (Tindsley & Stephenson, 2008).

The contractors, being the target population of a Malaysian study, highlighted e-tendering's poor reliability, followed by security issues, unwillingness to change and high initial cost (Tan & Kamarudin, 2016). Still, the contractors expressed their inclination towards adopting e-tendering if they were given the opportunity, due to the benefits attained. They valued the storage space reduction and improvement in competitiveness (Tan & Kamarudin, 2016).

With the distinctive appreciation of e-tendering advantages from the consultants' and the contractors' sides, the developers had their focus on timesaving as the prioritised benefit of e-tendering (Ashaari et al., 2018). In short, different stakeholders of the tendering process had differed considerations and priorities when it came to implementing e-tendering.

TRANSPARENCY AND ETHICAL ISSUES

E-tendering was introduced with emphasis on its transparency, being open and transparent to each members of the process (Chilipunde, 2013; Olukayode & Adeyemi, 2011; The Australian Cooperative Research Centre for Construction Innovation, 2001a). Yet, a Malaysian report had found otherwise where contractors in this study expressed their concern in the transparency of e-tendering, as certain stages in the process remained unrevealed to the public, which leads to another concern for ethical issues (Zakaria et al., 2014). Recently, it was reported in Madhya Pradesh, India, that e-tendering was being exploited as a tool for extortion, depravity, and fraudulence (Naveen, 2019; NewsClick, 2018; Singh, 2018).

EFFECTIVENESS MODEL

The success in implementing e-tendering relies on its transparency, value and efficiency and four categories of barriers in the application of an effective e-tendering system was identified as Process, Technology, People and Policy (Alsagoff et al., 2006). In the same study, it also found that People (user and knowledge implementation) and Policy (laws and regulations) being the primary challenges, instead of Process (system flow) and Technology (system security and design) (Alsagoff et al., 2006).

RESEARCH METHODOLOGY

Research methodology relates to the series of approaches used to obtain the required data and answer the research questions. This section displays the research framework, research approach, sampling method, data collection and data analysis to study the level of usage of e-tendering, challenges to implement paperless e-tender and the suggestions for improvement from the perspectives of Malaysian QS consultants in the construction industry.

RESEARCH FRAMEWORK

Figure 1 below illustrates the conceptual framework for this study.

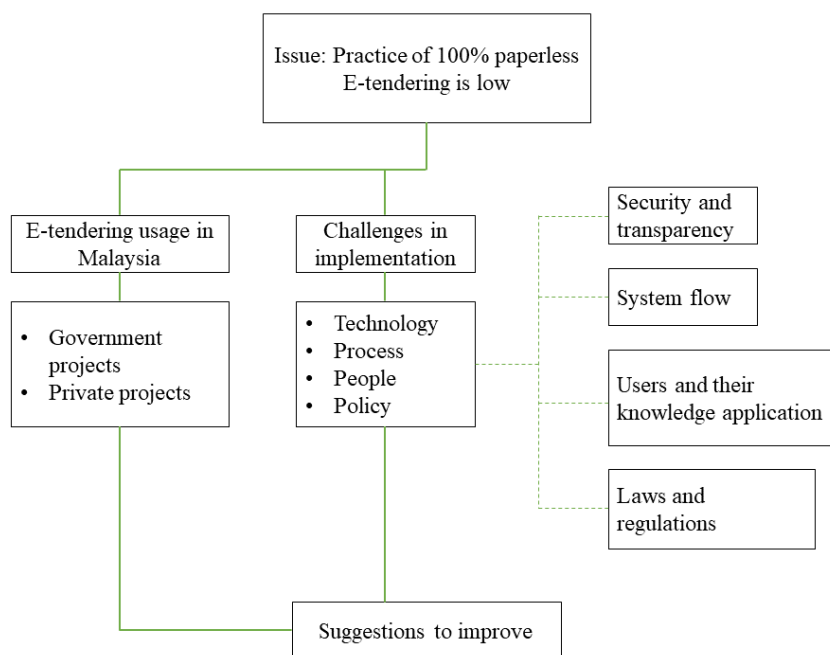


Figure 1: Conceptual Framework

The first stage of the research framework was the identification of low 100% paperless e-tendering practice in the Malaysian construction industry. The following steps of this research were the identification of usage level of e-tendering application; the challenges in implementing 100% paperless e-tendering from the constructs of: technology, process, people, and policy; then from there, providing suitable suggestions to improve from the current situation.

QUALITATIVE RESEARCH METHOD

The method applied was the qualitative approach which involves a smaller sample group size compared to the quantitative approach (Bhattacharyya, 2006). Through conducting in-depth interviews, open-ended questions asked would provide exploratory insights in meeting the research objectives.

Due to the exercise of Movement Control Order (MCO) amidst the global pandemic of COVID-19, the respondents were given the choice of conducting the interviews through cloud meetings (Zoom, Google Hangout, Microsoft Teams etc.) or answering the questions through email.

NON-PROBABILITY SAMPLING

Target population of this study was QS consultants from Klang Valley (Kuala Lumpur and Selangor). Non-probability sampling technique was applied for the intentional selection of five (5) respondents with adequate user knowledge in e-tendering. Table 2 below shows the selected respondents' profile.

Table 2: Respondents' Profile

Respondents	Role in Organisation	Experience in Construction Industry
I	Contract Executive	2
II	Director	36
III	Contract Executive	2
IV	Associate	5
V	Senior Project Executive	3+

DATA COLLECTION

Primary data was collected through interview questions, which consisted of mainly four (4) sections: (I) General information; (II) Level of usage of e-tendering; (III) Challenges to implement paperless e-tendering; and (IV) Recommendations to improve current situation.

Secondary data was obtained through the collection of previous processed data, e.g. books journal articles, reports, websites, newspaper reports, dissertations etc. (Kothari, 2008). This information would help support the findings and arguments in the following section of this report, besides providing a deeper understanding towards the current research topic.

CONTENT ANALYSIS

Manual coding was used to categorise the data collected systematically into themes, patterns, or concepts through interpretation of verbal and written language Columbia University Mailman School of Public Health (n.d.).

The two types of content analysis include conceptual and relational analysis. In conceptual analysis, the frequency of words and texts would be counted from the responses, then categorised to identify patterns in the respondents' answers to generate a coding system. In relational analysis, the further analysis on the relationship or emotional value of the responses on top of conceptual analysis would be conducted (Colorado State University, 2004).

FINDINGS

LEVEL OF E-TENDERING USAGE

On a personal level, the interviewed QS consultants in Malaysia rarely adopts e-tendering and lacks the experience and exposure in handling e-tendering systems. Respondents I and II had zero (0) past experience in e-tendering, while the others had only handled one (1) project using e-tendering before, despite Respondent II had thirty-six (36) years of experience in the industry. Other than Respondent II, most of the responses displayed an agreement in the low implementation of e-tendering in the Malaysian construction industry currently.

When asked about the industry usage, Respondent V pointed out that paper-based tendering is still widely practiced and very prominent in the industry because hardcopies are still used as the basis for reference and documentary evidence in tender award. This remains a tradition in the industry for record and safe keeping.

Respondent III perceived that the low adoption of e-tendering is due to the low awareness of the construction players on e-tendering. This statement contradicted one of the previous findings on the seemingly high awareness of e-tendering from the developers' side (Ashaari et al., 2018).

Only Respondent II was aware of the e-tendering system used by the public sector (JKR). This relatively low awareness could be due to the respondents' lack of exposure towards government projects. Nevertheless, all the respondents were able to name at least one (1) private platform, i.e., SAP Ariba, NiuAce, Glodon E-tender, Build Space and Autodesk BIM360. Surprisingly, none of the respondents had mentioned Aconex which was previously mentioned by The Australian Cooperative Research Centre for Construction Innovation (2001a) as the popular e-tendering service in Asian region.

In short, research objective 1 of this study has been achieved, which is to understand the current level of usage of e-tendering in the Malaysian construction industry.

CHALLENGES IN IMPLEMENTING PAPERLESS E-TENDERING

Table 3: Coding for Objective 2

Category	Theme	Sub-theme	Code
Challenges Implementing Paperless tendering	1) Process	a) Inability to manage suppliers	C1a
		b) Inconvenient	C1b
	2) Technology	a) Transparency issues	C2a
		b) Lack of technological investment	C2b
		c) Complex user interface	C2c
		d) Security issues	C2d
	3) Policy	a) Poor governmental law and regulations	C3a
		b) Poor lead by public sector	C3b
	4) People	a) Lack of knowledge	C4a
		b) Unwillingness to change	C4b
		c) Industrial practice	C4c
		d) Human errors in operating e-tendering	C4d
		e) High training cost	C4e
		f) Ethical issues	C4f
	5) Unsure		C5

Table 4: Top Four (4) Popular Responses for Challenges in Implementing Paperless E-tendering

Rank	Challenges	Key words/phrases	Code	Times mentioned
1	Unwillingness to change	“Tradition”, “prefer old way”, “stubbornness to change”, “prefer...rather than”, “lack of incentive”, “not ready”	C4b	8
2	Industrial practice	“Hardcopy”, “filing”, “contract binding / documents”, “reference”	C4c	6
2	Transparency issues	“Not transparent”, “issue exists”, “not revealed”, “(un)fair model”	C2a	6
3	Poor governmental law and regulations	“lack of enforcement / regulations”, “(poor) national / government law and policy”	C3a	4
4	Ethical issues	“Yes...huge problem”, “...unethical works”, “unfair”	C4f	3
4	Lack of knowledge	“(Lack of) knowledge enhancement”, “unfamiliarity”	C4a	3

Table 4 displays the top four (4) popular responses for challenges in implementing paperless e-tendering. In their responses, Respondent I and V stated that “it is difficult (to implement 100% paperless concept in e-tendering)”, while Respondent III and IV were of the opinion that previous e-tenders were not able to achieve 100% paperless, however, there was substantial minimizing of physical documents.

The keywords mentioned in their answers included “...people are still filing with paper...prefer to print out...rather than looking at computer”, “JKR...implementation was poor”, “...must keep...hardcopy for contract binding purposes”, “...majority...practices traditional method...referring to hard copy...depends on method adopted by client”, “... contract documentation is important depends on method adopted by client”. The difficulty of implementing paperless concept was confirmed in one of the previous studies (Bradwell, 2009).

Overall, the challenges in implementing paperless e-tendering identified were mostly “people” issues. Ranked first was “unwillingness to change”. This was identified as one of the cultural issues present in the construction industry (Griffith & Watson, 2004). Cultural issues were also the barriers to change and one of the problematic barriers in e-tendering application (Kajewski & Weippert, 2004; Tan & Kamarudin, 2016; The Australian Cooperative Research Centre for Construction Innovation, 2001b).

A new factor that most respondents mentioned is “industrial practice”, which became the second ranked challenge identified. In the response obtained in this study, phrases like “contract binding is important” or “hardcopy as reference is required” were stated several times. As mentioned by Respondent V, hardcopies are always kept because “in case of discrepancies, the hardcopies will always take precedent”. This phenomenon might also be common amongst the other older and traditional industries as well, with paper-based documents accepted as the only formal documentation which has been practiced since the pre-digital era. This deeply ingrained mind-set becomes difficult to break and changing an entire process also requires more investment in time, cost and energy (Lou & Alshawi, 2009).

Transparency was also ranked second amongst the challenges. This was related to the Technology issues and aligned with a previous Malaysian literature (Zakaria et al., 2014). This worry not only includes the incomplete revelation of tender process, but the client can choose to hide any information at will, which is cited from the respondents’ answers - Respondent IV. Regardless, this issue has not been solved since 2014.

Next was policy issues, pertaining to “poor governmental law and regulations”. This was especially stated by Respondent II, which mentioned this issue numerous times in his response on different questions. This was related to the insufficiency and lack of comprehensiveness in the legislations on this matter that are governed by statutory bodies (CIDB, JKR or BQSM). This issue was ranked first in another study (Lavelle & Bardon, 2009). However, it was ranked rather low among the contractors’ viewpoint (Tan & Kamarudin, 2016).

“Ethical issues” has a close relation to “poor governmental law and regulations” and “transparency issues”; it was ranked fourth. “To be honest, there is nothing we can do to stop people from being corrupted or doing unethical works...There are also some people who believe that the fastest way is to take shortcuts, and thus, we have all these unethical works”, answered Respondent III, whose statement was also supported in a previous work (Zakaria et al., 2014). Ironically, e-procurement was introduced as a solution to these ethical issues (Kajewski & Weippert, 2004; Zakaria et al., 2014) yet it can be seen that e-tendering has not achieved that purpose yet.

“Lack of knowledge” was ranked fourth as well, however not much context was given by the respondents. It could be due to “unfamiliarity” and “lack of awareness” towards the application of e-tendering and its benefits, and the insufficient training and information dissemination among members of the construction industry. This contradicts the findings of the earlier research by Ashaari et al. (2018) and Tan & Kamarudin (2016) which were conducted on contractors and developers where they were found to have reasonable level of awareness.

On being asked on the benefits received by contractors; most respondents agreed that contractors would receive the least benefits among all parties in the tender process. This aligns with the previous study (Tindsley & Stephenson, 2008). Respondent I was of the view that e-tendering substantially reduces printing cost; hence clients can include more tenderers. Due to the number of tenderers participating, competition will be stiffer thus tenderers will need to price their tender more competitively to secure a good position in the pricing aspect. This means the successful contractor will have to perform the work with a lower profit margin or maybe even at break-even prices. Any error they make may cause them to make a loss that can lead to other problems both for the project and for the organization.

Respondent II gave another perspective in terms of benefit to the client and consultants. Since most of the documentation and printing works involved are done during the preparation of tender documentations, it would be natural that the consultants and clients benefit more from e-tendering, since e-tendering lessens this heavy workload. At the same time, Respondent III and IV thought that it is much easier for the tenderers to do it the traditional way as shifting to e-tendering requires them to learn and adopt a new process which would result in some level of difficulties.

Yet, Respondent V had a different perspective from the others, where he neither agreed nor disagreed on contractors having received the least benefits. His rationale elaboration was, “contractors would experience time savings to scan the tender documents”.

All five (5) respondents were unanimous that the client has most influence in deciding whether to implement e-tendering in their projects. Four of the respondents opined that the contractor has the least influence in this manner. This statement could be supported by a previous literature (Ashaari et al., 2018). As “clients are the paymaster”, quoted from Respondent III, the final decision depends on the top-level management of the client’s side.

It was surprising to find that the respondents unanimously disagreed on the suggestion that Malaysia is ready for e-tendering. This contradicts the previous research finding (Alsagoff et al., 2006). However, some of them agreed that People and Policy are still the main issues confronting the industry towards adopting paperless e-tendering.

The above arguments link back to the research question 2, which is to identify the challenges faced in implementing paperless concept of e-tendering system in Malaysian construction industry.

RECOMMENDATIONS TO IMPROVE CURRENT SITUATION

Four (4) of the respondents indicated that paperless e-tendering should be encouraged. The reasons given were that e-tendering can bring positive impacts to the environment, as being paperless helps to preserve eco life. Respondent II mentioned that it is important that the Malaysian construction industry catch up with the advancements as achieved in other industries. Less usage of physical documents was also mentioned by Respondent IV as it is more convenient.

Only Respondent V disagreed with the encouragement to implement paperless e-tendering because he believes hardcopies are still very important in the contract binding process in Malaysian construction industry. It is understandable this concern was raised due to company policies or its status as a standard practice, or perhaps this was because of the obstinate frame of mind that was engraved in the majority of construction players.

Table 5: Respondents’ Recommendations for Improvement

Respondents	Responses
I	Start educating consultant QS's company, provide training for their staff. Slowly but surely, once there's success in e-tendering, slowly every company will follow.
II	JKR must formulate a workable model and take the lead.
III	Provide a platform whereby tenderers can easily do an arithmetical checking to avoid any errors. Encourage the BQSM to introduce and implant e-tendering practice. Obviously, we cannot take e-tendering by full force in one go. So, it will be advisable to introduce it slowly and move away from traditional tendering
IV	Government initiative and incentive for companies to adopt e-tendering.
V	Enhancement in tendering software with no hacking system.

Table 5 shows the responses obtained on the recommendations to improve the current phenomenon of e-tendering in the construction industry. Half of the respondents opined that government entities should lead the industry by providing more incentive and encouragement, with the introduction of an effective and efficient platform.

Other responses included the improvement of the current e-tendering systems to enhance security and add the feature of arithmetical checking. Education is also significant in increasing awareness of the construction players on e-tendering.

It can be concluded that research objective 3 has been achieved, which is to recommend possible solutions that can overcome the challenges towards adopting total paperless concept in the e-tendering system.

LIMITATIONS OF THE STUDY

This research paper was prepared and completed during the outbreak of global pandemic (COVID-19) and under the restraint of Movement Control Order (MCO) in Malaysia. The major limitation was the inability to conduct a face-to-face interview. Whilst the author was only able to collect five (5) samples, the respondents’ experience in this area of study might not be satisfactory. Although given the options of other forms of interactive interviews, the respondents had chosen to respond in email for this research. Due to this, the quality of responses in an interactive session where further clarifications and more in-depth opinions could have been sought was sorely missed and these could have been very relevant to the findings of this research.

Due to that, the quality of data collected might be lower than the normal standards and due to time constraints, some vague responses could not be clarified, and the respondents’ state of minds were also very much affected by their respective situation due to the pandemic. In addition, due to low number of samples, the findings obtained might lack accuracy. Lastly, the lack of available literatures on e-tendering, especially in Malaysia, might have an impact on the end results of this research.

CONCLUSION

This paper detected the lack of awareness and exposure of the current QS consultants in Malaysia towards the application of e-tendering systems; moreover, the barriers and stigmas of the respondents towards adopting a total paperless e-tendering system were identified. This phenomenon could mean the revocation of the previous statement of Alsagoff et al. (2006), with Malaysia being “ready” for e-tendering, despite the current efforts of the local authorities to embrace The Fourth Industrial Revolution (IR 4.0). Other important contributions include the insights from the perspectives of QS consultants in providing a future direction for e-tendering implementation in the Malaysian construction industry, with more commitment on the governments’ part.

Notwithstanding the limitations, the research objectives of this study had been met. To recap, the objectives were: (1) to study the current level of e-tendering application in Malaysian construction industry; (2) to identify the challenges faced by Malaysian construction industry in implementing paperless concept in the e-tendering system; and (3) to recommend possible solutions that can overcome the challenges towards adopting total paperless concept in the e-tendering system.

Findings indicated the low usage and awareness of e-tendering among the QS consultants, as they lack hands-on experience and exposure towards e-tendering, hence, they were not able to point out the public platforms used.

Most of the challenges identified were “people issue”, as they agreed on “unwillingness to change” being the top-ranking barrier, followed by “industrial practice”. Next was the “technology issue”, given that transparency of e-tendering did not meet the expectations of the industry. This was followed by the “policy issue”, where they complained on the inadequate legislature on the authorities’ side. Other issues stated were on “people issue”, regarding ethical usage and lack of knowledge on e-tendering.

Most of the respondents agreed on the need to encourage e-tendering usage; only one disapproved of the idea. The basis of their agreement was environmental considerations, keep abreast with technological advancement as other economic sectors and convenience. For the respondent who had disagreed, it was because of industrial practices, which relates back to cultural issues. Recommendations pointed out by the respondents were mostly on education, training, governmental involvement on implementation and regulations, as well as improving the e-tendering system itself.

RECOMMENDATIONS FOR FURTHER STUDIES

The construction industry is all about effectiveness in managing cost, time, quality and raising clients’ satisfaction. With a more productive way of tackling drawbacks that exist in the traditional method of tendering, especially the heavy usage of paper, web-based tendering system should be promoted widely among construction industry players in Malaysia to encourage the adaptation of paperless concept in tendering.

It is hoped that the data presented from this study may allow further understanding on the latest adoption level of e-tendering among construction players, where QS consultants play a major role in giving advice to the client and facilitating the e-tendering process. A study to compare the views of QS consultants who are more involved in government projects versus QS consultants whose clients are from the private sector could be conducted in future to understand better the different perspectives of these two groups. This would give a more comprehensive understanding of how QS consultants view the e-tendering issues and prospects which will provide useful insight on directions for future preparations and proper planning before the construction industry can fully accept a paperless concept of e-tendering.

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