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### INVESTIGATION INTO THE PERCEPTION OF CONSTRUCTION SUPPLIERS TOWARDS FUTURE ADOPTION OF ELECTRONIC BIDDING FOR PUBLIC PROCUREMENT IN MALDIVES

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**Afaaf Mohamed Saeed, Dr. Siti Sarah Binti Maidin, Intan Farahana Binti Kamsin. Investigation Into the Perception of Construction Suppliers Towards Future Adoption of Electronic Bidding for Public Procurement in Maldives-- Palarch's Journal of Archaeology of Egypt/Egyptology 17(7), 5199-5208. ISSN 1567-214x**

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#### **ABSTRACT:**

This paper aims to understand the effort expectancy, performance expectancy, social influence and external factor of government regulation towards the future adoption of electronic bidding for public procurement in the Maldives by using a revised Unified Theory of Acceptance and Use of Technology (UTAUT) model. This research is focused on nationwide construction suppliers of Maldives. The findings of this research identify the most influential determinant towards future adoption of electronic bidding and the relationship between each determinant towards future adoption of electronic bidding.

#### **INTRODUCTION**

The Republic of Maldives consists of 1,190 islands (188 inhabited), categorized into 20 administrative atolls in the Indian Ocean [1]. The registered population of the country in 2017 was at 378,114 with almost 70,000 people residing in the capital city of Male' as per the population category of the Statistical Yearbook of Maldives 2018 [13]. Maldives economy has been growing steadily and Real Gross Domestic Product (GDP) reached 6.9 percent in 2017 followed by a positive growth in 2018 due to increasing investment in the fields of construction, commerce and tourism (International Monetary Fund, 2019).

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registered population of the country in 2017 was at 378,114 with almost 70,000 people residing in the capital city of Male' as per the population category of the Statistical Yearbook of Maldives 2018 [13]. Maldives economy has been growing steadily and Real Gross Domestic Product (GDP) reached 6.9 percent in 2017 followed by a positive growth in 2018 due to increasing investment in the fields of construction, commerce and tourism [14].

Construction is one of the most important sectors of the Maldives. Construction projects undertaken by the government of Maldives have increased due to large scale projects such as the past 3000 units social housing scheme [1]. It is predicted to keep on increasing with the announcements of new construction projects such as the 4000 housing units under Social Housing scheme in Hulhumale' City [2]. These new projects will need to go through formal bidding procedures as per government regulations for public procurement.

According to the World Bank [3], construction industry of Maldives greatly increased due to large scale infrastructure projects backed by the government strategies such as the 'Greater Male' Development Strategy'.

Moreover, it is estimated that that expenditure of major projects (mostly construction) funded by foreign loans will amount to Maldivian Rufiyaa Four Thousand Four Hundred and Fifty Nine Million in 2019 and over Maldivian Rufiyaa Five Thousand Two Hundred and Fifty Nine Million in 2020 [4].

All these projects are public procurements and need to be carried out according to the procurement regulation of the country. Public procurement is the purchase of good and services by the government and state owned enterprises [5]. For public procurement, Maldives follows its regulations under the Public Finance Act locally known as Dhaulathuge Maaliyyathuge Gaanoonu [6] and procurement regulation locally known as Dhaulathuge Maaliyyathuge Gavaaidhu [7].

Maldives currently practices open tendering for public procurement whereby projects over a certain threshold must be publicly tendered to proceed with the implementation afterwards. This includes many paperwork activities such as the submission of tender documents, which are done manually with the delivery of hard copies. Suppliers are not allowed to submit bid electronically. Therefore, a solution to this manual process can be the integration of Electronic Bidding for public procurement projects.

Electronic Bidding (EB) is an online procurement process where communication, publication, access, review and submission of all tender documents with strict procedures and rules are all done through an online system or the internet [8]. According to Chen and Chiang [9], electronic bidding is one of the most important operational function and solution of public administration. The main aim of this research is to investigate the perception of the construction suppliers of Maldives towards the adoption of

electronic bidding for public procurements in the future by using a modified research framework as detailed in the below passages.

The objectives of this research are 1) To identify the issues faced by construction suppliers with the current procurement practice, 2) To propose EB as a suitable alternative to manual bidding process currently being used, 3) To determine the relationship between Performance Expectancy, Effort Expectancy, Social Influence factor and External Factor: Government Regulation and behavioural intention of construction suppliers for the future adoption of EB and 4) To determine the most influential variable towards the future adoption of EB amongst suppliers.

Currently there are lack of study on the investigation into supplier perception towards the current procurement practice nor on the future procurement practice plans of the country. Due to the increase in Maldives economic growth and its construction sector and its strides to modernize its government operations, it is imperative aid the procurement mechanism by conducting a feasibility study on implementing EB by getting feedback from the suppliers.

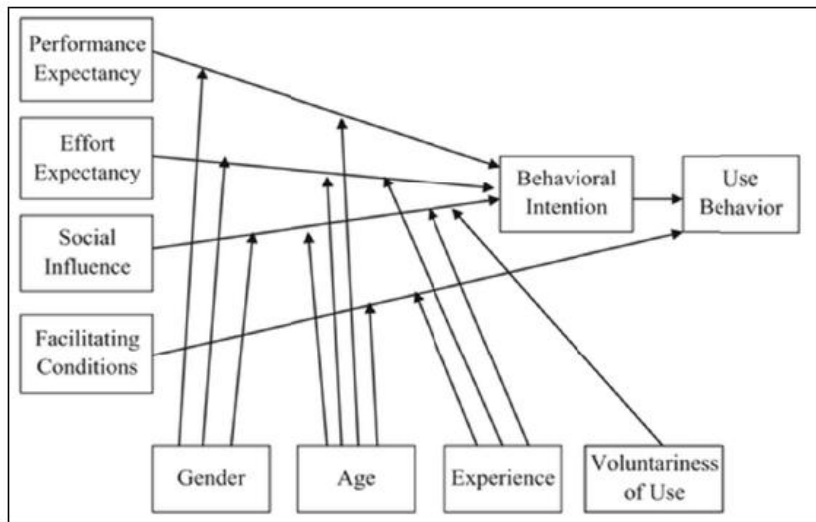
By obtaining and understanding the feedback of the suppliers for the future use of a new bidding system will help the government of Maldives to develop a good online system, implementation plans and carry them out more smoothly. Supplier feedback is crucial, especially in the development of the EB system as they are customers who will be using it to apply for projects.

## **MATERIALS AND METHODS**

### ***Theoretical Framework***

The Unified Theory of Acceptance and Use of Technology (UTAUT) Model is a mix of eight previously introduced models of technology acceptance literature. The eight models are Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behavior (TPB), model combining TAM and TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT) which were reviewed and combined to develop a unified view towards technology acceptance [12]. According [11], by examining each factor, researchers will be able to assess an individual's intention to use and accept a specific system.

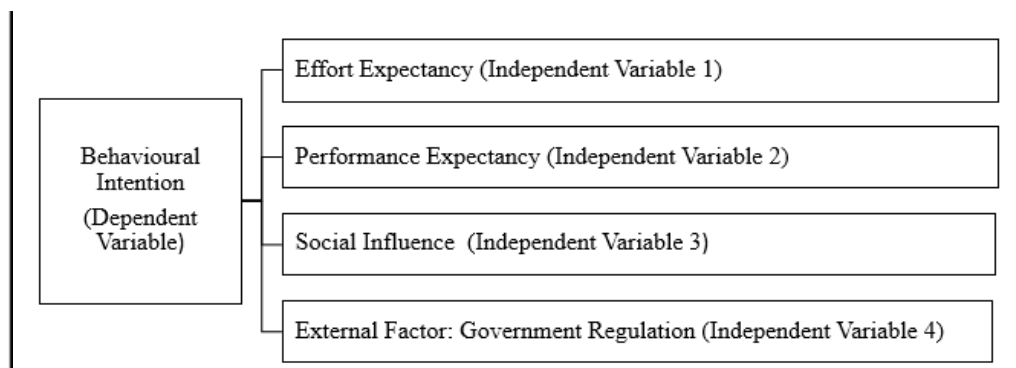
The UTAUT Model identifies four direct determinants; (i.e., performance expectancy, effort expectancy, social influence, and facilitating conditions which has a direct effect on behavioural intention. Furthermore, facilitating conditions have a direct effect on use behaviour [10]. Also included are four moderators (i.e., age, gender, experience, and voluntariness) related to predicting behavioural intention to use a technology and actual technology used primarily in organizational contexts. According to UTAUT, performance expectancy, effort expectancy, and social influence were theorized and found to influence behavioural intention to use a technology, while behavioural intention and facilitating conditions determine technology use [11].



**Figure 1.**Unified Theory of Acceptance and Use of Technology (UTAUT) Model[12]

• **Research Framework**

The research framework used for this research modifies the theoretical framework by omitting some variables. The key determinants of the UTAUT Model which are performance expectancy, effort expectancy, social influence factors (as independent variables) and behavioral intention (as dependent variables) will be used. Adding to the three (3) key determinants is the external factor of Government Regulation as an additional determinant. Government Regulation is the only external factor because if government passes a regulation on making EB compulsory for public procurement, then all suppliers will need to comply. The facilitating conditions and the moderating four variables; gender, age, experience and voluntariness of use are not included as these factors are deemed insensitive to the research. The final determinants of the modified model for this research is below:



**Figure 2.**Research Framework (Revised Model)

Effort Expectancy (IV1) - The degree of ease associated with using the specific system.

Performance Expectancy (IV2) - The degree to which an individual believes that using the specific system will help him/her enhance job performance.

Social Influence (IV3) - The degree to which an individual perceives that others believe that he/she should use the specific system.

External Factor: Government Regulation (IV4) - This refers to the factors outside the individuals control that influences him/her to use the specific system.

Behavioural Intention (DV) - The individual's tendency to take part in a certain behaviour.

### ***Research Methodology***

This research used a quantitative approach to conduct the survey. This research has four independent variables, Effort Expectancy, Performance Expectancy, Social Influence, External Factor: Government Regulation. The population for this research was based on the list of contractors obtained from the Ministry of Planning of Maldives (as at 17 September 2019). The original list of 1001 contractors were shortened to 822 as 179 contractors did not have adequate contact information.

The questionnaire items used identify the current bidding challenges for public procurement in Maldives are:

(Q1) Select problems currently faced during bidding for public contracts (Pick one):

- Company location different from bid submission location.
- Time consuming to prepare bid documents.
- Time constraints to submit bid documents on times sometimes.
- Cost of preparing hard copies of bidding documents.
- Hard copies of bid documents are difficult to prepare and keep as records.
- Other.

(Q2) Is there a need to transform the current procurement process being practiced from manual to electronic bidding?

The questionnaire items used to measure the variable Effort Expectancy are:

(Q3) I predict Electronic Bidding will be easy to use.

(Q4) I predict learning to operate the Electronic Bidding system will be easy.

(Q5) I predict training will be given be given, if needed to use the Electronic Bidding system.

The questionnaire items used to measure the variable Performance Expectancy are:

(Q6) I predict Electronic Bidding will cut down cost of preparation of bid documents.

(Q7) I predict Electronic Bidding will speed up the bidding process.

(Q8) I predict Electronic Bidding will increase overall productivity of my employees.

The questionnaire items used to measure the variable Social Influence are:

(Q9) My company thinks Electronic Bidding should be implemented for public procurement.

- (Q10) Acquaintances outside my company believe Electronic Bidding should be implemented in future.  
 (Q11) Do you agree that in general, people feel Electronic Bidding should be implemented in future?

The questionnaire items used to measure the variable External Factor: Government Regulation are:

- (Q12) I will use Electronic Bidding if regulated by Government.  
 (Q13) I will focus only on private contracts if Electronic Bidding is regulated by Government.

The questionnaire items used to measure the dependent variable Behavioural Intention is:

- (Q14) I intend to use EB for public procurement in the future.

For this research, IBM Statistical Package for Social Sciences (SPSS) 20 Software was used for the analysis of the primary data collected. All the data collected was entered into the SPSS and analyzed. The hypotheses were tested with the techniques, Pearson’s Product Moment Correlation Coefficient and Multiple Regression Analysis technique. After analysis, charts and diagrams of SPSS were used to represent the data findings.

### RESULTS AND DISCUSSION

Questionnaires were distributed to construction companies of Maldives whereby Q1 used Radio Button to select one choice, Q-Q13 was based on a 5-Point Likert Scale where possible answers range from 5- Strongly Agree, 4- Agree, 3-Uncertain, 2-Disagree and 1-Strongly Disagree. Q2 and Q14 was based on Yes or No basis. Figure 3 illustrates overall score for the problems currently faced during bidding for public contracts.

CURRENT PROBLEMS				
	Frequency	Percent	Valid Percent	Cumulative Percent
Company location different from bid submission location	14	17.1	17.1	17.1
Time consuming to prepare bid documents	12	14.6	14.6	31.7
Time constraints to submit bid documents on times sometimes	26	31.7	31.7	63.4
Valid Cost of preparing hard copies of bidding documents	18	22.0	22.0	85.4
Hard copies of bid documents are difficult to prepare and keep as records	3	3.7	3.7	89.0
Other	9	11.0	11.0	100.0
Total	82	100.0	100.0	

**Figure 3.** Overall Score for the Problems Currently Faced During Bidding for Public Contracts

The current bidding challenges for public procurement in Maldives were identified by rank as below:

1. Time constraints to submit bid documents on time sometimes (31.7 %).
2. Cost of preparing hard copies of bidding documents (22%).
3. Company location different from bid submission location (17.1%).
4. Time consuming to prepare bid documents (14.6%).
5. Other (11%)
6. Hard copies of the bid documents are difficult to prepare and keep as records (3.7%).

Whether there is a need to transform the current procurement process being practiced from manual to electronic bidding, 91.5% stated Yes while only 8.5% stated No.

Coefficients <sup>a</sup>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.557	.104		5.375	.000
1 IV1	.116	.060	.305	1.939	.056
IV2	.145	.063	.312	2.292	.025
IV3	.075	.047	.211	1.599	.114
IV4	.012	.038	.022	.306	.761

a. Dependent Variable: DVQ1

**Figure 4.** Multiple Regression Analysis Findings

Multiple Regression Analysis was carried out as indicated in Figure 4, the results indicating that the most significant variable to the DV (Behavioural Intention) is IV2 (Performance Expectancy at 0.025 which meets that criteria of  $p < 0.05$ . All other variables are over 0.05 indicating that they are not statistically significant compared to Performance Expectancy.

Correlations						
		DVQ1	IV1	IV2	IV3	IV4
DVQ1	Pearson Correlation	1	.750**	.738**	.711**	.222*
	Sig. (2-tailed)		.000	.000	.000	.045
	N	82	82	82	82	82
IV1	Pearson Correlation	.750**	1	.845**	.833**	.262*
	Sig. (2-tailed)	.000		.000	.000	.018
	N	82	82	82	82	82
IV2	Pearson Correlation	.738**	.845**	1	.773**	.222*
	Sig. (2-tailed)	.000	.000		.000	.045
	N	82	82	82	82	82
IV3	Pearson Correlation	.711**	.833**	.773**	1	.240*
	Sig. (2-tailed)	.000	.000	.000		.030
	N	82	82	82	82	82
IV4	Pearson Correlation	.222*	.262*	.222*	.240*	1
	Sig. (2-tailed)	.045	.018	.045	.030	
	N	82	82	82	82	82

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

**Figure 5.** Pearson Product-Moment Correlation Coefficient Test Finding

Pearson Product-Moment Correlation Coefficient test, as illustrated in Figure 5 was also carried out. Result as displayed above indicating that all the independent variables demonstrate a positive correlation to the dependent variable. Effort Expectancy is positive (0.750), Performance Expectancy is

positive (0.783), Social Influence is positive (0.711) and lastly, External Factor: Government Regulation is positive (0.222).

Table 1 shows the summary of the hypothesis test. As shown in the table, Null Hypothesis One to Four has been rejected by the Pearson’s product moment correlation coefficient test. Hence it demonstrates that all of the independent variables have a positive relationship towards the dependent variable. In addition, Null Hypothesis Five has been rejected as there is a significant independent variable (Performance Expectancy) towards behavioral intention of suppliers.

**Table 1** Summary of Hypothesis Test

**CONCLUSIONS**

T Hypothesis		Hypothesis Statement	Findings
m a i n p r o b l e m w i t h t h e c u r r e n t	H1	Effort Expectancy does not influence behavioural intention of suppliers to use/adopt EB in the future.	Rejected (0.750**)
	Ha1	Effort Expectancy influences behavioural intention of suppliers to use/adopt EB in the future.	ACCEPTED
	H2	Performance Expectancy does not influence behavioural intention of suppliers to use/adopt EB in the future.	Rejected (0.738**)
	Ha2	Performance Expectancy influences behavioural intention of suppliers to use/adopt EB in the future.	ACCEPTED
	H3	Social Influence conditions do not influence behavioural intention of suppliers to use/adopt EB in the future.	Rejected (0.711**)
	Ha3	Social Influence conditions influence behavioural intention of suppliers to use/adopt EB in the future.	ACCEPTED
	H4	External factors do not influence behavioural intention of suppliers to use/adopt EB in the future.	Rejected (0.222*)
	Ha4	External Factors influence behavioural intention of suppliers to use/adopt EB in the future.	ACCEPTED
	H5	There is no significant independent variable towards behavioural intention of suppliers.	Rejected (Effort Expectancy - 0.025)
	Ha5	There is a significant independent variable towards behavioural intention of suppliers.	ACCEPTED

procurement practice of Maldives was identified as the time constraints to submit the bid documents on time. The current procurement practice can be



improved in the future by modernizing it to use EB. The Pearson product correlation coefficient method gave results that all four independent variables (Effort Expectancy, Performance Expectancy, Social Influence and External Factor: Government Regulation) has a positive correlation with the dependent variable (Behavioural Intention). This shows that all variables affect the user behaviour of the construction suppliers. There is prediction that the performance of construction supplier will be enhanced in future if electronic bidding is implemented, as the Multiple regression results showed the independent variable of Performance Expectancy as the most influential factor affecting the behavioural intention of construction suppliers.

This research achieved its aim by finding that modernizing the current manual method of bidding to electronic bidding in the future is very important for the public procurement of Maldives. Furthermore, a change of process is welcomed in the future by the construction suppliers of the country.

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