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Factors Affecting E-commerce Adoption of Small and Medium Enterprises in Sri Lanka: Evidence from Retail Sector

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Authors' contributions

This work was carried out in collaboration between both authors. Author DYG designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author KMVS managed the analyses of the study and finalized the manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

Purpose: There is a resistance in the adoption of e-commerce in certain parts of the world even though most successful businesses in the world has successfully adopted e-commerce to their businesses gained an increasing success. The study aims to find the crucial factors affecting to the adoption of e-commerce by using the evidence of retail sector in Sri Lanka as a developing nation.
Methods: The targeted population for the study was the retail sector registered as Small and Medium Enterprises in Colombo District. Adopting stratified simple random sampling technique, the study selected 200 SMEs in Colombo District who are engaged in retail sector. A structured questionnaire was used to collect data. Five dimensions namely adoption of e-commerce, perceived benefits, computer literacy, government support and technology infrastructure were measured by using a Likert scale measurement items, acknowledging the prior studies.
Findings: The results revealed that computer literacy, government support and technology infrastructure had significance influence on e-commerce adoption of SMEs in Sri Lanka even though perceived benefits had less impact on e-commerce adoption.

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Implication: It has been realized that Sri Lankan government support and intervention is necessary to build speedy technology infrastructure in order to encourage the usage of e-commerce as government support and technology infrastructure share a significant correlation with e-commerce adoption.

Keywords: E-commerce; SMEs; retail sector; multiple regressions; developing context.

1. BACKGROUND

The current business environment has been changing ever since the emergence of new technological advancements from time to time. E-Commerce is one such technological tool to conduct businesses in a new way which is defined by Chaffey [1] as all types of electronic transactions between organizations and stakeholders. Furthermore, communication within the business has become faster and managing resources has become more efficient with the implementation of e-commerce technology. Yet there are many drawbacks which hinder the adoption of e-commerce by an organization including high operating costs, high staff training costs, etc [2].

Influencing dynamics for the adoption of e-commerce may vary based on the industry in which the organization operates. In manufacturing industry, factors such as competitor pressure, government support, top management, organization readiness, perceived benefits and perceived barriers [3] would govern the adoptability of e-commerce to an organization whereas order fulfillment, new entrants, distribution and mass customization would mainly influence in textile and apparel industry. Furthermore, in retail industry, perceived benefits, government support, computer literacy and technology infrastructure are the major factors that impact for the adoption of e-commerce within the industry [4] while economic factors, in-house ICT expertise and financial resources [5] are few of the distinguishing factors that influence for the e-commerce adoption in tourism industry.

Even though large organizations accept information technology advances including e-commerce technologies, the same level of adoption is not witnessed among small and medium enterprises (SMEs) [6]. This is mainly applicable for SMEs in developing countries, where they face many problems and barriers when adopting e-commerce [7]. Unfortunately, despite the efforts by the government and many other donor organizations, most of the SMEs in developing countries have failed to grab new opportunities relating to e-commerce and excel in their field of business [8].

When moving on to Sri Lanka, SMEs are considered as the backbone of the economy by the government of Sri Lanka, as it accounts for more than 75% of the total number of enterprises, providing 45% of the employment and contributes to 52% of the Gross Domestic Production [9]. SMEs contribution to the GDP of the Sri Lankan economy is quite higher compared to the other major economies in the Asian region [10].

According to previous studies that are compatible with the RBV (Resource Based View) theory, emphasize that e-commerce steers as a source of competitive advantage to earn more profits [11]. Furthermore, the productivity and economic structure of an organization will be impacted by e-commerce technologies. An organization can attain efficiency and cost effectiveness through the lower fixed costs for initiating and maintaining e-commerce and the higher degree of upgrade in unit transaction efficiency through e-commerce technologies [12]. As a result, the presence of e-commerce technologies has bought a crucial impact on the performance of the organizations in Sri Lanka [10].

According to previous studies conducted by many scholars SMEs constitute a major contribution to the development of economies including higher economic growth and innovation specially in developing countries [13]. As a result, SMEs are considered as a key economic sector in Sri Lanka as a developing country [10]. Yet, the adoption of e-commerce technologies among SMEs in Sri Lanka is low and it is important to overcome the barriers and challenges of implementing e-commerce technologies [10], especially with regard to the retail industry which is a prominent industry in Sri Lanka as one of the fastest growing industries in the country [14].

Therefore, an attempt is made to portray the impact of e-commerce and identify factors that mainly contribute to the adoption of e-commerce among SMEs in Sri Lanka, especially in the retail

sector as Sri Lanka's one of the fastest growing industries [14].

This study would be beneficial for the SMEs in retailing industry in Sri Lanka and to the world in general. Thus, the study contributes knowledge to the companies operating in retailing industry, especially in the aspects of factors affecting to the extent of adoptability of e-commerce and barriers for the adoption of e-commerce encountered within the industry. As a result, companies operating in the retailing industry will get the knowledge to identify the factors and barriers affecting to the e-commerce adoption.

Furthermore, e-commerce has become a vital tool deciding the survival and expansion of the industry. Even though Sri Lankan retail industry is lagging behind in implementing e-commerce, the estimated benefits are far greater than imagined and SMEs in retail industry has every possibility to increase their market share with the implementation of e-commerce for their organizational activities. An assistance is provided for SMEs in retail industry by highlighting the importance of e-commerce for the industry and potential barriers that may face, so that managers can take appropriate steps to overcome the barriers in adopting e-commerce and implement relevant strategies to expand market share. This will help the firm to boost its financial performances too.

2. REVIEWING LITERATURE

Over the past few years many scholars have been defined e-commerce in such ways each definition greatly varies from each other. E-commerce was initially defined as a process of buying and selling of goods over the internet. Later it was developed as "exchange of information" in addition to "buying and selling of goods" (Chong [15], pp. 470). E-commerce can be identified as all the processes and activities, which facilitate the exchange of information (financial and non-financial) in an electronically mediated environment with the company's stakeholders via computer networks [15,1, 16,17].

Observably, the world community has identified three core actors in the area of e-commerce i.e. businesses, individual consumers and governments. These three actors are used to categorize e-commerce into different groups) namely Business to Business (B2B); Business to Consumer (B2C); Consumer to Business (C2B); Consumer to Consumer (C2C); Customer to Government (C2G); Business to Government (B2G) and Government to Consumers (G2C) [18].

E-commerce is expected to become the largest retail channel in the world by 2021. According to Euromonitor International, overtaking sales through retail outlets like independent grocers, supermarkets, apparel and footwear retailers, among others. E-commerce will account for 14% of total retail sales in that year [19].

Moving on to the Sri Lankan context from the global context, e-commerce segment of Sri Lanka has been expanded with a growth of 34% for year on year, as at July 2018 [20]. According to Takas.lk, one of the largest online retailers in the country, growth in e-commerce is expected to easily outpace overall retail growth over the next four years [14].

Many researches among Small and Medium Enterprises (SMEs) about the perceived benefits of e-commerce adoption has been increased. Yet, due to the differences between the countries, the type of business they are into and the character of the companies, the results are different [21]. Chaffey [1] has divided the benefits from e-commerce into tangible and intangible in order to identify major benefits or aspects which drive an organization to adopt e-commerce for their organizational activities. Tangible benefits are connected with decreased costs, increased sales and market expansion which can be measured, whereas intangible benefits are hard to recognize and access. But they clearly are connected with the tangible. For an example, if the company shorten its product development lifecycle, this could lead to costs savings and better satisfying customer needs and finally increased sales (tangible benefits).

In developing economies, SMEs contribute up to 45% of total employment and 33% of GDP. When taking the contribution of informal businesses into account, SMEs contribute to more than half of GDP and employment in most countries regardless of income levels [22]. In addition, SME development can contribute to economic diversification and resilience. This is especially relevant for resource rich countries that are particularly susceptible to commodity price fluctuations. According to Sri Lankan context, SME is defined based on turnover and number of employees. As per "National Policy Framework for SME Development" issued by the Ministry of Industry and Commerce a SME is

made up of less than 300 employees and an annual turnover which is not exceeding 750 Mn.

Arawwala [10] examined the challenges and barriers of applying e-commerce technologies among SMEs in Sri Lanka. They revealed that there is a relationship between attitudes towards e-commerce usage of customers, ICT security and government support with the application of e-commerce technologies among SMEs in Sri Lanka. These results can be linked with Technological Acceptance Model (TAM) as attitude towards e-commerce adoption will impact behavioral intention to use and actual use.

Rahayu [8] furthermore examined factors that affect SMEs in developing countries in adoption of e-commerce. In this study variables that impact for the adoption of e-commerce were recognized as perceived benefits, technology readiness, owner's innovativeness and owner's IT capability which were again categorized into four segments as technological context, organizational context, environmental context and individual context. These results can be linked to Technology-Organization-Environment (TOE) framework since the major factors that influence for the adoption of technology innovation (i.e. technological context, organizational context and environmental context) are identified through this study as factors that impact for the adoption of e-commerce in an organization. Technological Acceptance Model (TAM) also go in line with these study results as perceived benefits together with attitude (towards) drive the behavioral intention to adopt technological innovation.

Yeng [23] inspected the relationship between organizational context, technological context and environmental context towards E-commerce adoption among SMEs in Northern state of Malaysia. As per the study findings there is a relationship between organizational perspective, technological perspective, environmental perspective and e-commerce adoption among SMEs in Northern state of Malaysia. These results are connected to the TOE framework, as the study identifies major factors influencing for the e-commerce adoption among SMEs in Northern State of Malaysia are technological context, organizational context and environmental context similar to TOE framework.

Based on the research conducted by Park [24] on factors determining e-commerce and their impact on its adoption in Tanzania, it was revealed that perceived ease of use, perceived usefulness, trust, technology infrastructure, national policy initiatives and intention to use mainly affect to the e-commerce adoption in developing countries. These results can be connected to Technology Acceptance Model (TAM) as perceived usefulness and perceived ease of use drive attitude (toward) and behavioral intention to use e-commerce and finally for the actual use.

Perceived benefits, ICT security, government support, education and training, owner's innovativeness, technology readiness, management attitudes towards e-commerce, socio-cultural factors, external pressure, size, resource availability, family orientation, inter-organizational succession and skilled staff are some of the key factors identified by the literature review as factors influencing e-commerce adoption among SMEs.

For the study purpose, out of all the variables identified as affecting for adoption of e-commerce among SMEs, most crucial variables including perceived benefits, computer literacy, government support and technology infrastructure have been selected.

Perceived benefits are defined as the gains or improvements resulting from existing ways of operating business transactions using e-commerce applications [18,8]. Computer literacy is the ability to use computers and related technology efficiently, with a range of skills covering levels from elementary use to programming and advanced problem solving [23]. There are many programs conducted by the government institutions such Industrial Development Board (IDB) etc. to develop ICT infrastructure in SMEs. SME development programs need to focus their attention to build a positive environment to provide reliable information in order to help SMEs to make good decisions [25]. Technology infrastructure consists of the World Wide Web, internet, hand held cell phone/computers such as iPhone, relational databases, cloud computing, client/server computing, and fiber optic switches and personal computers [26].

Accordingly, the study tested the following hypotheses;

- **H_1:** There is a relationship between perceived benefits and e-commerce adoption among SMEs in Sri Lanka.
- **H_2:** There is a relationship between computer literacy and e-commerce adoption among SMEs in Sri Lanka.
- **H_3:** There is a relationship between government support and e-commerce adoption among SMEs in Sri Lanka.
- **H_4:** There is a relationship between technology infrastructure and e-commerce adoption among SMEs in Sri Lanka.

3. METHODOLOGY

The study used deductive approach since the conceptual framework is developed based on the prior studies and quantitative and cross-sectional design was utilised. The targeted population for the study was the retail sector registered Small and Medium Enterprises in Colombo District. Using simple random sample technique, 200 SMEs in Colombo District was selected. The sample size was selected based on a similar research conducted in this area by Arawwawala [10] due to lack of availability in research data in district wise pertaining to this field.

A structured questionnaire was designed to collect primary data (refer Table 1). Apart from the independent factors identified above as perceived benefits, computer literacy, government support and technology infrastructure, demographic factors such as number of employees, gender of owner/ manager, educational level of owner or manager are also considered. The designed questionnaire was directed to an estimated 200 owners/ managers in retail SMEs. The designed questionnaire was verified by using a pilot survey (30 managers in SMEs).

The data collected was sorted and analyzed using descriptive statistics and inferential statistics. In order to test the hypotheses constructed, multiple regression analysis was employed.

Table 1. Operationalization of the study

Variable	Dimensions	Source
Perceived benefits	Sales, revenue, and profits growth.	Heung (2003)
	Effectiveness of commercial transactions.	Park et al. (2014)
	Increased employee productivity.	Park et al. (2014)
	Customizing services to customer needs	Pease and Rowe (2005)
Computer literacy	Knowledge on internet and its impact on company sales	Thong (1999), Gable & Raman (1992) Looi (2005), Ghobakhloo et al. (2011)
	Knowledge on uses of internet to the business	
	Technical knowledge and skills	
	Impact on business profit	
Government support	Actions taken to promote e-commerce	Park et al. (2014)
	Policy initiatives for telecommunication competition	
	Government incentives and subsidies	
	Government support for science	
Technology infrastructure	Sufficiency of technology and resources	Park et al. (2014)
	Usage of LAN and WAN	
	Country's internet penetration	
	Availability of sufficient business resources in organizations	
	Experience with network based applications	
Adoption of e-commerce among SMEs in Sri Lanka	Availability of e-mails and websites that facilitates for online enquiry, advertising, display of products and services, online ordering and online transaction processing	Looi (2005)

4. FINDINGS

From the study 154 out of 200 sampled respondents filled in and the questionnaires making it 77% response rate which is above the response rate threshold [27] hence the sample was sufficient. The sample of the study possess 134 SMEs owned by male and 20 firms owned by female out of total 154 respondents. The majority of SMEs consist with 11-50 employees (86 SMEs) and there are 57 SMEs comprise with 1-10 employees. Concerning on the education background of the owner of SMEs, 49 owners are qualified in degree as well as diploma qualifications. Further, there are 19 SMEs owners who are fulfilled in post graduate qualification.

The reliability of variables was assessed by examining their internal consistency values through computing the construct reliability and factor analysis was applied using principal axis factoring method for data reduction and purification of the items under each variable of the study. It can be concluded that adoption of e-commerce (4 items), perceived benefits (4 items), computer literacy (4 items), government support (4 items) and technology infrastructure (5 items) met adequate validity (KMO > 0.50; Bartlett's test of sphericity < 0.001; AVE > 0.50) and reliability (Cronbach's alpha value > .70) requirements (Table 2).

Table 3 illustrates the descriptive statistics and inter-correlational values between the variables. There were statistically significant correlations between adoption of e-commerce, government support and technology infrastructure. However, perceived benefits and computer literacy were not significant correlated with adoption of e-commerce.

The multiple regression analysis was used to determine whether perceived benefits, computer literacy, government support and technology infrastructure have any significant effect on the adoption of e-commerce in selected SMEs.

The results of the multiple regression analysis are presented in Tables 4 and 5. Table 4 shows that R-square was 0.732 ($F = 18.408$, $p < 0.001$), implies that 73 percent of the variation in e-commerce adoption can be explained by perceived benefits, computer literacy, government support and technology infrastructure. The Durbin–Watson value was 1.851 (fallen within 1.53 to 2.50), indicates that there is no autocorrelation problem in the data. In Table 5, the p-values of computer literacy, government support and technology infrastructure were less than 0.05. Hence, computer literacy, government support and technology infrastructure have significant effect on the adoption of e-commerce in selected SMEs in Sri Lanka. However, the p-value for perceived benefits was greater than 0.05, thus perceived benefits was not significant influencer of e-commerce adoption. Among the factors, government support recorded the highest coefficient value (B = 0.952), following computer literacy (B = 0.446). It is further interesting to note that, technology infrastructure has a negative relationship with adoption of e-commerce in selected SMEs in Sri Lanka (B = -0.323).

Table 2. Measurement adequacy

Variable	Cronbach alpha	KMO	Bartlett's test of sphericity	AVE
Adoption of e-commerce (AE)	0.789	0.730	0.000	.6122
Perceived benefits (PB)	0.862	0.745	0.000	.7244
Computer literacy (CL)	0.748	0.515	0.000	.4961
Government support (GS)	0.778	0.753	0.000	.6024
Technology infrastructure (TI)	0.699	0.635	0.000	.7284

Table 3. Descriptive statistics and correlation analysis

	Mean	SD	PB	CL	GS	TI
PB	2.8636	.62367				
CL	4.1851	.26936	-.114			
GS	4.1299	.38690	.279**	-.118		
TI	3.6870	.54060	. 378**	-.300**	.246**	
AE	4.1412	.45187	.128	. -0.65	.465**	.179*

***. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed)*

Table 4. Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-watson	F	Sig.
1	.855[a]	.732	.692	.51551	1.851	18.408	0.000

a. Predictors: (Constant), TI, PB, CL, GS; b. Dependent Variable: MAE

Table 5. Coefficients

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
		B	Std. error	Beta			Tolerance	VIF
1	(Constant)	1.051	.502		2.093	.046		
	PB	-.299	.173	-.237	-1.725	.096	.527	1.899
	CL	.446	.189	.360	2.355	.026	.425	2.353
	GS	.952	.173	.860	5.506	.000	.407	2.458
	TI	-.323	.143	-.292	-2.260	.032	.597	1.675

a. Dependent Variable: AE

5. DISCUSSION AND CONCLUSION

The study aimed to determine the factors affecting e-commerce adoption among Small and Medium Enterprises (SMEs) in Sri Lanka by pre identifying four major independent factors to the adoption of e-commerce i.e. perceived benefits, computer literacy, government support and technology infrastructure.

The results revealed that computer literacy, government support and technology infrastructure had major influences on e-commerce adoption of SMEs in Sri Lanka. It has been realized that Sri Lankan government support and intervention is necessary to build speedy technology infrastructure in order to encourage the usage of e-commerce as government support and technology infrastructure share a significant correlation with e-commerce adoption.

Adoption of e-commerce in SMEs developing countries is different from the developed countries. As a developing country Sri Lanka lags behind in e-commerce adoption. Thus, perceived benefit is not considered as a significant influence on adopting e-commerce since SMEs in each level of e-commerce adoption perceived these benefits differently. In this regard, the higher the level of e-commerce adoption, the more benefits realized by the SMEs. This finding is consistent with the stages of growth model suggested by Prananto [28]. According to this model, the benefits of e-commerce assembled by businesses mostly depend on the level of e-commerce adoption where the higher the level of e-commerce adoption the more sophisticated the technology infrastructure required and the greater the benefits that will be gathered. This finding also supports the study of Kraemer [29] and Rahayu [8].

Concerning the mean value of adoptability of e-commerce (Table 3), there is a moderate level of adoption in the selected SMEs. It is a good sign that Sri Lankan SMEs with an understanding of opportunities available for them to expand their business activities by identifying potential importance of e-commerce to the modern world. Comprehending benefits of integrating e-commerce into business operations allows Sri Lankan enterprises to determine whether they should adopt e-commerce. In the literature, the extent of adopting e-commerce in SMEs has been greatly realized and affirmed by many authors and therefore Sri Lankan SMEs that try to adopt e-commerce in their businesses will be likely to gain benefits from this decision. Further, the researchers conducted by many scholars in the similar areas confirm that computer literacy, government support and technology infrastructure have a major influence on deciding the extent of adoptability of e-commerce in SMEs [8,24,30,13].

From the regression analysis result, it was further identified that there was a negative relationship between technology infrastructure and e-commerce adoption. The possible reasons that can be predicted are that with the increased technology infrastructure various complexed processes (e.g. payment, financial) are introduced even though there are less opportunities for the wide community to learn

about these new technological advancements due to improved technological infrastructure. In order to fill the gap between these complicated processes and less knowledge web designing companies are being introduced to help community to access more to e-commerce and introduce e-commerce to their businesses. Yet it can be witnessed that designing web sites through web designing organizations are costly and most SMEs are unable to afford such costs. As a result, people are getting reluctant to adopt e-commerce even with new technological advancements. Another important aspect is the prevailing unstable situation in Sri Lanka following terrorist attacks in April 2019. Social media can be considered as a major platform for SMEs to conduct their businesses promote them with a minimum cost i.e. even without a website.

Due to the terrorist attacks Sri Lankan government banned social media several times which affected badly for the SMEs who conducted their businesses with the support of social media. As a result, it can be predicted that even with improved technological infrastructure people gets reluctant to adopt e-commerce due to prevailing situation in the country and less government support provided by government for entrepreneurs.

The results of the study are significant to a number of groups specially to government policy makers on ICT. Government can take initiations to improve computer literacy of school children, young generation and adults by providing necessary education on ICT. As a result, the Sri Lankan population gets more access to knowledge on e-commerce and its potential benefits which would eventually improve the adoption of e-commerce and the economy.

Further improvements and implementations can be made to technology infrastructure by developing facilities to access to internet and e-commerce. This is another important aspect from the perspective of government which can be implemented in corporation with international or private donors to improve the access ability to internet and e-commerce in all corners of Sri Lanka.

Another important aspect is businesses get an understanding of importance of e-commerce adoption to their perspective businesses and the perceived barriers where management can take appropriate steps to mitigate them. As a result, appropriate actions can be taken in a timely manner to improve the business and win the market.

Moreover, new employment opportunities can be created as a result of these newly obtained knowledge on factors affecting e-commerce adoption as a solution to increased unemployment rate among young population. With more people getting accessed to internet and e-commerce they tend to unveil new opportunities to earn income. As a result, new employment opportunities will emerge within the society.

Traditional eight hours per day working time will get replaced with 24*7 working model as employees as well as customers can get access to their particular businesses at any time of the day irrespective of the location. As a result, this will hugely impact to the traditional employment opportunities as they will become less attractive with emerging e-commerce related businesses.

The study conducted on factors affecting e-commerce adoption among SMEs in Sri Lanka in the retail sector in Colombo District. It can be further widened to other industries of Sri Lanka including manufacturing, tourism etc. and to other districts.

The study was further identified that there is negative relationship between technology infrastructure and e-commerce adoption. Further research can be conducted to identify the possible causes for this negative relationship and necessary actions can be taken based on the findings to overcome them.

Perceived benefits, computer literacy, government support and technology infrastructure were the factors that were considered as major influences to the adoption of e-commerce throughout the study. Yet other factors such as education and training, owners' innovativeness, management attitudes towards e-commerce and external change agents and IT security are some of the significant factors identified for the adoption of e-commerce in related studies. As a result, future research can be conducted considering these significant factors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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