Evaluating the Adoption of Enterprise Applications by Small and Medium Enterprises in Sri Lanka

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Abstract

Adoption of information and communication technology has various factors' influence; Enterprise Applications' (EAs) adoption is not an exception. Small and Medium Enterprises (SMEs) that share around 80 percent of Sri Lankan economy also confront the same kind of influence from various factors. Although the adoption of EAs brings various advantages for such enterprises, many firms are reluctant to make adoption decision. Vendors of such applications would be willing to know about which factors to address to motivate these SMEs' to adopt their applications. This study aims to delineate the factors influencing SMEs' adoption of EAs. Many adoption models have been studied in many contexts by researchers; however, these studies address selected fragmented variables. In order to provide a holistic view of factors influencing such adoption by SMEs, this study used Technology, Organization and Environment (TOE) framework. Population for this study is from the North and the Eastern provinces of Sri Lanka. Analysis revealed that technological, organizational and environmental factors significantly influence SMEs' adoption of EA.

Keywords: Small and Medium Enterprises, Enterprise Applications, Adoption, TOE Framework, Sri Lanka

1. Introduction

In Sri Lankan economy the share of Small and Medium Enterprises (SMEs) found in all primary, secondary and tertiary sectors of the economy as well as agri-business and industrial establishments, is 80 percent (NHREP 2014) offering employment for the skilled, the semi-skilled and the unskilled. Being a vital source of employment, the SMEs are assessed to contribute roughly 35 percent of employment in Sri Lanka (NHREP 2014). SMEs are defined by various countries in a variety of ways based on different parameters such as investment, number of employees, profit, etc. (Gamage 2003). Based on the number of employees as the criteria the Central Bank of Sri Lanka (1998) defines small business as an establishment whose total number of employees is less than 50 persons, those with 50 to 99 employees as medium-sized and others with 100 and above as large, therefore, this study considers organizations with less than 100 employees as SMEs.

Efficiency and effectiveness which result in competitiveness of firms of any type is their ability to make use of Information and Communication Technologies (ICTs) (Storey 1994; Williams 2007; Ramdani *et al.* 2013). It can be seen that most SMEs use the ICT to certain levels, say for instance only for administrative tasks, and they do not exploit the maximum benefit of ICT. SMEs' adoption of electronic commerce technologies which include the buying and selling of goods and services online has already been extensively studied by researchers (e.g. Zappala and Gray 2006; Alonso Mendo *et al.* 2009) but the adoption of enterprise applications (EAs) which includes all applications that help organizations conduct their business activities digitally including accounting information systems (AIS), inventory management system, customer relationship management (CRM), supply chain management (SCM), inter-organizational information systems and so on by SMEs has not been paid the same amount of attention (Ramdani *et al.* 2013) despite the fact that these applications carry great deal of efficiencies and effectiveness to these organizations. Electronic business tools available these days have evolved from manufacturing planning systems (MRPs). Having built early days for supporting various activity-oriented back-office functions, these software tools were called enterprise resource planning (ERP) systems (Volkoff *et*

al. 2005). In due course these core back-office packages paved ways for the inclusion of front-office as well as inter-organizational systems such as SCM system, CRM system, (Volkoff *et al*. 2005; Ramdani *et al*. 2013) and so on.

2. Literature Review and Theoretical Background

EAs are software packages that integrate the business processes of an organization and its transaction-based data, hence these applications includes ERP systems, SCM systems, CRM systems as well as electronic procurement systems (Shang and Seddon 2002; Ramdani *et al*. 2013). Only large organizations had been adopting EAs (Ramdani *et al*. 2009) but now the software vendors have moved their focus on small and medium sized firms as well; they provide a variety of EAs (Ramdani *et al*. 2013). SMEs who play a big role in the economic growth of a country varies in different aspects from large organizations including how they search for information therefore the embracement of ICT by these SMEs is also different (Buonanno *et al*. 2005; Ramdani *et al.* 2013) hence it is important to understand those factors that differentiate these SMEs from large organizations in their ICT adoption so that successful contributions can be made to SMEs and these organizations may come out with improvements in their competitive performance (Ramdani *et al*. 2013) because some SMEs have adopted EAs meanwhile other SMEs with similar market and competitions have still not chosen. This nature has not been studied thoroughly (Ramdani *et al*. 2013); particularly there has not been any published works available in Sri Lankan context. Therefore this paper aims to address this gap by delineating the technological, organizational and environmental factors that influence SMEs in adopting EAs in Sri Lanka.

2.1 Technology, Organization and Environment (TOE) Framework

In order to study the adoption of ICTs in SMEs many theories such as Theory of Planned Behaviour (TPB) (eg. Harrison *et. al*. 1997), Diffusion of Innovation (DOI) (eg. Premkumar 2003), Technology Acceptance Model (TAM) (eg. Grandon and Pearsn 2004), TAM2 (eg. Venkatesh 2000), Combined TAM and TPB (eg. Riemenschneider *et at*. 2003), Unified Theory of Acceptance and Use of Technology (UTAUT) (eg. Anderson and Schwager 2003) and so on have been used in the by researchers. Although very useful contributions have been made by these researchers in the examination of diffusion and adoption of technologies their finding have been fragmented that is they have made investigation on certain selected variables (Jeyaraj *et al*. 2006) rather than making a holistic study (Ramdani *et al*. 2013). Because the study of adoption of technology, especially ICT, examines a variety of technological, organizational as well as environmental variables that have influence on the adoption, the TOE framework devised by Tornatzky and Fleischer (1990) is believed and argued to be providing a holistic base of such studies on the adoption of ICT and studies of various technology innovations, such as cloud computing, e-business and electronic data interchange, have used this framework (Baker 2011; Ramdani *et al*. 2013). Since this theory is said to have been generic model for studying the adoption of technology innovations, this study on the adoption of EA also aims to use this TOE model.

2.1.1 Technological Context

In SMEs' adoption of EA, the technology context is said to have high influence however the number of studies that have examined the technology context's influence on SMEs' adoption of EA is very small (Premkumar 2003). The factors that influence SMEs in the adoption of EA are Relative Advantage, Compatibility, Complexity, Trialability and Observability. According to Rogers (1995) Relative Advantage, Compatibility, Complexity, Triability and Observability affect the rate of the diffusion of innovation; these characteristics are used to explain the users' adoption of innovation.

Rogers (1995) defines Relative Advantage as "the degree to which an innovation is seen as being superior to its predecessor" and previous studies (e.g. Thong 1999) claim the Relative Advantage has positive impact on ICT adoption. By reducing operational and administrative costs, improving business processes, and so on EAs provide their adopters many benefits therefore organizations are very much motivated to adopt ICTs, by these benefits. Compatibility is "the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopter" (Roger 1995); this variable is found to be making much positive influence on SMEs in the adoption of ICT (Premkumar 2003). Adoption of new technology is accompanied by changes in how businesses operate. These changes inherently carry reluctance from employees' side; when the new technology is very much compatible, reluctance is minimized. Complexity is "the degree to which an innovation is seen by the potential adopter as being relative difficult to use and understand" (Rogers 1995). The higher the complexity of a new technology the higher the possibility of facing failures in the implementation and adoption of such technology hence the decision to go for such technology is risky (Premkumar and Roberts 1999). As this complexity factor is found to be negatively influencing the SMEs' adoption decision on ICT, it is considered to be an important factor of ICT adoption by them (Thong 1999; Ramdani *et al*. 2013). Triability is

"the degree to which an idea can be experimented with on a limited basis" (Rogers, 1995); this factor is considered to be important in SMEs adoption of ICT since it was found to be influencing SMEs in the adoption of electronic commerce in previous studies (Kendall *et al*. 2001). Observability "the degree to which the results on an innovation are visible" (Rogers 1995). Ramdani *et al*. (2013) found this variable is found to be a significant variable in SMEs' adoption of EAs.

2.1.2 Organizational Context

Since many studies focus on the factors of this context in SMEs (Premkumar 2003), it is said to have high influence on EA adoption by SMEs (Ramdani *et al*. 2013); these factors are Top Management's Support, Adequate Resource, ICT Experience, Size and Benefits.

Top Management's Support which is highly prioritized factor in the organizations' ICT adoption (Jeyaraj *et al*. 2006) refers to whether or not the executives or the people in the top management of SMEs understand the nature and functions of EAs and therefore support the adoption of the same by means of communication as well as reinforcement of the ideas (Thong 1999; Ramdani *et al*. 2013) affecting the adoption of new information systems (Chang *et al*., 2006). This factor has been found to be critical in creating a conducive atmosphere for the adoption of new technologies and allocation of adequate resources for the adoption of new technologies (Lin and Lee 2005; Wang *et al*., 2010) since the implementation and adoption of EAs is usually a bigger project and a huge undertaking for the SMEs. The implementation of EAs involves integration of resources and re-engineering of the business processes, hence the support from top management, mostly the decision makers in the case of SMEs, is very crucial.

If a given SME has Adequate Resource such as plentiful budget, sufficient human resource support, ample time, and good involvement from top management, then the adopting of EAs will be met in a positive manner. To this end, the Adequate Resources factor is critical to the successful adoption (Chang *et al*. 2007) of EAs by the SME.

The ICT Experience factor evaluates whether an organization's adoption of ICT is deprived by the limited experience the organization has in the technology. Previous studies (e.g.: Kuan and Cahu 2001) found that ICT experience affects organizations' adoption of new technologies. ICT growth of SMEs is claimed to be deprived by technical knowledge and economic costs (Cragg and King 1993). Technology existing in the organization also impacts the adoption of a new technology since the new adoption would require less resources in addition to the existing ones such as computers and so on (Dholakia and Kshetri 2002).

The factor Size of an SME has also been found to be one of the most important factors influencing the organization's adoption of new technology (Jeyaraj 2006). It is argued that if the size of an organization is large, the firm has more needs, more resources, more skills and more experience and the capacity to exist in times of failures than other firms smaller in size (Levenburg *et al*. 2006; Ramdani *et al*. 2013), making it clear that if the firm size is big then likelihood of the adoption of new technology is also high.

The study of Chang *et al*. (2006) found that the Benefits reaped from of information systems will lead to a positive adoption. Potential benefits such as improving the SME's image, gaining strategic advantage over other organizations, improving their product or service quality, and enhancing the efficiency of internal operations will also be critical.

2.1.3 Environmental Context

The environment factors that consist of Competitive Pressure, Scope of the Market and External ICT Support have been found to be influencing SMEs adoption of EAs. The environmental dimension represents the current operating environment of the firm. This will no doubt impact the organization as it adopts new information systems (Chang *et al*. 2006; Hsiao *et al*. 2009). In Sri Lanka, SMEs try to provide product or service better by means of efficiencies. This competitive pressure will force them to adopt new information systems quickly to provide the products or services better and gain strategic advantages. Previous studies also confirm the fact that business competition significantly affects organizations to adopt new technologies (Hsiao *et al*. 2009).

Competition in SME's industry positively affects the firm's adoption of ICT (Gatignon and Robertson 1989). When the competition in the industry is directly affected by the adoption of innovation, the firm is more likely to go for such technology (Kuan and Chau 2001) since, to compete in the market; this adoption would become a strategic requirement (Premkumar and Ramamurthy 1995).

Scope of the Market means the market area in which a firm operates which can be local or international; larger the scope higher the complication of dealing with legal, ethical as well as cultural issues and diversities (Buonanno *et al*. 2005). Firms are on the move to expand their existing limited ICT infrastructure to get them connected with other organizations internationally since these firms are becoming globally operational (Ramdani *et al*. 2013) resulting in the adoption of inter-organizational information systems.

External ICT support which has been found to be one of the critical factors for the success of ICT (Delone 1988) and positive determinant of ICT adoption by organizations refers to the support available for the adoption of ICT (Premkumar and Roberts 1999). Since the availability of third-party support is growing and outsourcing is becoming more popular organizations are prepared to embrace new ICT since they are confident that enough third-party support is available.

Based on the above theoretical background the research model shown in Fig. 1 and hypotheses have been developed.
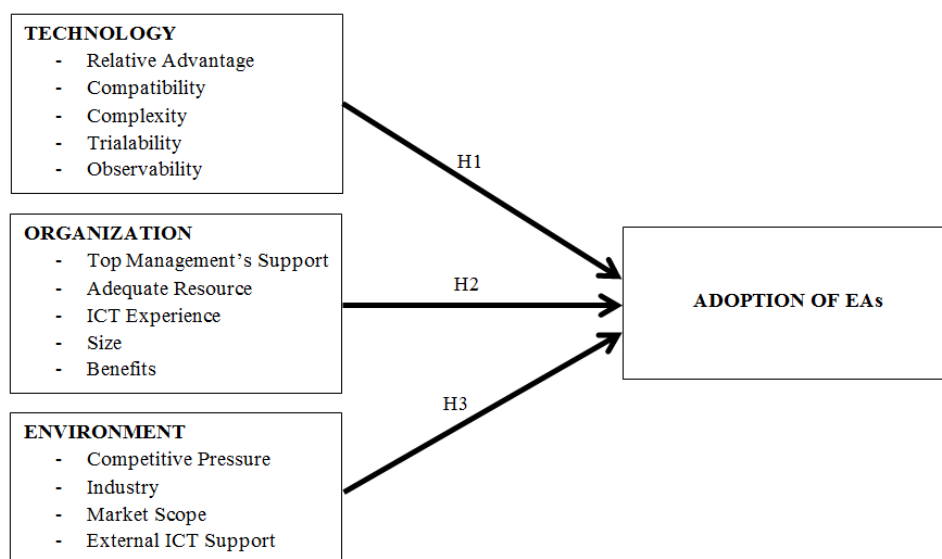
Fig. 1 Research Model, SMEs' Adoption of EAs

The following hypotheses were developed based on the research model:

H1: Technology factors have significant influence on SMEs' adoption of EAs.

H1a: There is a positive and significant relationship between Relative Advantage and SMEs' Adoption of Enterprise Applications.

H1b: There is a positive and significant relationship between Compatibility and SMEs' Adoption of Enterprise Applications.

H1c: There is a negatively significant relationship between Complexity and SMEs' Adoption of Enterprise Applications.

H1d: There is a positive and significant relationship between Trialability and SMEs' Adoption of Enterprise Applications.

H1e: There is a positive and significant relationship between Observability and SMEs' Adoption of Enterprise Applications

H2: Organization factors have significant influence on SMEs' adoption of EAs.

H2a: There is a positive and significant relationship between Top Management's Support and SMEs' Adoption of Enterprise Applications.

H2b: There is a positive and significant relationship between Adequate Resource and SMEs' Adoption of Enterprise Applications.

H2c: There is a positive and significant relationship between ICT Experience and SMEs' Adoption of Enterprise Applications.

H2d: There is a positive and significant relationship between Size and SMEs' Adoption of Enterprise Applications.

H2e: There is a positive and significant relationship between Benefits and SMEs' Adoption of Enterprise Applications.

H3: Environment factors have significant influence on SMEs' adoption of EAs.

H3a: There is a positive and significant relationship between Competitive Pressure and SMEs' Adoption of Enterprise Applications.

H3b: There is a positive and significant relationship between Market Scope and SMEs' Adoption of Enterprise Applications.

H3c: There is a positive and significant relationship between External ICT Support and SMEs' Adoption of Enterprise Applications.

3.   Research Method

The research study employed is quantitative study based on questionnaire survey. According to Bernard and Bernard (2012), a quantitative analysis allows for the classifying of features, counting them, and constructing more complex statistical models in an attempt to explain what is observed, findings can be generalised to a larger population, since quantitative data is in numerical form it allows researchers to analyse more easily, provides high level of accuracy and also allows to present analysis graphically. Quantitative method enables the researcher to test the relationships between the variables identified in the model and thereby let him provide evidence to support or disprove the hypotheses (Carter and Belanger 2005). Scholars mentioned that the main purpose of a survey is to produce quantitative statistics about some aspects of a study and a survey is a systematic method for assembling information from a sample of the population for the rationale of constructing quantitative attributes. In social sciences research the questionnaire based survey has become one of the most widely used techniques of data collection for reasons such as economy, ability to reach a larger sample of the population, saving time, feasibility to collect data within a predetermined framework, and feasibility to process the data using a coding system that could be easily used on computers (Ranasinghe and Fonseka 1998). Questionnaires are an efficient data collection mechanism when the researcher knows exactly what is required and how to measure the variables of interest (Sekaran and Bougie 2010).

3.1 Questionnaire Development

This study's survey questionnaire was developed based on many past researches which have thoroughly been validated in different context. Table 1 details the constructs and their sources.

Table 1: Measurements and Sources

Constructs	Sources
Relative Advantage, Compatibility, Complexity, Trialability, Observability	Moore and Benbasat (1991)
Top Management's Support	Yap *et al.* (1994)
Adequate Resource	Chang *et al.*, 2007
ICT Experience	Southern and Tilley (2000)
Size	Jeyaraj (2006)
Benefits	Chang *et al.* (2006)
Competitive Pressure	Premkumar and Roberts (1999)
Market Scope	Buonanno *et al.* (2005)
External ICT Support	Yap *et al.* (1994)

3.2 Population, Sample and Data Collection

The population of this study included all SMEs in North and Eastern provinces of Sri Lanka. All Government Agent Offices from all districts in these two provinces were contacted to get the list of SMEs available in the provinces. The list indicated that there were 8457 registered SMEs that had done proper business registration through local government agencies. Since it was not possible to include each and every SME in the population framework a random sampling method was used to select the potential respondents. According to Hair *et al.* (1998) as cited by Rehman *et al*. (2012), "*each independent variable is expected to have ten data records"*; since this study had thirteen independent variables, 130 respondents should have sufficed however the sample size was targeted to be 400 because "*sample sizes larger than 30 and less than 500 are appropriate for most research*" (Sekaran and Bougie 2010). Data were collected using printed as well as electronic version of the questionnaire. The respondents of the study voluntarily willed to fill up questionnaire which was e-mailed using an online survey, Google Docs, and those who filled up printed questionnaire which was posted and administered using university students. During the six months of data collection process the researcher managed to get response from 379 entrepreneurs and out of those collected 11 were discarded as they were not complete; therefore only 368 questionnaires were taken into analysis.

3.3 Reliability and Validity

Reliability and validity are considered to be the two most important and fundamental characteristics of any research instrument. In quantitative approach, validity addresses to what extent the research instrument accurately measures the research outcome or research construct under consideration and reliability addresses the consistency of the instrument's measurement (Creswell 2003; Swanson & Holton 2005).

Achieving consistent results in different research situations is described as reliability of the instrument in quantitative approaches (Swanson & Holton 2005). According to Boudreau *et al.* (2001) standard coefficient of internal consistency, namely Cronbach's Alpha, is used by the majority of the researchers to evaluate reliability of their instruments. According to Creswell and Miller (2000), the generally acceptable limit for Cronbach's Alpha to achieve reliability is 0.70. In this study, Cronbach's Alpha was employed to test the consistency between multiple measurements of the research variables, results of the reliability test shown in Table 2.

Table 2: Results of Reliability Test

Scale	Cronbach's Alpha
Relative Advantage	.909
Compatibility	.835
Complexity	.877
Trialability	.904
Observability	.776
Top Management Support	.808
Adequate Resource	.799
Benefits	.748
Competitive Pressure	.917
Market Scope	.876
External ICT Support	.849

Exceeding the accepted threshold of 0.7 (Boudreau *et al*. 2001) means that the constructs have more shared variance between them. According to Table 2 all constructs are in Excellent and High reliability scales (Hinton *et al* 2004) ensuring the establishment of reliability of all variables. Validity requires that an instrument to be reliable. Quantitative approach uses a variety of strategies to achieve validity in research. For the research to achieve its practical significance there was the need to ensure appropriate, accurate, and reliable instrument. Consultation with experts in EAs was made and pilot test was also done with 43 owners of SMEs to test the Face validity of the instrument prior to the administration of final version of the questionnaire.

In order to verify the construct validity, a factor analysis, a data reduction method, was conducted utilizing Principal Component Analysis (PCA) with the Varimax rotation. Since all the constructs in the model have already been validated in many contexts individually, the researcher did the factor analysis for each construct individually. The results of the factor analysis are given in Table 3.

Table 3: Total Variance Explained by Constructs

Constructs	KMO Measure of Sampling Adequacy	Total Variance Explained (Initial Eigenvalues Cumulative %, 2 components)
Relative Advantage	.894	78.312
Compatibility	.828	79.026
Complexity	.829	81.624
Trialability	.918	75.279
Observability	.556	92.647
Top Management Support	.810	72.354
Adequate Resource	.780	78.295
Benefits	.677	86.116
Competitive Pressure	.905	75.204
Market Scope	.899	68.549
External ICT Support	.910	71.178

As can be seen from the Table 3, the Kaiser-Meyer-Olkin Measure (KMO) all constructs were Good confirming the Sampling Adequacy (Hutcheson and Sofroniou 1999 as cited by Field 2009) and the variance explained by the constructs is also high.

4. Data Analysis

In order to describe and improve the adoption rate EA by SMEs it is important to understand why some of them opt to adopt meanwhile other who confront the same atmosphere do not therefore measurement such as correlational coefficient which measures the direction and strength of relationship between predictor and predicted variables and regression (R^2) which measures how much of variance is explained by the predictor variables are used in quantitative studies. According to Swanson and Holton (2005), regression analysis is the most popular statistical technique for hypothesis testing and is used to measure the naturally occurring levels of the variables to predict the score on the dependent variable. Regression analysis has been widely used in IT field studies, such as by Davis (1989) and Venkatesh *et al.* (2003), and this study also used the same.

The results of correlation analysis, Table 4, show that all variables, except Complexity, have positively Strong Correlation (Cohen 1988).

5. Results and Discussion

5.1 Relationship between Technological factors and SMEs Adoption of EA

The coefficient of determination of the contribution of Technology variables to SMEs Adoption of EAs the R^2 value from Table 5 which is 0.777 (Adjusted R^2 .773) indicates a shared variation of about 77% between the data. That is, approximately 77% of the variances in SMEs Adoption of EAs can be accounted for by knowledge of technological context. As the model predicts the technological characteristics have significant impact on the adoption of EAs by SMEs. The variables Relative Advantage, Compatibility, Complexity, Trialability and Observability which are in the technology context have all significant influence on the adoption. The results of this study are in alignment with previous studies (e.g. Kuan and Chau, 2001; Ramdani *et al.* 2013) on the adoption of EA as well as ICT.

Organizations adopt new technology when the recognize that such adoption would bring benefits such as growth, reduction in costs, integration of stand-alone applications among functional areas, etc. to the firm so that the unexploited business opportunities can be milked. If the legacy systems in an organizations are not compatible with the applications to be introduced in the organization this incompatibility would deprive the adoption. When an organization lacks expertise in the technology, new systems would sound complex thereby it makes the adoption difficult. As the implementation of EAs asks for big amount of investments potential adopters would like to have an experiment with the new technology and assess the performance of the system in order to make adoption decision (Ramdani and Kawalek2007) therefore trialability is also a significantly influencing factor to the adoption of EAs by SMEs. Observability of EAs have also been found in previous studies to be significantly influencing (Ramdani *et al.* 2013) although some studies (e.g.: Moore and Benbasat 1991) were inconsistent.

5.2 Relationship between Organizational factors and SMEs Adoption of EA

The coefficient of determination of the contribution of Organization variables to SMEs Adoption of EAs the R^2 value from Table 5 which is 0.714 (Adjusted R^2 .710) indicates a shared variation of about 71% between the data. That is, approximately 71% of the variances in SMEs Adoption of EAs can be accounted for by knowledge of organizational context. All variables in the organizational context have significant impact on the SMEs adoption of EAs. When the organization is of large size, it has higher tendency to the adoption of EAs.

Table 4: Correlations among variables

		Dep en	RA	Co mp	Co mx	Tri al	Obse rv	To p	Reso urc	IC T	Siz e	Benef its	CompP res	MktS co	ExtI CT
Depend ent	Pearson Correlat ion	1	.77 4**	.775 **	- .673 **	.77 2**	.668*	.58 4**	.779**	.77 1**	.62 8**	.758**	.768**	.766*	.609*
	Sig. (2-tailed)		.00 0	.000	.000	.00 0	.000	.00 0	.000	.00 0	.00 0	.000	.000	.000	.000
	N	368	367	368	368	368	332	338	368	368	368	368	368	368	320

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

Table 5: Model Summaries

	R	R^2	Adjusted R^2	Std. Error of the Estimate	Hypotheses
Technology Context	.882[b]	.777	.773	.21891	H1 Supported
Organization Context	.845[a]	.714	.710	.23133	H2 Supported
Environment Context	.852[a]	.726	.723	.23012	H3 Supported

This is consistent with past studies (Premkumar and Roberts 1999; Ramdani et al. 2013). The top management support which has consistently been found to be significant in SMEs adoption of ICT (Premkumar and Roberts 1999; Ramdani *et al*., 2013) has also been found to be significant this study as well. Managers or owners of SMEs are the key decision makers and how much they plan for the future growth plays a vital part in their support for the adoption. When the management has positive attitude towards this adoption they would invite EA solution providers to visit their shop-floor and make demonstration about their products and also adoption of such EAs need the integration of internal functional units as well as organizational partners, hence the top management support is very much important for the adoption of EAs by SMEs. Another key organizational factor which influences SMEs in adopting EAs and which has been found to be significant in this study is adequate resources; without enough technological and financial resources organizations will not be able adopt EAs, this is consistent with the findings of previous studies about SMEs (Iacovou *et al*. 1995; Kuan and Chau 2001; Ramdani *et al*. 2013). Bigger organizations have more resources to invest in the EAs whereas smaller ones try to manage their businesses without going for such innovative solutions. When the firm believes or experiences that the adoption of EAs will bring in benefits such as reduced expenditures, improved product or service quality then it will prefer the adoption of such technology adoption, this study has found benefit to be significant in SMEs adoption of EAs.

5.3 Relationship between Environmental factors and SMEs Adoption of EA

The coefficient of determination of the contribution of Environment variables to SMEs Adoption of EAs the R^2 value from Table 5 which is 0.726 (Adjusted R^2 .723) indicates a shared variation of about 73% between the data. That is, approximately 73% of the variances in SMEs Adoption of EAs can be accounted for by knowledge of environmental context. The environment context; Market Scope, Competitive Pressure and External ICT Support, has been found to be significantly influencing SMEs' adoption of EAs. SMEs that have wider market scope tend to see the adoption of EAs as a means of catering their scattered markets effectively. Broader the scope of firm's markets higher the competitive pressure it faces therefore the firm with higher pressure would attempt to adopt EAs. External ICT support is also found to be significantly influencing SMEs adoption of EAs, availability of support from software vendors as well as third-party support would give assurance for future

technical support for ICT implementation, this is consistent with Fink (1998) but inconsistent with some other studies (e.g. Premkumar and Roberts 1999; Ramdani *et al.* 2013).

It can be seen from the above discussion that the Technology, Organization and Environment contexts of TOE framework used in this study to find the factors that influence SMEs adoption of EAs fit with the findings of previous studies that used TOE for the adoption of EAs and ICTs.

6. Conclusion

Empirical exploration of TOE framework in Sri Lankan context to study the factors influencing SMEs adoption of EAs is the major contribution made by this study. The analysis has revealed that the TOE model very much predicts this adoption behaviour by delineating the factors that significantly influence SMEs. Vendors of EAs can take these factors into their account when they craft their strategies to target the SME segment with the software solutions thereby increasing adoption rate of SMEs.

Inherent with the study are the limitations. First, this study was geographically confined to only two provinces of Sri Lanka while other seven provinces were not; therefore the generalizability of the results to the whole Sri Lanka is questionable. Second, since this study is cross-sectional, the researcher limited the study to look at the pre-adoption of EAs by SMEs; had it been longitudinal post-adoption factors could also have been studied. Third, this study could not incorporate the industry variable into account; it would have been more comprehensive otherwise. Another limitation is that this research studied the EAs as a 'big-picture' therefore individual applications such as CRM, SCM, ERP and so on were not studied separately. Studies on the adoption of EAs could also look into the factors influence the EAs which are available as Software as a Service (SaaS) in future.

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