

Critical Success Factors Affecting E-Procurement Adoption in Public Sector Organizations in Sri Lanka

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Abstract

E-procurement is one of the ICT applications utilized in both public and private sector organizations. Many countries all over the world benefited through the government procurement using electronic means as it enables the government to offer more convenient and widespread accessible government services in an efficient, cost-effective and participatory manner. The main purpose of the study are to identify the most significant factors which affect on public sector e-Procurement adoption in Sri Lanka; to identify the level of using electronic methods in procurement function of those organizations and to identify the barriers in adopting e-Procurement in those organizations. The data was collected through a structured questionnaire and interviews were conducted with officers who involved in the procurement function of selected public-sector organizations. The population of the study comprises of the national level public sector entities; Ministries, Departments, Statutory Boards and Public Companies. The sample of 114 officers was selected as key informants based on stratified random sampling method. Both qualitative and quantitative methods were utilized in this study. Quantitative research approach was utilized to identify the determinants of successful e-procurement adoption and the level of e-Procurement usage. The qualitative approach was employed to identify issues in e-Procurement adoption. It was found that Relative Advantage, Compatibility, Complexity, Top Management Support, Employee Knowledge and skills and Supplier Readiness are statistically significantly (at $p < 0.01$) affecting e-Procurement adoption. Those variables altogether explain 66.2% of variance in e-Procurement adoption in the public sector organizations in Sri Lanka. Among them, Top Management Support and Relative Advantage can have 70.2% and 60.2% impact on successful e-Procurement adoption. Weak procurement guidelines, Weak Legal framework and ICT infrastructure, and Lack of IT knowledge and experience of employees are the present barriers to e-Procurement adoption in national level public sector organizations in Sri Lanka. Policy recommendations for the e-Procurement adoption are proposed in the paper.

Keywords: e-Procurement, e-Procurement adoption, Critical success factors, National level public sector organizations

1. INTRODUCTION

With the globalization, the usage of Information and Communication Technology (ICT) has been intensified in both public and private sector organizations. In competitive business environment, organizations either in government or private ownership seeks to maximize capabilities and resources properly to increase productivity. In this regard, ICT facilitates to explore new business opportunities while accelerating competition among businesses all over the world.

E-Procurement is one of the latest technologies utilized by modern day organizations in order to reduce time, cost and effort (Baternburg 2007). E-Procurement has evolved into the use of electronic technologies to streamline and enable procurement activities of an organization. Many countries all over the world have gained benefits through the application of e-Procurement systems into their business operations.

Sri Lanka in its development agenda identifies, ICT as a key driver in economic development. However, e-Procurement is a new phenomenon to the most government sector organizations in the country. Moe (2004) mentions that in contrast to the business organizations, the adoption of e-Procurement systems by the governments are more influenced by political and institutional commitments (Baternburg 2007). Different studies have suggested that the real challenge of the public e-Procurement is not technical but managerial (Ramanathan & Somasundaram 2004). Hence, adoption of e-Procurement in the public sector is challenging.

2. IMPORTANCE OF THE STUDY

The government is the largest procurement agency in any country which needs to fulfil the expectations of citizens by providing goods and services. Thai (2001), mentions public procurement is an important function of the government where it needs to satisfy requirement for goods, systems and services in a timely manner. Value for Money (VFM) is the core principle governing public procurement and is supported by the underpinning principles of efficiency and effectiveness, competition, accountability and transparency, ethics and industry development (Commonwealth Procurement Guidelines (2005) as cited by Raymond 2008).

Sri Lanka as a developing country, procurement is one of the key functions of government as well as a key determinant in the delivery of quality services to the citizens. According to Ekanayaka

(2015), public procurement in Sri Lanka is one of the key areas of the last regime where there were serious lapses costing billions of dollars and damaging the whole Sri Lankan economy, environment and society. This statement clearly illustrates the magnitude of the procurement function for the whole economy. Ekanayaka (2015) mentions that the operational management in procurement is in a feeble state in Sri Lanka due to lack of good governance. Liyanage (2005) discussed several weaknesses of the Sri Lankan Government Procurement System such as extensive delays in contract awards and non-compliance with rules and regulations (cited by Samarasingha 2009). An interview conducted with Algama (2017) quoted that “Some of the contracts appear to have been awarded without observing the fundamental principles of governance in procurement such as transparency, accountability and VFM”. Verité (2016) shows that introducing an efficient procurement system will empower the businesses and reduce wastage in public funds in public procurement in Sri Lanka. These factors highlight the importance of moving into automated systems of procurement function in Sri Lanka.

3. BENEFITS OF THE STUDY

The findings of the study will be important for the heads of public sectors organizations to identify the most influential factors that determine e-Procurement adoption in public sector organizations in Sri Lanka. Further, the findings could be taken as inputs to the policy decision making process.

The findings of the study will add new knowledge to the existing literature as there is no research related to information technology adoption theories to determine e-procurement adoption in Public Sector Organizations in Sri Lanka.

4. OBJECTIVES

The research is sought to achieve the following objectives;

- i. To examine the level of e-Procurement usage among selected public-sector organizations in Sri Lanka
- ii. To determine the critical success factors in the adoption of e-Procurement in public sector organizations in Sri Lanka.
- iii. To identify the challenges and barriers that face e-Procurement adoption in public sector organizations in Sri Lanka.

5. LITERATURE REVIEW

5.1. Theoretical concepts

Procurement means acquiring of goods and services and is a business-to-business (B2B) transaction. Procurement guidelines (2006) issued by the National Procurement Agency in Sri Lanka, defines Procurement as “obtaining by Procuring Entities of Goods, Services or Works by the most appropriate means, with public fund or funds from any other source whether local or foreign received by way of loans, grants, gifts, donations, contributions and similar receipts”.

Government procurement is the process by which government buys goods and services from suppliers (from both public and private) for the needs of its people (Cardapan-Antonio (2003 as cited by Samarasinghe 2009).

Government Procurement in Sri Lanka: Procurement guidelines and the procurement manual issued by National Procurement Agency (NPA) in 2006, for goods and works are the main compliances that need to be adhered in government procurement in Sri Lanka. Procurement methods used in government procurement have been specified in the procurement guidelines issued in 2006.

Weaknesses of Traditional Procurement in Sri Lanka: Government Procurement in Sri Lanka requires adhering to many rules and regulations according to the procurement guidelines issued by the National Procurement Agency in 2006. Liyanage (2005) discussed several weaknesses in government procurement of Sri Lanka as extensive delays in awarding contracts and non-compliance to rules and regulations. This has been exacerbated by frequently changing suppliers, poor monitoring, inadequate knowledge and skills, lack of expert advice and institutional support, non-availability of standard contract documents and specifications and weak contract administration. This has direct negative consequences on critical economic development (Samarasingha 2009). Delays in procurement process are the major concerns which hinder the performance of government organizations.

E-Procurement: Electronic procurement is the use of information and communication technology (especially internet) by organizations for concluding their procurement relationships with suppliers

and for acquisition of goods and services. Lusons & Gillingham (2003 cited by Samarasinghe 2009) defined electronic procurement as the combined use of information and communication technology to enhance the internal and external purchasing and supply management processes.

Electronic Government Procurement in Sri Lanka: The usage of electronic methods in procurement function in public sector organizations in Sri Lanka is at minimal level. Procurement guidelines (2006) have given few provisions to facilitate adopting e-Procurement. Any procuring entity who wishes to carry out procurement by means of electronic form has to obtain prior concurrence from the Procurement Committee. Procurement guidelines allow Procuring Entities to Publish Procurement invitations on website; to inspect pre-qualification (PQ) applications and bidding documents electronically or otherwise; to obtain clarifications through electronic media. However, electronic submissions of Bids are not allowed.

E-Procurement functionalities: Lefebvre et al., (2005) classified e-Procurement functionalities in detail considering information and transaction perspective as a part of B2B e-commerce study. As per his findings, searching for new suppliers and searching for goods and services is considered as “electronic information search”; purchasing via e-catalogues, placing and managing orders with suppliers and accessing suppliers’ goods or services database as “simple electronic transactions”, purchasing via e-auctions, e-tenders, negotiating contracts with suppliers, making payments to suppliers, accessing suppliers’ inventories and allowing suppliers to access the buyers’ inventories as “complex electronic transactions”; and sending documents to suppliers, doing collaborative online engineering with suppliers’ and tracking goods purchased during transportation as “electronic collaboration” (Hasan 2013).

5.2.Theoretical Background to the Research

This study reviewed several related theories, namely, Diffusion of Innovation (DOI) theory, Resource Based View (RBV) theory, Network Effect Theory, Institutional Theory, Path Dependency Theory and Technology, Organization and Environment Context (TOE) Framework.

Oliveira (2011) mentions DOI and TOE framework (Tornatzky & Fleischer 1990) are the most commonly used models on IT adoption at the firm level and most studies on IT adoption at the firm level are derived from these two theories. Soares-Aguiar & Palma dos- Reis (2008) explicitly relied on the TOE framework, institutional theory, and RBV theory to formulate hypotheses

regarding factors affecting e-Procurement adoption. Results of the study reveal that firm size, industry and top management support from the organizational context, information technology infrastructure, information technology expertise, B to B know-how from technological context, perceived indirect benefits, perceived success of competitors and trading partner readiness from environmental context are positively and significantly associated with the e-Procurement adoption. Teo et al., (2009) explicitly relied on TOE framework in order to formulate hypotheses regarding factors affecting e-Procurement adoption.

DOI theory, RBV theory, Network Effect Theory, Institutional Theory and Path Dependency Theory were compared with the TOE framework to eliminate the redundant variables. According to the comparison, technological context is addressed by both DOI and RBV theory. Organizational context is addressed by DOI theory, RBV theory and path dependency theory.

Mohammadi (2001) conducted a study on Ranking of Critical Success Factors for e-Procurement implementation based on thirty-five (35) previous research studies. Out of the top ten critical factors, most critical factors are synonym with the information technology adoption theories. Accordingly, Top Management commitment and Trained and Skillful employees are similar to the organizational context in the TOE framework; Security, IT infrastructure and resources are similar to the technology context in TOE framework and RBV theory.

Vaidya et al., (2006) assert that there are a number of requirements relating to the adoption of an e-Procurement system. They include technology, objectives, information, staffing and skills. Several researchers such as Birks et al., (2001), considers the determinants of e-Procurement success such as; staff training; top management support; users and buyers; selection of the actual e-Procurement system (Cited by Vaidya et al., 2006).

Mose et.al. (2013) suggested five most critical factors which affect e-Procurement adoption among large scale manufacturing firms in Kenya. Accordingly, Employees and Management Commitment is the most critical factor for e-Procurement adoption. E-Procurement success is closely related to early supplier involvement. It is important to demonstrate the proposed solution to the suppliers and discuss any necessary changes, issues, and concerns such as various options in developing and maintaining supplier catalogues (Birks et al., 2001 cited by Vaidya et al., 2006).

The conceptual framework of the study has been derived as follows.

6. CONCEPTUAL FRAMEWORK

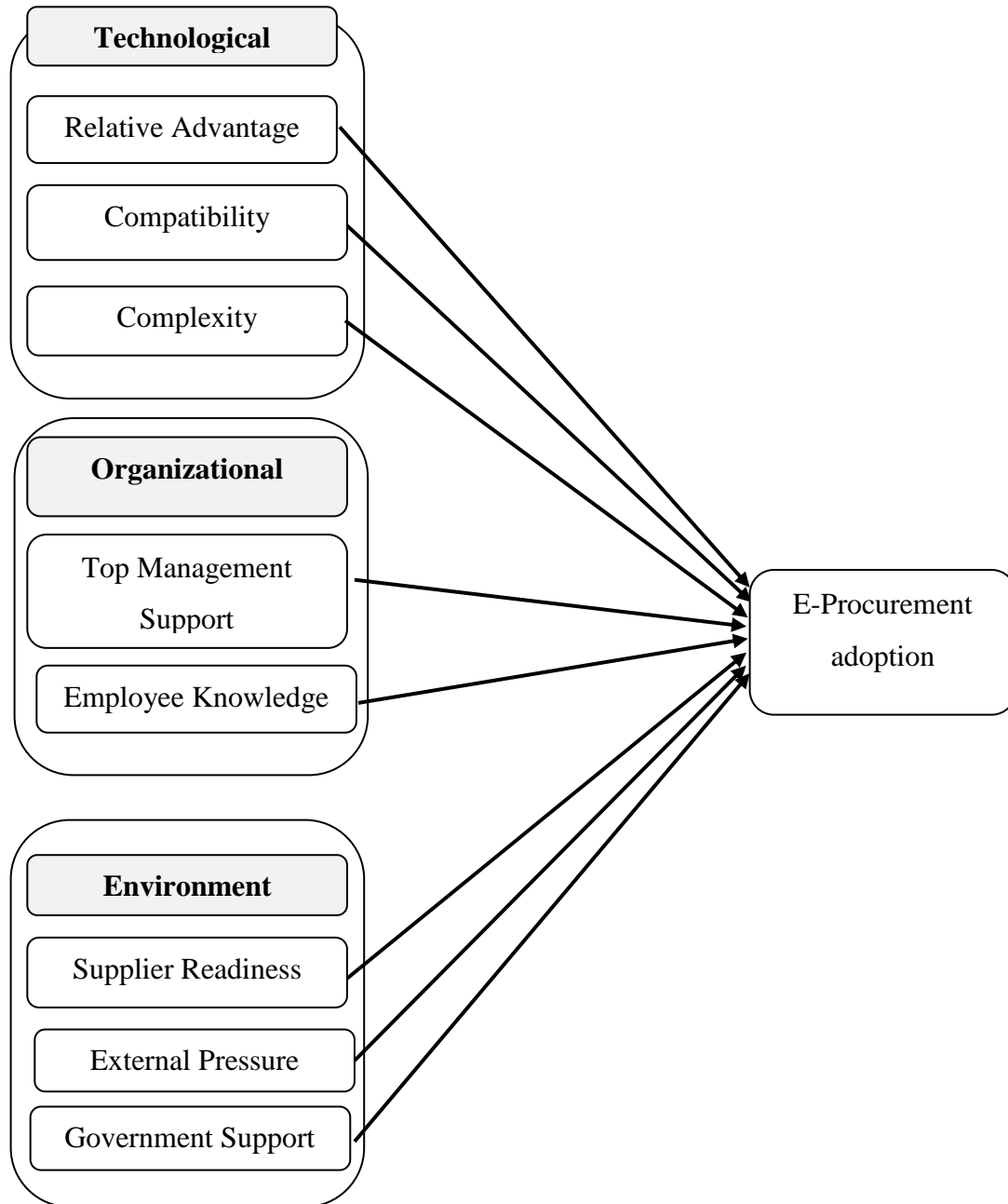


Figure 2: Conceptual Framework

7. MAIN HYPOTHESES OF THE STUDY

E-procurement adoption in public sector organizations in Sri Lanka is significantly and positively associated with the variables identified from the literature review. Hypotheses can be drawn as follows;

- H1: Higher the perceived relative advantage among the procuring officers, the more the organization will adopt e-Procurement.
- H2: Higher the perception of compatibility, the more the organization will adopt e-Procurement
- H3: Higher the perception as fewer complexes in e-Procurement technology, the more the organization will adopt e-Procurement
- H4: Higher the support from top management, more the organization will adopt e-Procurement
- H5: Higher the employee knowledge and skills on information technology, more the organization will adopt e-Procurement
- H6: Higher the supplier is willing to engage in e-Procurement; more the organization will adopt e-Procurement
- H7: Higher the external pressure, the more the organization will adopt e - procurement
- H8: Higher the government support, more the organization will adopt e-Procurement

8. METHODOLOGY OF THE STUDY

This study employed Quantitative Research Approach to achieve first and second objectives of the study and Qualitative research approach to determine the barriers for e-Procurement adoption in public sector organizations in Sri Lanka. The unit of analysis of the study was “national level public sector organizations” and the key informant is the person who entrust the duties of procuring activities of the organization. The population of the study comprised of national level public sector organizations; Government Ministries, Departments, Statutory Boards and Public Companies. 114

organizations considered as the sample which is 39% of the population. Of that, 74 responses were received with a response rate of 65%. Stratified random sampling method was used to select the sample under proportionate allocation.

Data was collected from both Primary and Secondary sources. Primary data of the study was collected through the questionnaires and from the interviews conducted with selected officials. Secondary data was collected by reviewing the existing literature. Quantitative data collected through questionnaires was analyzed using the Statistical Package for Social Sciences (SPSS) version 20. Both descriptive statistics and inferential statistics were used for quantitative data analysis. Statistical tools such as frequency analysis, reliability analysis, factor analysis, correlation analysis and regression analysis were used. Reliability analysis used to ensure the scale of reliability. Factor analysis was used to ensure construct validity of the measures. Correlation analysis used to describe the relationship among the variables and regression analysis was used to find out casual relationships among dependent and independent variables.

Qualitative data was gathered from the interviews conducted with the officers who are directly involved in the procurement function of the organization and through the questionnaires. Ten structured interviews were conducted to avoid biasness in responses. Open ended questions were asked form the interviewers to obtain the true view of the existing phenomenon. Collected data was recorded and sorted into meaningful categories. The results were interpreted and reviewed with the co-author to avoid ambiguity and to avoid influencing the biasness. Content analysis employed to analyze data to identify the basic patterns and themes related to issues of e-procurement adoption.

9. VALIDITY AND RELIABILITY OF MEASURES

The dependent variable of the study is the e-Procurement adoption among public sector organizations in Sri Lanka. All independent variables and dependent variable were derived from the literature and measured by using five-point Likert scale and asked them to answer each item to get the respondents' preference from mostly agreed to mostly disagreed.

9.1. Validity

Validity of data was measured using construct validity. As construct validity cannot be measured directly; convergent validity and discriminant validity were employed. All independent variables and dependent variable were based on strong literature to support the theoretical validity of the study. Therefore, content validity of the data was ensured. Convergent validity of the data was ensured through Exploratory Factor Analysis. KMO and Bartlett's test carried out to verify the adequacy of sample for each variable and the suitability of the data for Factor Analysis. Discriminant and convergent validity (Construct validity) of the measures were ensured considering the Square roots of Average Variance of Extracted (AVE).

9.2. Reliability

For ensuring the reliability of the variables; Cronbach's coefficient alpha was employed. Alpha coefficient ranges from 0 to 1 may be used to describe the reliability of factors extracted from various types of questionnaires or scales (Khalid K. et al, 2012). As alpha values are greater than .50, they can be considered as acceptably reliable in general; thus, those coefficients seem satisfactory enough to be included in further analysis of the study.

9.3. Factor Analysis

As shown in table 1, Factor Analysis was used to ensure the validity of each factor. Item loading of dependent variable and independent variables were greater than .05. Also, total variance explained by each variable were greater than 50% and initial Eigen values were greater than 1 show an acceptable validity in each variable.

Table 9: Results of Factor Analysis of Dependent Variable

Item	Alpha	Absolute Loading*
E-Procurement Adoption	.857	
Employees aware on automated processes in procurement function		.852
Employees accept fully automated e-Procurement system		.842

Employees use existing e-Procurement system	.859
Employees willing to use fully automated e-Procurement system	.794
Total Variance Explained – 70.116%	
Initial Eigenvalues – 2.805	

Table 10: Results of Factor Analysis of Independent Variables

Item	Alpha	Absolute Loading*
Relative Advantage	.873	
RA 01- E-Procurement makes the procurement process faster		.955
RA 02- E-Procurement facilitates better management of purchasing function		.934
RA 03- E-Procurement improves relationship with suppliers		.817
Total Variance Explained – 81.731%		
Initial Eigenvalues – 2.452		
Compatibility	.919	
E-Procurement system appropriate with existing information technology infrastructure		.857
E-Procurement system appropriate with organisation's preferred way for conducting purchasing activities		.913
E-Procurement adoption is consistent with organisation's business strategy		.886

Item	Alpha	Absolute Loading*
E-Procurement adoption is consistent with organisation's values		.940
Total Variance Explained – 80.923%		
Initial Eigenvalues – 3.237		
Complexity	.712	
Learning to operate e-Procurement is easy		.710
Interaction with e-Procurement system is clear		.647
e-Procurement is flexible to interact with		.740
Easy to become skillful at using e-Procurement		.851
Total Variance Explained – 54.865%		
Initial Eigenvalues – 2.195		
Top Management Support	.878	
Top management considers e-Procurement adoption is important		.890
Top management considers e-Procurement adoption as a part of business strategy		.982
Top Management is willing to take risks involved in the adoption of e-Procurement		.933
Top Management sets goals to achieve e-Procurement		.835
Top Management is committed to use e-Procurement		.857

Item	Alpha	Absolute Loading*
Top Management is willing to change organisational structure required to adopt e-Procurement		.675
Top Management is willing to change business processes required to adopt e-Procurement		.517
Top Management is capable of formulating policies required to adopt e-Procurement		.555
Total Variance Explained – 60.078%		
Initial Eigenvalues – 4.806		
Employee Knowledge	.851	
Employees aware on process improvements		.852
Employees have an overall knowledge on e-Procurement		.924
Employees have technical knowledge to start e-Procurement		.864
Total Variance Explained – 77.519%		
Initial Eigenvalues – 2.326		
Supplier Readiness	.738	
Suppliers willing to automate supply process		.792
Suppliers trust organisation's system		.908
Suppliers have automated systems		.749
Total Variance Explained – 67.109%		
Initial Eigenvalues – 2.013		

Item	Alpha	Absolute Loading*
External Pressure	.936	
Organisation is forced to e-Procurement to meet suppliers requirements		.969
Pressure to use e-Procurement as a standard purchasing practice		.969
Total Variance Explained – 93.95%		
Initial Eigenvalues - 1.879		
Government Support	.936	
Government is supportive to adopt e-Procurement		.865
Legal framework is sufficient to adopt e-Procurement		.865
Total Variance Explained – 74.796%		
Initial Eigenvalues – 1.496		

**Absolute loading of .50 or higher were significant*

10. ANALYSIS OF DATA

Following section presents the demographic analysis of the characteristics of the sample. Subsequent section presents and analyses the correlation and regression among variables. Finally, identified problems were presented and categorized using content analysis.

10.1. Demographic characteristics of the sample

Demographic characteristics were considered for age, gender, educational and professional qualifications, and working experience. 42% of the sample is within the age range of 31-40. Majority of the respondents in the sample are male and it is accounted for 55% of the sample. Female respondents accounted for 45% of the total respondents. Highest responses received from

the Ministries category. 49% of the respondents are graduates and about 36% of the sample has fully qualified professional examinations and 49% of the respondents possess a range of two to four years' experience in the procurement function.

In organizational analysis, 65% of the respondents prefer to use automated system for procurement function of their organizations.

Table 11: Demographic Characteristics of the Sample (N=74)

Demographic Variable	Frequency	As a %	Cumulative %
Gender			
Male	41	55%	55%
Female	33	45%	100%
Total	74		
Age			
25-30	6	8%	8%
31-40	31	42%	50%
41-50	26	35%	85%
above 50	11	15%	100%
Total	74		
Type of organization			
Ministries	31	42%	42%
Departments	20	27%	69%
Statutory Boards	23	31%	100%
Total	74		
Education Level			
Master Level	27	36%	36%
Postgraduate Diploma	0	0%	36%
Degree	36	49%	85%
G.C.E A/L	11	15%	100%
Total	74		
Professional Level			
Fully qualified	27	36%	36%
Partly qualified	25	34%	70%
Reading	20	27%	975
No professional qualification	2	3%	100%
	74		
Working Experience			

Demographic Variable	Frequency	As a %	Cumulative %
Less than 1	20	27%	27%
2 - 4	48	65%	92%
5 - 9	6	8%	100%
More than 10	0	0%	100%
	74		

Source: Field Data

Table 12: Number of organizations having separate purchasing department (N=74)

Is procurement function of the organization operating through separate purchasing department?	No=1		Yes=2	
	No. of Organizations	%	No. of Organizations	%
Ministries	05	20	18	37
Statutory Boards	13	52	18	37
Departments	07	28	13	27
Total	25	100	39	100

Source: Field Data

Table 13: Employee's preference on using automated systems than manual systems (N=74)

Do employees prefer to use automated systems than manual systems?	No=1		Yes=2	
	No. of Organizations	%	No. of Organizations	%
Ministries	12	46	11	23
Statutory Boards	09	35	21	44
Departments	05	19	16	33
Total	26	100	48	100

Source: Field Data

10.2. Analysis of Level of automation in procurement process

The study examined the current level of ICT usage under four categories as “Information search and exchange”, “Conducting simple e-Procurement transactions”, “Fully automated e-Procurement transactions” and “Electronic collaboration in e-Procurement”. Likert scale was used to determine the level of e-Procurement usage using total of 22 questions. The level of e-Procurement usage in the national level public sector organizations was analyzed considering the Mean and Standard deviation of SPSS version 20.

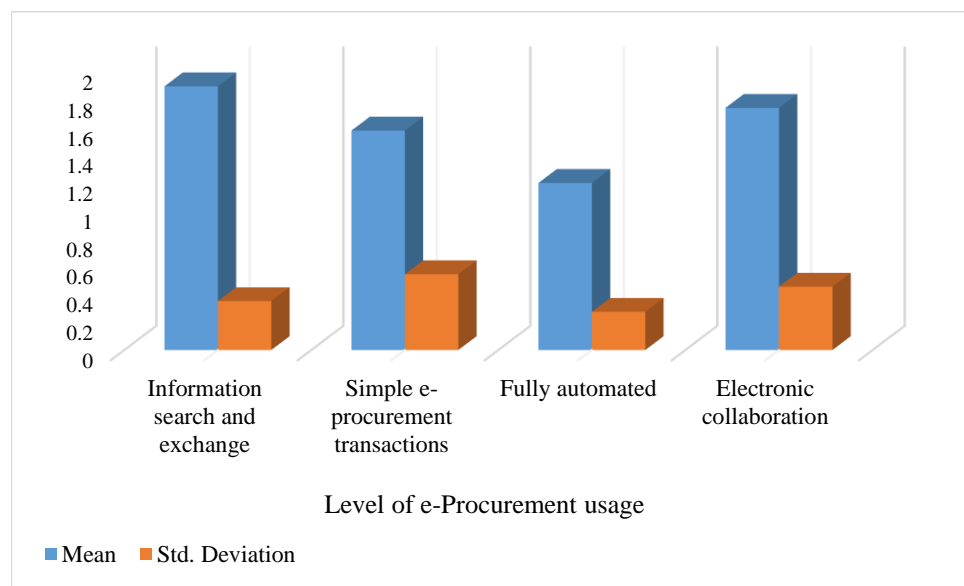


Figure 3: The level of e-Procurement usage in the national level public sector organizations

According to the results, mean value of all four levels is below 2.33. Hence, organizations in the sample are under lower level in using electronic methods in their procurement function.

10.3. Correlation of the Research Variables

Before analyzing the regression model, Multicollinearity analysis performed to identify how much the variance of an estimated regression coefficient increases if the predictors are correlated. VIF is the collinearity statistics utilized to measure the impact of Multicollinearity among variables. As Denis (2011) has mentioned, If VIF for one of the variables is around or greater than 5, there is Multicollinearity associated with that variable (Cited by Bush, 2009). According to the test results, there is no Multicollinearity issue in the model. A correlation analysis was used to examine the strength of the relationship between independent variables.

Table 14: Pearson Product Moment Correlation Matrix for the Research Variables

Correlations									
Variables	EPA	RA	COM	COX	TMS	EK	SR	EP	GS
EPA	1								
RA	.416**	1							
COM	.593**	.405**	1						
COX	.493**	.329**	.411**	1					
TMS	.636**	.360**	.591**	.398**	1				
EK	.515**	.386**	.330**	.277*	.288*	1			
SR	.125**	-.336**	.180	.179	.270*	.522**	1		
EP	.313	.141	.209	.312**	.661**	.374**	.548**	1	
GS	.213	-.238*	.058	-.044	.458**	.301**	.515**	.644**	1

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

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

There is a significant correlation between e-Procurement adoption and Relative Advantage, Compatibility, Complexity, Top Management support, Employee knowledge and Supplier readiness at the 0.01 level.

10.4. Regression Coefficients

Table 15: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.271	1.117		2.032	.046
Relative Advantage	.602	.219	.419	2.752	.008
Compatibility	.218	.103	.213	2.127	.037

Complexity	.341	.119	.239	2.873	.005
Top Management Support	.702	.159	.566	4.419	.000
Employee Knowledge	.705	.130	.705	5.422	.000
Supplier Readiness	-.917	.243	-.573	-3.776	.000
External Pressure	-.059	.164	-.049	-.358	.722
Government Support	-.038	.136	-.034	-.282	.779

a. Dependent Variable: E-Procurement adoption

Employee knowledge and skills, compatibility, complexity, relative advantage, top management support, supplier readiness significantly affect on e-Procurement adoption.

Table 16: Model Summary

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin –Watson
1	.836 ^a	.699	.662	.49172	2.144

a. Predictors: (Constant), Government Support, Complexity, Supplier readiness, External Pressure, Compatibility, Top Management Support, Employee knowledge and skills

b. Dependent Variable: E-Procurement adoption

All these factors explain 66.2% variance on the dependent variable of e-Procurement adoption. External pressure and government support are not significantly affect on the e-procurement adoption.

10.5. Qualitative Analysis

Qualitative findings are based on the responses given by the respondents for the questionnaire and responses received derived from the structured interviews conducted with the selected officers. Following specific issues were identified.

10.5.1. Weak Procurement Guidelines

According to the analysis of responses received from the interview, all respondents highlighted the weaknesses in the existing procurement guidelines. Procurement guidelines obstruct moving into automated systems in procurement function as suppliers are not allowed to submit bids in electronic form, purchasing via e-auctions or e-tenders, making payments electronically and sending documents to suppliers in electronic means. The same issue was highlighted by the responses received through questionnaires. Accordingly, 88% of the respondents mentioned that strengthening and revising existing guidelines is a must to facilitate e-Procurement adoption.

10.5.2. Weak Legal framework

From the interviewees four officers discussed the weaknesses in the existing legal framework of the country to adopt e-Procurement. Laws and regulations facilitating electronic transactions and other IT related laws can be identified as the major constraint in establishing an e-Procurement System. It was revealed that in the long term, absence of a national procurement law will diminish the stakeholders' trust, transparency, accountability and efficiency in procurement operations. Implementation of Electronic Transactions Act, No. 19 of 2006 and Computer Crime Act, No. 24 of 2007 are some of the positive tendencies on creating legal framework in the country. However, those laws should be revisited to facilitate towards implementing e-Procurement systems. 53% of the respondents highlighted the weak IT related laws through the questionnaires.

10.5.3. ICT infrastructure

Along with the strengthening legal framework, ICT infrastructure is required to facilitate those Acts and regulations should be established and maintained. All interviewees mentioned that existing ICT infrastructure does not facilitate in adopting e-Procurement systems in their organizations. 95% of the respondents confirmed the same issue through the responses received from the questionnaire. As e-Procurement System is highly relies on cryptography to establish Confidentiality, Integrity and Availability, it is required relevant cryptographic protocols, algorithms and techniques to establish a secure e-Procurement System. Standard Bidding Documents (SBD) should be modified and standardized to facilitate use of e-procurement.

According to the respondents, lack of Public Key Infrastructure (PKI) facilities is a key barrier in determining e-Procurement adoption.

10.5.4. Lack of IT knowledge and experience

Lack of IT knowledge and experience among public sector officials appeared as a key issue in e-Procurement adoption. Initiation of such a change would be challengeable without sufficient knowledge on IT. Officials engaged in procurement function does not know on laws and regulations facilitating electronic transactions and other IT related laws. 81% of the respondents highlighted the issue through the questionnaires.

11. DISCUSSION

First objective of the study is to find out the present level of automation in the procurement function in selected public-sector organizations. The four levels were defined based on the literature as “Information Search and Exchange”, “Conducting simple e-Procurement transactions”, “Automated e-Procurement transactions” and “Electronic collaboration”. Findings of the study show that organizations in the sample is at lower level in using automated processes in the procurement function.

Relative Advantage, Compatibility, Complexity, Top Management Support, Employee knowledge and Supplier readiness are critical determinants of e-Procurement adoption in public sector organizations in Sri Lanka. Relative advantage was found to have effect on e-Procurement adoption in the studies by Min and Galle (2003), Teo, et al (2009), Li (2008), Hasan (2013), Soares - Aguiar & Palma dos-Reis (2008).

Organizations are more likely to adopt and use innovation when it is compatible with their existing practices and values (Rogers 2003). Teo et al., (2009) and Soares - Aguiar, and Palma-dos-Reis (2008) presented evidence suggesting that organizations are more likely to adopt and use technology that is compatible with the organizations’ existing information technology infrastructure, business processes and value systems.

An innovation that is perceived as easy to use and understand is more likely to be adopted and used by an organization (Rogers 2003). Further, author suggested that organizations are more likely to adopt and use technology that is perceived as less complex. Difficulty in understanding and applying a new technology increases the risk associated with its adoption (Teo, et al., 2009).

Top Management support is a critical factor in both e-Procurement implementation and adoption as identified by many scholars. Support from top management is vital to ensure that resources needed to adopt a technology (Griver 1993 (as cited in Hassan 2013) or to expand its use are available and to overcome resistance to change.

Employee knowledge is more likely to result in e-Procurement adoption. Prior studies presented evidence that organizations are more likely to adopt and use technology when their employees have knowledge and expertise relevant to technology. Mata, et al., (1995) illustrate that knowledge about technology enables organizations to manage effectively the risks associated with investing in a technology (as cited in Hassan 2013). The findings are associated with the qualitative findings revealed through the interviews conducted with the officers of public sector organizations.

The benefits of e-Procurement can be realized by an organization only if its suppliers are ready to engage in information exchanges or transactions via procurement (Hassan 2013). Soares - Aguiar & Palma-dos-Reis (2008) presented evidence that organizations are more likely to adopt and use inter-organizational information systems when their trading partners are ready to use such systems. However, supplier readiness has a negative relationship with e-Procurement adoption due to suppliers' unwillingness to trust electronic systems in public sector organizations.

In Sri Lanka, most of the supplier contracts depend on personal relationships and have been awarded without observing the fundamental principles of governance in procurement (Verité 2016). Therefore, both buyer and seller do not wish to maintain electronic business relationships. ECOM (2002) provides constructive opinion on the same stating that suppliers may be unwilling to conduct businesses electronically with public sector agencies because they are unclear about the benefits to be gained, and they might see e-Procurement as a means by which public sector agencies will simply attempt to force down prices.

12. CONCLUSION

This study makes a significant contribution to the applicability of e-Procurement adoption theories to the public-sector organizations in Sri Lanka. Accordingly, technology and organization context variables were significantly affect on e-Procurement adoption in public sector organizations in Sri Lanka. Some of the qualitative findings such as employee IT knowledge and experience and IT infrastructure also compatible with the complexity in the technological environment and employee knowledge and skills in the organizational context. However, Supplier readiness from the external environment has a negative impact on e-Procurement adoption.

Therefore, top managers should more concern about organizational level factors to strengthen those factors. Top management support and employee knowledge have the highest impact on e-Procurement adoption in the organizational context. As suppliers' readiness negatively effects on e-Procurement adoption, managers should provide opportunities for them to offer their feedback and suggestions for the improvement and adjustment of practices.

13. RECOMMENDATIONS

E-Procurement adoption is possible when the users of the organization perceive its benefits such as performing procurement process faster, better management of procurement activities and improving relationship with suppliers. Therefore, users should make aware on the expected benefits of adopting e-procurement system.

E-procurement systems should be compatible with the existing information technology infrastructure. Then the additional cost and training can be minimized as users familiar with the existing information technology infrastructure. Further, users preferred method of doing their day to day activities should not diverge with the new e-procurement systems. End user participation is required from the beginning of such implementation to avoid resistance. E-procurement systems should be easy to learn and operate for end users. It should be provided with user friendly interface to interact with.

Top management support is a vital factor on e-procurement adoption. They should perceive moving to an automated solution is important to the organization. They should set goals and

formulate policies necessary for e-Procurement adoption. To accomplish the goal, they should identify e-Procurement system adoption as a part of their business strategy and they should be willing to change necessary changes required in the present organizational set up and business processes.

Employee knowledge and skills is another supportive hypothesis for e-Procurement adoption. Employee should be made aware of the process improvements and changes to the existing processes. User Acceptance Testing (UAT) should be conducted before implementation of e-Procurement systems.

Supplier readiness to perform purchase contracts based on automated process is another factor on e-Procurement adoption. As it is negatively correlated with e-procurement adoption in Sri Lankan context, suppliers should be involved in every stage of e-Procurement adoption by demonstrating the proposed solution to supplier by discussing necessary changes, issues and concerns.

Updating procurement guidelines, manuals and procurement procedures and adopting a principles-based procurement law are imperative requirements in order to speed up e-Procurement adoption.

The study examined the level of e-Procurement usage in public sector organizations and revealed that all organizations are at a low level in automating procurement processes in their organizations.

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