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Factors Influence on E-procurement Adoption in Tea Processing Factories in Sri Lanka

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Abstract

Purpose: Information communication technology (ICT) to handle transactions, is widely used across many industries, yet factors influencing its adoption, particularly in tea industry in developing countries like Sri Lanka, have been overlooked. This study aims to identify the factors influencing on digitization of the procurement in tea processing factories in Sri Lanka.

Methodology: The study relies on a quantitative research approach using a survey design. Rathnapura district, was selected as it is the largest law country tea growing district and sample of fifty factory staff members were selected using convenience sampling technique. Data was analyzed by use of the Statistical Package of Social Sciences.

Findings: Questionnaire survey results revealed that user friendliness and top management support have a significant and positive impact on e-procurement adoption while perceived benefits, ICT literacy and environmental factors not having a statistically significant impact on e-procurement adoption.

Unique contribution to theory, practice and policy: Study provides recommendation to achieve higher degree of adoption and successful implementation of e-procurement technology among tea processing factories in Sri Lanka.

Keywords: *Adoption, E-procurement, TOE framework, Tea processing factory, Sri Lanka*

1. INTRODUCTION

Procurement is one of the most important concepts that closely links with the supply chain perspective and has exploded into the business scene as one of corporate management's major concerns over the past decades. In tea manufacturing industry, tea leaf procurement involves a set of activities ranging from supplying picked tea leaves, weighing the leaves, transporting them to the tea factory, and in turn making payments to tea leaf suppliers/ farmers (Kapiyangoda & Karunaratne, 2021). Traditional procurement is fundamentally a method of off-contract buying and purchasing in a hardcopy form, which leads to massive scandals and indignity that have been attributed to poor handling of procurement information thus leading to excessive corruption (Khan et al., 2019; Thai, 2009).

Electronic procurement (E-procurement) is a web-enabled solutions designed at automating and streamlining the key activities involved in an organization's procurement process. As a developing nation, Sri Lanka in its development agenda identifies ICT as a key driver in economic development (Wattegama,2021). E-procurement is a new phenomenon to the agriculture sector and related organizations in the country. However, adopting to e-procurement significantly reduces the cost of purchasing tea leaves and is also more efficient than the current manual, hardcopy-based, labour intensive procurement process while merging and streamlining the entire tea supply chain process in a continuous, synchronized and smooth mode (Chepkemoi, 2014; Chirchir et al., 2015; Kosmol et al., 2019; Oteki,2019). These factors highlight the importance of moving into automated systems of tea leaf procurement function in Sri Lanka.

Chirchir et al. (2015), noted that e-procurement in the tea industry was not widespread and that there has been limited research into the factors affecting its adoption in many countries. Even though several studies focus on e-procurement adoption in Sri Lankan context (Premathilaka & Fernando, 2020; Nitharsan & Francis, 2022) it is however clear that none of the studies focused on the tea industry. Even in the Asian region, limited attention has been paid to the digitization of the tea supply chain. To the best of the researcher's knowledge, no evidence has been found in the Sri Lankan context, and the current literature in this regard is silent. As such this study aims to investigate the factors influencing on digitization of the procurement process in tea processing factories in Sri Lanka. Thus, the overarching research question of this study is what are the factors influencing on digitization of the procurement process in tea processing factories in Sri Lanka?

The findings of this research study are of great significance to the existing body of knowledge related to the field of study. Further, the study findings serve as a benchmark for tea processing factories that intend to adopt e-procurement systems and provides insights that can benefit various stakeholders, including ICT service providers, government authorities, and SMEs. These insights help identify potential barriers, formulate strategies for better implementation, and thereby improve competitiveness within the tea processing sector.

The rest of the paper is organized as follows. Next section presents the literature review followed by methodology. Subsequent section deals with the analysis of gathered data and making decisions about the results of the data analysis followed by theoretical and managerial implications of the study. Final section provides recommendations and conclusion.

2. LITERATURE REVIEW

2.1 Digital Procurement

Digital Procurement represents a set of concepts that involves the automation of traditional procurement processes using e-procurement systems. According to Gunasekaran et al. (2009) digital procurement is supported by e-procurement and is becoming central to B2B e-commerce. Digital procurement practices involve the use of smart hence advanced technologies such as big data analytics, data mining tools, Internet of Things (IoT), and cloud computing (Srai & Lorentz, 2019). Ilhan and Rahim (2020) explained that digital procurement can quicken the pace of procurement transformation and essentially decrease the grinding of progress management and at the same time help firms to achieve enormous cost savings and productivity improvement.

2.2 E-procurement and its application

E-procurement is a complex hence diverse field of study, where definitions have varied in different content (Aboelazm, 2022). For example, Schoenherr et al. (2007), defined e-procurement procurement based on an analysis of 1577 articles, in order to clarify the meaning and terminology of the various ideas expressed by different scholars. According to Rahim et al. (2011), the e-procurement system is simply defined as web-enabled solutions designed at automating and streamlining the key activities involved in an organization's procurement process such as ordering, sourcing, supplier evaluation, and receiving. It also defined as an organizational application of IT in setting up agreements, facilitating the B2B procuring transactions for goods and services (Rotich & Okello, 2015). E-procurement merges and streamlines the entire supply chain process in a continuous, synchronized, and smooth mode (Chirchir et al., 2015; Oteki, 2019). Further, Done et al. (2011) explained that companies adopt web-based e-procurement systems to gain a variety of benefits including; better integration, tap digitization benefits, improve procurement efficiency, cost management and elimination of fraud, corruption and sourcing errors.

2.3 E-procurement adoption in tea industry

Based on the comprehensive literature review it was identified that majority of the studies conducted in the African region, and several studies have attempted to explore the factors influencing the adopt e-procurement and e-procurement adoption and supply chain management practices in tea firms. For example, Chichir et al. (2015); Chepkemoi (2014) and Mangla et al. (2022) evaluated the impact of adopting e-procurement on supply chain integration practices in Kenyan tea firms. Research findings also suggests that tea companies should adopt both e-procurement adoption and supply chain management practices to improve supply chain

performance. Prior researches generally classified influencing factors into three categories: technological, organizational, and external but the particular issue associated with factor-based studies is that they have not systematically examined how the factors differ based on such organizational characteristics as size and type (public, private) (Hassan et al.2014).

Moreover, Woodside and Biemans defined (2005, p.335) adoption as "the decision-making process of an individual unit of adoption to use a product or service". Following that, the adoption of e-procurement in this study refers to the actual use of web-based technologies, tools, or processes to support the execution of some or all aspects of tea leaves procurement activities in tea processing factories.

2.4 Technology, Organization, and Environment (TOE) framework

Prior researchers used several theories to explain and understand factors influence on the adoption of new technologies. Diffusion of innovation (DOI), Technology, organization and environment (TOE) framework and Resource-based View (RBV) theory are the dominant theories that used to explain the adoption of new technologies by firms (Ray, 2016; Christiansen et al., 2022). Among the many theories Technology, Organization, and Environment (TOE) framework of Ornatzky and Fleischer (1990, as sited in Oliveira & Martins, 2011) served as the most acknowledged theory by many scholars. For example, works of Afolabi et al. (2019), Altayyar and Beaumont-Kerridge (2016), Gunasekaran and Ngai (2008) and Hardy and Williams (2005) among others. TOE framework considered three contextual determinants including technology, organization, and environment that could impact the management's decision on innovation adoption in terms of e-procurement adoption. These three factors can provide barriers and incentives to IT adoption like e-procurement. Further, it aims to identify technological, organizational, and environmental factors that influence the adoption of IT innovations in organizations.

The technology view includes technology factors such as complexity, relative advantage, privacy, security, and compatibility that can affect existing IT systems being deployed or the new IT system being considered for adoption (Rogers, 1995). The organizational perspective refers to the internal factors within an organization such as prior IT experience, innovativeness, top management support, organizational size, information intensity and organizational readiness (Clohessy, 2019). The environmental view encompasses factors that impact an organization's day-to-day business operations such as competitive dynamics or competitive pressure and industry dynamics, government interactions, and regulatory framework (Ijab et al., 2019).

2.5 Factors affecting for e-procurement adoption

Based on the extensive literature review, considering both theoretical and empirical studies this study extracted five significant factors in order to evaluate the adoption of tea-processing factories for e-procurement solutions, which will be discussed next.

2.5.1 User Friendliness

User Friendliness is the degree to which an innovation or new technology is perceived as easy to understand and also use (Rogers, 2003). According to Grandon and Pearson, (2004) among the factors proposed as determinants of e-commerce adoption, perceived ease of use or synonymously used as user-friendliness is identified as a significant determinant of e-commerce adoption. The further study considered a subset of Davis' instrument to measure perceived ease of use as modified to make them relevant to e-commerce. Teo et al. (2009) argued that organizations are more likely to adopt a technology that is compatible with the existing information technology infrastructure, business processes and value systems of the organization. In addition to TOE framework this study was guided by the Technology Acceptance model and Principal-agent theory evident that the intent-to-adopt public e-procurement has a positive and significant relationship with concept of ease of use. Furthermore, prior research confirmed that user friendliness is considered as a key determinant factor in e-procurement adoption literature (Ibem.et al., 2016; Clohessy & Acton, 2019; Premathilaka & Fernand, 2020).

H1-User Friendliness will positively influence on e-procurement adoption

2.5.2 Perceived benefits

Rogers (2003) defines perceived benefit of an innovation as the degree to which an innovation is acknowledged as more advanced than its successor. Ali et al. (2012) identified that perceived benefit and adoption behaviors are found to be positively related. Further, they explained that, if a firm perceives that e-procurement brings little benefit, then implementation of such a system would be really difficult. Daud et al. (2013) found that the key determinants influencing the adoption of e-procurement among Malaysia's 178 constructors are perceived benefit of e-procurement technologies in handling procurement works and the complexity of e-procurement technologies. Similarly, Ihem et al. (2016) findings from construction sector and Toe et al. (2009), finding from 141 companies from Singapore identified that perceive benefits is one of the highest influencing factor for the e-procurement adoption.

H2-Perceived benefits will positively influence on e-procurement adoption

2.5.3 Top Management support

Kulkarni et al. (2017) explained that top management support as a key recurrent factor critical to the adoption of IT innovations. They defined top management support as "managerial beliefs about technological initiatives, participation in those initiatives, and the extent to which top management promotes new technological advancement' (Kulkarni et al., 2017, p. 522). In the context of e-procurement adoption, top management is crucial as they set the vision and goals to the e-procurement adoption process (Premathilaka & Fernando 2020). Moreover, top management support has been identified as a key iterative factor critical to the adoption of IT innovation (Dong et al., 2009; Kulkarni et al., 2017; Wang et al., 2010; Gangwar et al., 2015). In the context of e-procurement adoption, top management support plays an crucial role because it may involve new

regulatory requirements, a high degree of complexity, the acquisition and integration of new resources, re-engineering of business-to-consumer and business-to-business transactions and information exchanges and the development of new skills and competencies through assessing the train needs (Swan, 2015; Pilkington, 2016).

H3: Top management support will positively influence on e-procurement adoption

2.5.4 ICT Literacy

ICT literacy is defined as individual ability to access, manage, integrate, evaluate, create, communicate information purposefully, knowledgeably, technically, and ethically to meet once needs. Afolabi et al. (2019) have identified ICT literacy as a Critical Success Factors (CSFs) for the e-procurement adoption in the Nigerian construction industry. Organizations are more likely to adopt and use technology when their employees have knowledge and expertise relevant to technology (Sun et al., 2020). Wang et al. (2010) conceptualized ICT literacy as the requisite knowledge, skill, and experience of employees to adopt new IT innovations. Kaliannan and Awang (2010) stated that the ability to use tools of ICT is regarded as a key determinant that leads to the adoption intention and usage of an e-procurement system.

H4: ICT literacy will positively influence on e-procurement adoption

2.5.5 External Pressure

Daoud and Ibrahim (2019), define competition pressure as the extent to which an organization's actions in applying e-procurement are influenced by other organizations and trading partners in the market. Daoud and Ibrahim (2019), reported that competitive pressure from external parties will push organizations to provide quicker responses to customers' needs, shorten lead times and offer a better level of customization. The adoption of IT can be the consequence of pressure and support exerted on the enterprise by its environment (Ismail et al., 2017). Previous research has found that competition pressure significantly affects on technology adoption (Teo et al., 2009; Lutfi et al., 2016; Alsaad et al., 2017). Lutfi et al. (2016) argued that completion or external pressure is also a key determinant in IT-related innovation adoption. Similarly, the more enterprises are economically dependent on their trading partners, the more they are likely to adopt e-procurement under the pressure of trading partners (Chwelos et al., 2001; Chatterjee et al., 2022). Li (2008) studied the impact of external pressure under two forms such as institutional pressure: the pressure from competitors and the pressure from suppliers or trading partners. Research findings evident that external pressure is a significant factor in adopting e-procurement.

H5: External pressure will positively influence on e-procurement adoption

2.5.6 Government Support

Government support would play a significant role in e-procurement adoption. Political commitment towards successfully implementing and enforcing e-procurement through approved

laws necessary for the accomplishment (Afolabi, 2019). Rogers (1995) and Raymond (1985) argued that governments can encourage the country's private sector to adopt e-procurement by providing supporting infrastructure, legal and regulatory frameworks, and guidelines for using e-procurement. The extent to which the government supports and facilitates to adopt of e-procurement might differ from country to country, hence Li (2008) stated that the Chinese government shows a clear commitment to e-procurement, potential adopters would view e-procurement more favorably and hence be more like to adopt it. Study found that government promotion was not found to be a significant influencing factor for enterprises e-procurement adoption. Abubakar (2021) finally concluded that good government policies are important in building thrust and confidence among the suppliers e-procurement system.

H6: Government support will positively influence on e-procurement adoption

2.5 Conceptual Framework

Based on prior research findings, this study conceptualizes that there is a relationship between user friendliness, perceived benefits, top management support, ICT literacy, external pressure and government support on degree of e-procurement adoption by tea processing factories as in Figure 1. There are six independent variables as per above mentioned and the dependent variable is the degree of adoption.

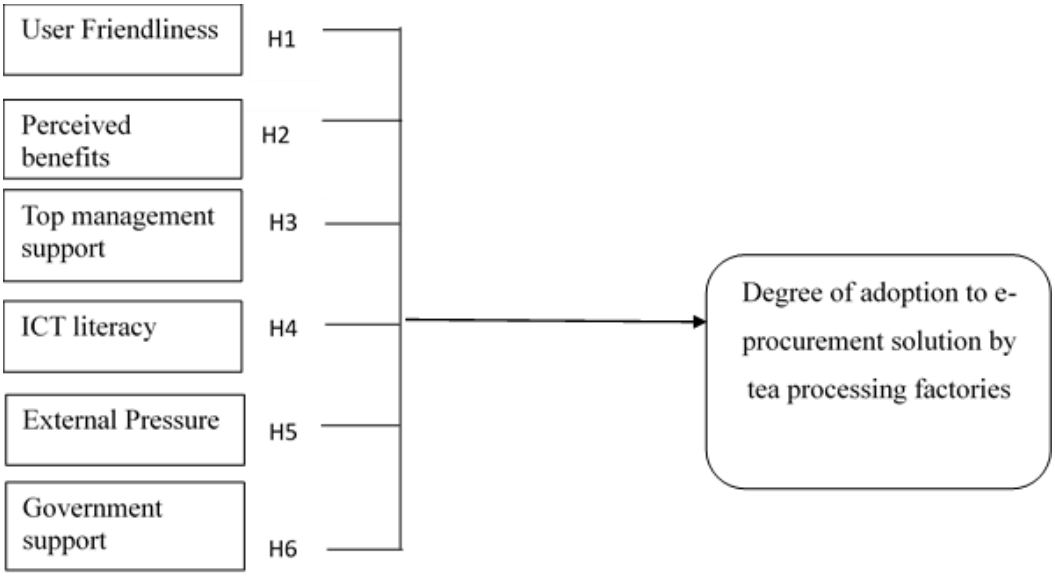

Figure 1: Conceptual Framework Source: Author's construct

3. METHODOLOGY

This study adheres to an explanatory research design. The design was suitable because it concerns with quantifying the six independent variables that have impact on degree of e-procurement adoption purposely to identify a cause-effect relationship This study allows for a greater

understanding of how user friendliness, perceived benefits, top management support, ICT literacy, external pressure and government support effect on e-procurement adoption by further explaining theories of e-procurement adoption such as TOE framework. The study was conducted in tea firms located in the Rathnapura District, Sri Lanka. The location was chosen because Rathnapura is considered as one of the largest tea-growing district belongs to low country tea producing district with over 100 tea-processing factories. Moreover, the location was chosen, because their tea firms have aware and adopted the e-procurement up to certain extent and therefore provides viable information required in the study. 50 respondents are selected as the sample for this study. The convenience sampling technique is used to extract the sample from the population. Sample comprised owners, middle managers and functional managers (Table.1). (Functional managers represent procurement, administration and production departments).

Table 1: Sample frame

	Frequency	Percentage
Owner	5	10.0
Middle manager	21	42.0
Functional manager	24	48.0
Total	50	100.0

Both primary data and secondary data are collected for this study. A self-administered, structured questionnaire is used as a major method to collect primary data. All variables were measured by using a five-point Likert scale and the respondents were asked to rate each item on the scale. The scales were given in the questionnaire in a continuum representing Never (1) to Always (5); to determine the level of e-procurement usage and strongly Disagree (1) to strongly Agree (5). The questionnaire consists with two major parts. First part of the questionnaire consists 10 questions developed to get demographic information while second section contains 29 questions to measure six independent variables and the dependent variable. Second section consists of five questions to measure Perceived Benefits, four questions for each to measure User Friendliness, Top Management Support, ICT Literacy, external pressure, Government Support and finally to measure the dependent variable. An English version questionnaire is used to collect data. Questionnaires are distributed among respondents at home factory premises to get responses at the same time. Secondary data for the study is gathered from factory records, annual reports, the company web site. Data gathered for the study is presented using tables and pie chart.

Table 2: Variables and measurements

	Variables	Dimensions	Scale	Source
Dependent variable	Degree of adoption to e-procurement	Users aware of the e-procurement system Users of the organization willing to accept the e-Procurement system Users willing to use e-procurement system Users willing to continue use e-procurement system	5-point Likert scale (1-Strongly Disagree to 5-Strogly Agree)	Rogers (2003)
Technological Factors	User-friendliness	Clear and easy to interact Easy to learn Flexible to interact with the user Easy to become skillful Compatible with existing processes and techniques	Do	Al-Hudhaif and Alkubeyyer (2011); Grandon and Pearson, 2004)
	Perceived benefits	Makes the procurement activities faster Facilitates better management of tea purchasing activities Improves relationships with suppliers Reduces the operational costs	Do	Crosby et al. (2016); Teo et al. (2009)
Organizational Factors	Top management support	considers e-procurement adoption is important Willing to take risk Willing to change existing processes Formulates policies and strategies to adopt e-Procurement	Do	Jeyaraj et al. (2006); Al-Qirim (2008); Alsaad et al. (2017); Ifinedo (2011)
	ICT Literacy of the staff	Ability to perform basic Computer functions Overall knowledge about e-procurement Technical knowledge Experience	Do	Lee et al. (2009); Looi (2005 as cited in Hassan, 2013)
Environmental Factors	External Pressure	Pressure from the competitors to use e-procurement Pressure from the business partners Pressure from suppliers Influence coming from important customer (international buyers)	Do	Guo and Liang (2016); Swan (2015); Premakumar and Ramamurthy (1995)
	Government support	Formulate supportive policies for e-procurement adoption The government provides low-cost infrastructure Economic stability of the country Government leadership	Do	Alatawi et al. (2012 as cited in Ismail et al.,2017)

3.1 Data analysis

Statistical Package for Social Sciences (SPSS) 16.0 is used to analysis data.

3.2 Validity and Reliability

Other than these major data analysis tools, some supportive statistical techniques are used in the study. Reliability and the validity of the questionnaire are tested using Cronbach's Alfa value and factor analysis respectively. According to test results, all Cronbach's alpha values are more than 0.6 which is at an acceptable level (Ursachi et al., 2015). To identify whether parametric tests can be performed, Skewness and Kurtosis indices are used to test the normality and all 6 independent variables and the dependent variable are between -1 and +1. Hence, both independent and dependent variables are approximately normally distributed hence, parametric techniques can be applied. Durbin - Watson estimate is used to test the independency where value near to 2 shows that data points are independent (Chan, 2004). As the value of Durbin - Watson estimate in this study is 2.383 revealed the independency assumption is not violated and standardized residuals are used to test outliers. Multicollinearity also tested to measure the interrelationship among independent variables.

4. RESULTS

Table 3: Sample Profile

Criteria	Categories	Percentage (%)
Age	20-30	38
	31-40	16
	>40	46
Years of service	1 to 5	44
	6 to 10	20
	11 to 20	14
	>60	22
Highest educational qualification	A/L	54
	Graduate	42
	Postgraduate	4
Years of operation of the tea factory	10 to 20	20
	>20	80
Mode of fresh tea leaf collection	Factory-own lorries	90
	Factory-own lorries and third-party leaf collectors	10
Current status of the leaf procurement	Fully manual	12
	Used ICT for information search and exchange	10
	Conducting simple procurement transactions	60
	Fully automated e-procurement systems	18

4.1 Sample Profile

The highest number of respondents comes under above 40 years age category and it is 46% of the total sample and none of the respondents belongs to the <20 age category. The average of the sample is having 2 years of service while it has been ranged from minimum of one year to a maximum more than 20 years. In term of educational qualification almost all the respondents have been educated up to the A/L, so as majority of the respondents have a good education level, there is no complicated problem with their knowledge and ability to adopt e-procurement. The management literature identifies age and size as two firm characteristics that have implications on competitive practices and served as considerable factors that influence on business process digitization. BarNir (2003) revealed that established firms digitize their processes to a greater degree than newer firms where majority (80%) of the factories have more than 20 years of production history while only 20% of the factories have an operation history between 10-20 years. Different methods are practiced to supply harvested tea leaves to the tea processing factories where ninety percent of the factories in the sample received tea leaves to the factories via their own lorries. Only 10% of the factories received tea leaves from both factory-own lorries and third-party leaf collectors

4.2 Correlation Analysis

Correlation analysis is done to understand the relationship between independent variables and the dependent variable. Correlation coefficient (r) indicates the relationship exists between variable and it ranges from -1 to +1. If the "r" is -1 or +1, it indicates the perfect negative or positive relationship respectively. If "r" between ±1 to ±0.7 shows strong relationship, between ±0.7 to ±0.3 shows a moderate and between ±0.3 to 0 shows weak relationship (Taylor, 1990). Regression analysis is used to test the hypothesis. R^2 value of the regression analysis represents the explanatory power which indicates the degree to which the dependent variable is explained by independent variables. The value of R^2 below 0.2 is considered as weak, between 0.2 and 0.4 is moderate and above 0.4 is considered as strong explaining. The value of the B coefficient of regression analysis represents the degree to which extent the dependent variable changed due to the changes of a certain independent variable while other independent variables are constant. Significant level (P – value) of B coefficient (unstandardized coefficient) is used to test hypotheses. If $P \leq 0.05$, alternate hypothesis is supported and can be used to make prediction. If $P > 0.05$, the alternate hypothesis is rejected (Cui, 2011).

Table 4: Correlation analysis

		Adoption
UF	Pearson Correlation	.381**
	Sig. (2-tailed)	.006
PB	Pearson Correlation	.452**
	Sig. (2-tailed)	.001
TP	Pearson Correlation	.761**
	Sig. (2-tailed)	.000
ICTL	Pearson Correlation	.750**
	Sig. (2-tailed)	.000
EXP	Pearson Correlation	.307
	Sig. (2-tailed)	.030
GS	Pearson Correlation	.724**
	Sig. (2-tailed)	.000

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

The influence of User-friendliness, Perceived benefits, Top management support, ICT literacy, External pressure, Government support on the degree of e-procurement adoption in tea firms was investigated using The Pearson correlation coefficient as shown in Table 2. A Strong, significant, and positive correlation have observed between **top management** support and degree of adoption since the correlation coefficient in between those two variables (r=0.761). Moreover, a strongly positive significant correlation have observed between **ICT literacy** (r=0.750) and degree of adoption and **Government support** (r= 0.724) and degree of adoption respectively. As per the result, other independent variables (perceived benefits, user-friendliness, and external pressure) do not strongly correlate with the degree of adoption. A moderately positive, significant correlation have been seen between **Perceived benefits** and degree of adoption since the correction coefficient is equal to 0.452 at a 0.001 significant level. A weakly positive, significant correlation have seen between **User-friendliness** and degree of adoption and **External pressure** and degree of adoption since the correlation coefficient is equal to 0.381 and 0.307 respectively.

As all six independent variables have a significant positive correlation with the degree of adoption to the e-procurement system since all the significant values are less than 0.01. Top management has the highest correlation with degree of adoption while ICT literacy has the second highest correlation and government support has the third highest correlation with degree of adoption. Therefore, in order to increase the degree of adoption to the proposed e-procurement system by tea processing factories priority should be given to those three independent variables. The least

concern should be given to the external pressure factor as it has a weekly positive significant correlation with the degree of adoption.

4.3 Multiple Regression Analysis

Table 5: Regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	.794[a]	.631	.589	.61273	15.023	.000b

According to the model summary of the regression, the coefficient of determination (R^2) describes the degree to which extent the variance of the dependent variable is explained by independent variables. Usually, in order to use the model R^2 needs to be greater than 20% and if R2 is greater than 60% model is said to be nicely fitted and a model that explains most of the variation in the response variable around its mean. According to test results, coefficient of determination (R^2) is 0.631, this says that 63.1% of the dependent variable (degree of adoption) has been explained by this model. So it is greater than 60%, therefore the model is nicely fitted. Adjusted R^2 is 0.589. It indicates that around 60% of the degree has been explained by the model as there is no huge difference between R^2 and adjusted R^2. So no unnecessary independent variables in the model.

The multiple correlation (R) is 0.794. This indicated that user-friendliness, perceived benefits, top management support, external pressure and, government support are strongly and jointly correlated with the degree of adoption. Further the probability of the “F” test statics is 0.000. This is highly significant. Therefore, the model is jointly significant. It indicates that user-friendliness, perceived benefits, top management support, external pressure, and government support are jointly influence on e-procurement adoption.

Table 6: Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.131	.475		-.275	.784
User-friendliness	.250	.122	.223	2.054	.046
Perceived benefits	.001	.130	.001	.007	.995
Top mgt support	.750	.281	.693	2.672	.011
External pressure	-.054	.095	-.054	-.566	.574
Government support	.036	.261	.034	.138	.891

B coefficient for user-friendliness is .250 indicates that increasing 1 unit of user- causes to increase degree of adoption by 0.250 units while other independent variables remain constant. This conclusion can be done with the 95% of confidence level.

Perceived benefit has a B value of 0.001, which indicates that, when perceived benefits increases by 1 unit, degree of adoption increase of tea processing factories for e-procurement system increase by 0.001 units while other independent variables remain constant and vice versa. This conclusion can be done with 0.5% of confident interval since the significant value is 0.995 which means that, there is a higher probability to reject this conclusion.

B coefficient for Top management support is 0.750, which denotes that when top management support increase by one unit, degree of adoption increase by 0.750 units at 0.011 significant level. This conclusion can be drawn with 98.9% of confident interval which means that, there is a least probability to reject this conclusion.

External pressure involves -.054 B value, which denotes, when external pressure increases by 1 unit degree of adoption to e-procurement decreases by -.054 units. This conclusion can also be done with 42.6% confident interval. Because, significant value is 0.574 which denotes the probability of rejecting this conclusion is 57.4%.

On the other hand, Government support factor has a B value of .036. This implies that when increase of government support by 1 unit cause to increase degree of adoption by tea processing factories for proposed e-procurement solution by 0.036 units. However, this conclusion can be drawn only with 10.9% of confident interval. Because, significant value is 0.891which denotes the probability of rejecting this conclusion is 89%.

5. DISCUSSION

5.1 Theoretical contribution

Impact of User Friendliness on e-procurement adoption

Study findings proved that user-friendliness significantly influences on e-procurement adoption by tea processing factories. The B Coefficient of user-friendliness is β 0.250, p = 0.046, H1 is accepted. Result concludes that user-friendliness effect on the degree of adoption by tea processing factories. Moreover, this is significant since it has a significant value less than 0.05. Several studies also proved that user-friendliness or perceived ease of has positive significant effect on e-procurement adoption. Da Silva et al. (2020), Teo, et al. (2009), and Ismail et al. (2017) concluded that perceived as easy to use and understand or in other term user-friendliness significantly effect on adoption and use of new technology. Further in the Sri Lankan context, Premathilaka and Fernando (2020) found that this factor is a statistically significant determinant of e-procurement adoption. However, in contrast, this finding is different from studies conducted by Li (2008).

Impact of Perceived benefits (PB) on e-procurement adoption

This study proves that, perceived benefit effect on e-procurement adoption with value of β 0.995, p =0.995. However, the significant level of PB, which is higher than 0.05, is insignificant. Therefore, this study concludes that PB is not significantly impacted on e-procurement adoption by tea processing firms. This is because most of the processes and practices followed by the tea factories hardly changed over time and were inadequately aware of the novel technologies like e-procurement and the related benefits of such technologies. Therefore, companies were apparently just starting to realize the benefits of e-procurement. The findings of this study are similar to the study conducted by Gunasekaran et al. (2009) concluded that perceived benefits not significantly affected on the degree of adoption to e-procurement systems.

In contrast, Li (2008) listed the benefits of e-procurement, procurement as reduced transaction costs, increased transaction speed, reduction in data entry errors and access to current information, and enhance supply chain performances, but remained ignorant about the strategic benefits of e-procurement. However, this result is different from studies conducted by Min and Galle (2003), Hassan (2014), Li (2008), SoaresAguiar and and Teo et al. (2009) as they concluded that relative advantage have effect on e-procurement adoption. Also, this study result does not correspond with previous studies by Chen and Rankin (2006) and Eadie et al. (2011), Issa et al. (2003) which also revealed that the perceived benefits of e-procurement considered as a key factor for the most organizations in the construction industry tend to adopt to e-procurement system.

Impact of Top management support on e-procurement adoption

Results of this study prove that, Top Management support effect on e-procurement adoption with a B coefficient of β 0.750, P= 0.011. Since the significant value is less than 0.05 this study concludes that top management support also significantly influences the decision to adopt the e-procurement system by tea processing factories. Moreover, this study concludes that top management support is the highest influencing factor according to the standardized coefficient (B)

of 0.693. The findings of this study consistant with the study findings of Li (2008), Premathilaka and Fernando (2020), and Premkumar and Roberts (1999). Further Gunasekaran et al. (2009) suggested that the most important factor in e-procurement implementation is top management involvement and support. Therefore, this is not surprising because many studies have arrived at the same conclusion where technology initiatives like e-procurement must have top management involvement and support.

Impact of External pressure on e-procurement adoption

External pressure impact on e-procurement adoption with a β 0.054, p = -0.574. Significant level of external pressure is higher than 0.05, which is insignificant. Therefore, it is not supported to conclude that external pressure significantly influences on adoption to the e-procurement system by tea processing factories in Sri Lanka. Furthermore, external pressure has a negative effect on e-procurement adoption due to external parties such as competitors, other business partners, tea leaf suppliers (tea growers) and customers or vendors do not adequately aware of the application of e-procurement systems for tea industry. This study finding is aligned with the studies conducted by Premathilaka and Fernando (2020) and Quaddus and Hofmeyer (2007) that revealed External pressure does not significantly effect on e-procurement adoption. This result is different from studies conducted by Li (2008), Ismail et al. (2017) and Premakumar and Ramamurthy (1995). Li (2008) described the reason for this as fierce market competition in China whereas, others also agreed that enterprises might feel the need to adopt e-procurement more extensively in order to obtain or sustain competitive advantage over competitors. Even though the direct influence of external pressure was not found to be significant, there may be circumstances in which competitors and external parties may exercise an indirect influence on the adoption, through various marketing strategies.

Impact of Government support on e-procurement adoption

The B Coefficient of government support is β 0.036, p = 0.891 which revealed that there hasn't an effect on adoption. Therefore, findings of this study did not support the statistical significance of Government support and e-procurement adoption. This finding is consistent with previous studies by Premathilaka and Fernando, Li (2020) and Quaddus and Hofmeyer (2007) which described that government promotion was not found to be a significant influencing factor of enterprises' e-procurement adoption. Surprisingly Li (2008) also proved that government support is not significantly affected on e-procurement adoption. Further this study is evident that current measures taken by the government to promote e-procurement adoption is not very effective hence most of enterprises expect government to take active measures to build a supportive regulatory environment for electronic trading, to lessen the taxation barriers of e-commerce, and to strengthen the legal protection of e-procurement. These findings disagreed with previous findings by Ismail et al. (2017).

As overall, the findings of the present study, except perceived benefit (relative advantage) are almost similar to the findings of the study conducted by Premathilaka and Fernando (2020) and Quaddus and Hofmeyer (2007). Because those two studies also provide significant statistical evidence to support a positive relationship between user-friendliness and government support on e-procurement adoption and at the same time both of these studies revealed that external pressure and government support are not significantly influenced on e-procurement adoption.

Present study also proved that only User-friendliness (perceived ease of a use) p = 0.046 and top management support p= 0.011 have a significant impact on e-procurement adoption among tea processing factories in the study area while perceived benefits, ICT literacy, external pressure and government support do not significantly impact on e-procurement adoption. Anyhow, the findings of this study are different from findings of studies conducted by Kasaine (2016) which focused on analyzing success factors that are critical for online procurement practices in public procurement in Tanzania and found that all these variables significantly impact on degree of e-procurement adoption.

5.2 Practical contribution

Propose solutions to enhance the rate of adoption to e-procurement solution by tea processing factories

After identifying the significant factors influencing e-procurement adoption by tea processing factories, the final phase of this study has developed a strategic framework to enhance the rate of e-procurement adoption. Proposed strategic framework consist of six strategies as follows.

Need Identification- The first step of developing a successful strategy to overcome e-procurement platform adoption challenges which comprised of two sections. First section is to examine the current status of the procurement handling process. Understanding the manner in which the tea firms handle their procurement functions and the level of digitization of the existing system is so crucial before introducing new system. This also includes detailed study of existing technologies that are currently used by firms, as well as other technologies (and their characteristics) use by the competitors. The study uncovered that 12% of tea processing factories still use a traditional paper-based approach, while 10% utilize ICT for procurement-related tasks. A majority (60%) conduct basic e-procurement transactions, employing the Internet and related technologies, but not in a fully automated manner. Additionally, 18% of the sample already employs fully automated e-procurement systems. The second phase is identifying the readiness of the organization to invest and acquire an e-procurement system. The proposed e-procurement solution will only work if tea processing firms ready to acquire it. Study identified that tea factories run by third generation tend to adopt new technologies than factories own by second generations. Moreover, single-tea-processing factories and factories with two or three branches are ready to accept e-procurement solutions than tea factories running under a large group of companies. This is mainly because all

the tea factories belonging to a group of companies tend to follow similar procedures, and change in a single business process would involve huge cost and risk at the same time.

Identifying critical success factors/significant factors- The next step is identifying critical success factors or the significant factors that affect on e-procurement adoption by tea processing firms. Prior scholars highlighted an array of critical success factors with the technology organizational and environment framework that affect e-procurement adoption in different industries and different countries in the world. However, this study identified that among the considered technological factor user-friendliness and top management support from organizational factors have significantly influence on e-procurement adoption by tea processing factories in the study area. Therefore during the designing and implementing stages, factories should focus on the user-friendliness ($p < 0.01$), perceived benefits ($p <0.01$), top management support ($p <0.01$), ICT literacy ($p <0.01$) and government support ($p<0.01$). This is because correlation test results proved that there is a significant relationship between each of the above criteria and degree of e-procurement adoption.

Communicate with employees and partners- Not only purchasing department but accounting and other teams are also directly and indirectly involved in the procurement process and have different goals. Therefore, it is important to properly communicate the usage, basic functions, and benefits of using the proposed e-procurement system to create a culture and encourage dialogue with all departments and employees to ensure the e-procurement solution is accepted equally and runs smoothly. The study findings also revealed that external pressure coming from competitors, business partners, suppliers, and important buyers are insignificant ($p = 0.03$). This might be due to lack of awareness among business partners about the application of e-procurement systems for the tea industry. Therefore, it is important to show them the potential benefits of using the new platform that will resonate with them. Further, established mutually beneficial relationships and improved collaboration would ensure a higher rate of adoption and successful implementation of this e-procurement application at the long run.

Develop e-procurement software- E-procurement solutions need to be developed after considering company's needs and requirements of related stakeholders and business partners. Rather than providing a full package at first better to offer free trials and demos that any tea processing factory can acquire and use (Kamarulzaman & Mohamed, 2013). Free trials and demos, also identify possible challenges that each factory currently faces such as compatibility issues ensure that final package is free from errors which helps to enhance the established operation that works well. It is also recommended to provide information on platform usage and its implementation whenever necessary. Aman et al. (2011) highlighted the importance of developing a service package rather only the e-procurement system. Further, conduct frequent software reviews is mandatory to identify what features are tea firms satisfied and dissatisfied with? Are

the firms willing to put up with the disadvantages of the software, and are its advantages really valuable to them? Security concern is also critical factor that needs to consider in this stage.

Implementation - Assigning a specific responsible person from each tea factory is advisable to support, provide technical know-how, and to collecting feedback and contact support in case of questions. Also recommended preparing instructions and collecting training materials beforehand, schedule training sessions for teams in advance. It is also important to choose the right time for implementation, so the trial doesn't occur at a busy time like the end of the quarter. Successful implementation also involves running a pilot project for one department or test group using a free trial.

Continuous monitoring and evaluation - Implementing of an e-procurement system is not just about the technical side, hence successful implementation has to do with stakeholder management. Closely monitoring the implementation would help to get important user feedback and suggestions for the system significantly affect speed up the degree of adoption.

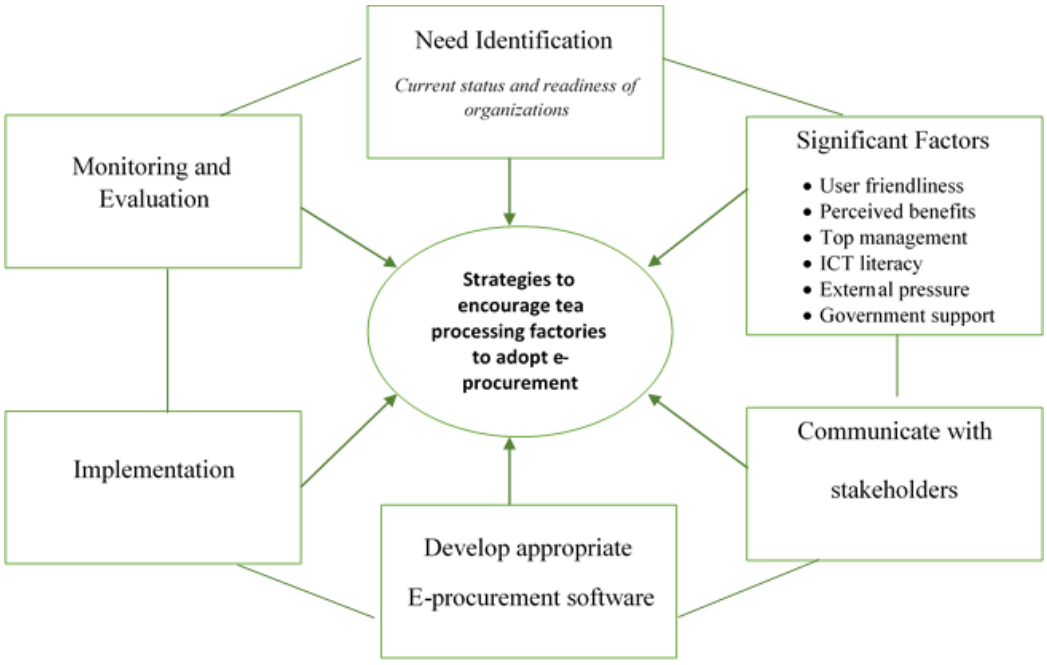

Figure 2: Propose Strategic framework for successful e-procurement adoption

6. LIMITATIONS AND FUTURE RESEARCH

It is worth highlighting some limitations of this study in order to re-direct many areas for future research in this field. This research is based on the perceptions drawn from a small sample comprised of owners and other related staff members of the selected tea processing factories in the Rathnapura district. If this could be done using a large sample and considering more variables, the

results would be more precise and reliable. Even though this study was limited to single tea processing district, if the research could be extended to the tea processing factories in other districts it would be more valuable to the industry. Further research attention also need to be given to the moderating influence of contextual factors (e.g. management norms, organization culture) on digitally enabled e-procurement systems adoption. Research could be extended to other potential agriculture sector industries where e-procurement will be useful in the future like the livestock industry, food manufacturing industry etc.

7. CONCLUSION AND RECOMMENDATIONS

Identifying critical success factors that influence e-procurement adoption and developing strategies to increase the adoption rate would be paramount for both tea processing factories and technology providers. Results discover that majority of the respondents studied up to Advance level, 44% had 1-5 years of working experience in the tea sector, 90% of the factories used factory own lorries as mode of fresh leaf collection and 60% of them are performing few procurement functions electronically. Further results indicate that only user friendliness from the technological factors (β 0.250, $p = 0.046$) and top management support from organizational factors (β 0.750, $p = 0.011$) have a significant and positive impact on e-procurement adoption. Therefore, e-procurement service providers and software vendors, should pay more attention towards the user-friendliness of the e-procurement web application and convincing top management to acquire higher degree of top management support in order to accelerate the adoption and smooth implementation of the proposed e-procurement system among tea processing factories in the study area.

The strategic framework developed based on the prior research findings and the information gathered during the questionnaire survey consists of strategic approaches (need identification, focus on critical success factors, proper communication with stakeholders, develop appropriate e-procurement web application, implementation and continuous monitoring and evaluation) which IS providers needs to adhere in order to achieve a higher degree of adoption by tea processing factories for proposed e-procurement solution. A strategic framework would eliminate most of the challenges associated with end-users and technology providers to ensure a critical mass uptake of e-procurement by tea processing factories in Sri Lanka.

As senior management leadership is critical to the success of an e-procurement implementation, study recommended to develop long-term partnerships with top management of the tea processing factories. Further, IS providers need to concern on raising awareness among important stakeholders, develop comprehensive e-procurement protocol and best practices prior to the deployment of the e-procurement solution, provide technical know-how through training to demonstrate the functioning of new system as well as to avoiding confusion over responsibilities while balancing the functions of traditional vs. new system and acquiring government support

would facilitate the high rate of adoption, smooth implementation and continuation of the e-procurement solution by tea factories in Sri Lanka.

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