A Study on the Adoption of Software as a Service (SaaS) in Online Business SMEs in Sri Lanka

Ahamed Lebbe Mohamed Ayoobkhan[1*] and David Asirvatham[2]

[1]*Graduate School of Management, Management and Science University, Malaysia.*
[2]*School of Computing and IT, Taylor's University, Malaysia.*

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The purpose of this study is to investigate the factors that influence the adoption of Software as Service (SaaS) at Small Medium Enterprises (SMEs) that have adopted online business in Sri Lanka. Prior studies have shown that SMEs significantly benefit due to the adoption of SaaS. The research sough to explain the adoption of SaaS using Awareness, Trust, Cost, Top Management Support, Complexity and Relative advantage. Conceptualization of this researcher's variables and their interrelationship have been supported by theory of Diffusion of Innovation (DOI) of Rogers' (1962) and Technological Organizational and Environmental (TOE) Framework of Tornatzky and Fleisher (1990). The study was conducted among 250 randomly selected SMEs adopting online business using questionnaires addressed to managerial and ICT professionals who were capable of making ICT decision at SMEs under study. However only 224 questionnaires were returned with complete data required for the purpose of analysis. The study employed principal component analysis to reduce the data and employed Ordinary Least Square (OLS) to test the relationship between the variables. It is found that Cost (CT), Complexity (CX) and Relative Advantages (RA) are having significant impact on SaaS adoption in SMEs in Sri Lanka. This study extends the existing body of knowledge by providing empirical support for explaining SaaS adoption by SMEs in

Corresponding author: E-mail: ayoob@seu.ac.lk, ayoobfn@hotmail.com, ayoob@seu.ac.lk;
;

1. INTRODUCTION

Nowadays, the growing body of Information technology (IT) innovation leads the Small Medium Size Enterprises (SMEs) to make a decision regarding adoption of advanced technology to solve the organizations computing requirements, to support their services, products and to satisfy their business operation need to create a large infrastructure of Information technology and resources employment in order to effectively and efficiently utilize the limited resources [1,2]. Cloud computing is one of these technologies provide solutions to overcome the existing problems identified and faced by many SMEs in the world. The Cloud is generally accessible to business companies and access to Small and Medium Enterprises (SMEs) in particular. Cloud computing technology offers many significant benefits to business enterprises with a specific reference to the reduction of cost saving benefits: Hardware investment, main-tenance costs and low power consumption [1,2,3,4]. The service is dynamically scalable (on-demand self-service and rapid elasticity) because users only have to consume the amount of online computing resources they actually need without human interaction with the provider [5,6,7]. It is very useful for SMEs that meet high and low demands of IT services and must pay only when it is paid for server usage increases. The service is based on a utility basis (pay-as-you-go service) and low investment result is no risk of immediate access to any fixed costs and cost savings improvements [5,8,4,9]. National Institute of Standards and Technology (NIST) define the Cloud computing as "Cloud computing is a model for enabling convenient, on demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Most organizations today are making great utilization of Cloud computing in couple of ways.

To start with, the organizations that make Cloud innovation much of the time don't have to make it rather it can be given by a Cloud organization infrastructure. A valid example is the point at which each organization in Benchmark's portfolio makes utilization of Cloud foundation of Amazon. The concept of Cloud computing is a moderately new idea in a few firms and consequently making the greater part of them to have low trust in the Cloud computing framework [2,8]. Further, [10], notes that Cloud computing is mobile and at the same time a remote data center through which users can comfortably share information with neighbors and the strangers at the same time. Therefore, Cloud computing ensures that the users can economically access all the available IT resources at any point and time in the manner in which they deem fit.

The SMEs sectors have been identified as an important strategic sector in the overall policy objectives of the Government of Sri Lanka [11] and it is seen as a driver of change for inclusive economic growth, regional development, employment generation and poverty reduction. SME sector is envisaged to contribute to transform lagging regions into emerging regions of prosperity. The Government of Sri Lanka recognizes SMEs as the backbone of the economy, as it accounts for more than 75% of the total number of enterprises, provides 45% of the employment and contributes to 52% of the Gross Domestic Production (GDP) in compare to India. SMEs promote broad based equitable development and provide more opportunity for Women and Youth participation in the economic development of the country (see Table 1). With the globalization trend, the SME sector is not merely seen as a sector for "protection and promotion" but, more importantly as driving force for "growth and development". Therefore, Government of Sri Lanka recognizes that enhancing national and international compete-tiveness is fundamentally important for this sector to face the emerging challenges and develop SMEs as a thriving sector. Given the nature of this sector and the challenges faced, it

Table 1. Countries' and SMEs' contribution to GDP up to December, 2017

Country	Contribution to GDP	Contribution to employment	No of enterprises as % of the total	GDP per capital Dec. 2017 in US $
Sri Lanka	52%	45%	75%	4065
India	32%	40%	95%	1751
Malaysia	36%	67%	97%	9817
Singapore	Over 50%	70%	99%	57722

is important to have a Government led intervention and support mechanism to upgrade and strengthen this sector to meet the expectations of the country [11].

1.1 Objective of the Study

This study proposes the following objectives;

a) To study the current status of SaaS adoption in Online Business SMEs in Sri Lanka.
b) To identify the relevant factors influencing the adoption of SaaS in Online Business SMEs.
c) To develop a conceptual framework for technology adoption of SaaS for SMEs and empirically validate the conceptual framework as an adoption model for SMEs in Sri Lankan context.

Therefore, the overall objective of the study is to develop a framework that would assist and function as guide to SMEs in adopting SaaS in Sri Lankan context. Further, the study will also ensure that the Software as a Service platforms will be chosen to improve the value and the benefits that come along with it.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

SMEs play a key part in the economy to surety that companies have a considerate of the matters connected with adopting Cloud Computing. Workers do not need to worry about the storage and the setting of the information with the conception of Cloud computing as all these properties can be retrieved through a mobile or computing means of their choice at any prearranged time and anywhere so long as there is an internet association [2,5,6]. The computing technology provides the firms a chance to acquire on-demand various Information Technology facilities through the diverse internet applications that occur using a payment or unrestricted mode tailored on the usage [4,12] [13]. The studies have dwelled on Cloud Computing without giving clear references to the organization and related factors contributed to

the successful adoption of SaaS. Remote-based email such as, Yahoo Mail, Gmail, MSN Mail Hotmail, or any comparable service, may be the easiest way to explain the basics of how Cloud computing function, since forecasters have pointed to the fact that our thoughtful of how Cloud computing works can be best agreed by means of our own particular use of Google's Gmail and GoogleApps [14,8,15]. A study was conducted by Rackspace in 2009 has been mentioned that 60% of people are not well conversant with the term Cloud computing, in particular SaaS, the remaining percentage had a shallow knowledge in this regard. According to [16], the Information Technology customers are the fundamental focus of the SaaS service. SaaS allows the clients to make their own particular application through application programming interface (API) [9] which has helped in solving customization as a drawback [13,17]. The SaaS enables a company to pay more often than not a month to month charge to acquire [10]. Recent research has shown that there are significant advantages of SaaS when adopted by SMEs. Through this, organizations can formerly advance their technical and considered quickness. Moreover, the research studies that have been conducted in the past have majorly concentrated on the usage of the Cloud Computing in organization and the conveyance models, teething troubles related with moving to Cloud and Cloud selection.

Buyya et al. [18], indicates that some of the cost that is eliminated include; system upgrade, data storage, incising, hardware purchases and maintenance. It is also used to encourage close collaborations. However, according to Bhat et al. [19], there is a knowledge gap as pertains to the understanding of the factors that influence the effective adoption of SaaS in SMEs. Recent study indicates that the Sri Lankan government has made efforts to increase the competitiveness of SMEs. This is for improving infrastructure and helping low cost. But adoption of Cloud computing is still down as far as the SMEs are concerned. But, information on SaaS is limited and only few sectors have been adopted this service. Up to now, there has not been existing

much committed studies on SaaS concerns in Sri Lanka. According to a study there is inadequate information on fruitful case studies and indicators on SaaS implementation. Moreover, according to Nabeel and Adil [20], SMEs are performing well but yet they are missing a lot. This could be considered as an issue in this study.

Further, this research will also cover the gaps in previous studies, as reported by Ondiek [14], that there's a big disconnect between the popular scholarly discussion about SaaS for SMEs leading to limited and inadequate access to relatable information in this regard. The study will also review the existing adoption models which are not contextualized for developing countries pertaining to SaaS adoption factors by SMEs. Therefore this study will formulate an acceptable framework for adoption of SaaS in Cloud computing for SMEs in Sri Lankan context. Moreover, the study brings more understanding of the Cloud Computing Software as used as a service adoption for SMEs. The research tends to fill the knowledge gap that exists between Cloud SaaS computing for the SMEs. This paper, consequently, should be able to function as instrument for an SME that is uncertain on what Cloud computing particularly Software as a service is adopted.

2.1 Development of Hypotheses from Prominent Studies for this Research

According to Premkumar and Ramamurthy [21], the consumers often undergo a lot while striving to get a new product. The process is hectic and entails acquisition of knowledge, conviction, process of making decision and ideally confirming the decision before proceeding to approve the artefact or even the facility. Once the consumer approves and finds the innovation, any innovation begins with adoption or rejection procedure. On the other hand, [22,23] emphasized that for one to comfortably adopt, they have to know the new brands that get into the market. By being unaware of the new brand, the adoption of IT is affected negatively [24] but according to Irshad and Md Gapar [8], indicates that the effect on Awareness in Academic institutions have positive influence in the context of Sri Lankan. In accordance to the conceptual framework of this study the following research hypothesis have been developed.

H1: There is a positive and significant relationship between Awareness and SaaS adoption

According to Siau and Shen [17] and Ayoobkhan [25], Trust is regarded as a measure of buyers' level of accreditation that the service will be well furnished with least conceivable anticipation. Amongst the signs of the goal to use SaaS, dependence has been perceived to be a standout amongst the most indispensable fundamentals that influence a person to use the invention [26,27]. According to Erisman [28] Ondiek [14], Trust is equally an important portion in imagining out if an individual buys products or services by means of the Web. Trust is the base of the vital association between an industry and its Internet consumer [12]. A customer's ability to utilize from an Internet store which is affected by his or her state of mind and impression of danger [12]. The person's willingness to take part in online trades of cash and individual delicate data [29]. As designated by Eder and Igbaria [30], non-Internet supporters require wide effort of influence before they begin participating in e-keeping money and make an e-propensity. A study carried out by Poon and Swatman [26] reveals that approximately 70% of the respondents correspond that trust is influencing them to use Internet saving money. Therefore, in this study the factor generated the following research hypothesis as given:

H2: There is a significant relationship between Trust and SaaS adoption Services

According to Tornatzky and Fleischer [31], Cost as the amount to which the usage of a development is acknowledged to be comparatively exclusive. The application of information systems (IS) is measured a safe approach for SMEs in terms of as long as together a substance for transaction based innovativeness and as a foundation of cost savings and practical development [25,32]. The distribution of this systems are based on Cloud computing knowledge that minimizes the possession cost, upfront cost and conservation cost. In accordance to the conceptual framework this study the factor generated the following research hypothesis as given:

H3: There is a significant relationship between Cost and SaaS adoption Services

According to many researchers [33,25,8], it mentions to Promising time to the (ICT) program to a convinced grade its cost, probable, infectious up on consequences, measuring plans and hopeful the regulatory matters obligatory with organizing ICT with the organization technique of the business. According to Young

and Jordan [33] Irshad and Md Gapar [8], it has been revealed that the Top Management Support and methods can be biased toward improved performance change. Cloud computing implementation management maintenance is considered as the chief connection amongst individual and hierarchical ICT development in their audit of the indicators and biases in IT. According to Low et al. [7], the topmost administration maintenance key to possess the reputation of conceivable change over an pronounced deliberation for the reminder, and by directing signs of the importance of the new information to different personalities from the organization. According to Premkumar and Ramamurthy [21] Annuka [34], manager affiliation guarantees the enough assets to be disseminated so as to cuddle the new know-how. The implementation of SaaS Cloud computing is strategically important when considered from the organization top management. In accordance to the conceptual framework this study the factor generated the following research hypothesis as given:

H4: There is a positive and significant relationship between Top Management Support and SaaS adoption Services

The degree to which an invention is apparent as comparatively difficult to appreciate and use representation will be fewer probable if the detection is careful as actuality more inspirational to use. SMEs might be antagonized with trials when commissioning a new knowledge in footings of changing the deportments in which they intermingle with their work-related systems. Conferring to [35], performing will be fewer likely if the expansion is watchful as being more thrilling to use. SMEs may be endangered by the encounters when accepting a new experience in rapports of moving the performances in which they interrelate with their commerce systems [36] [32]. According to Sahin [37], in order to increase occupation rate, the new know-hows have to be user friendly. This factor is more disadvantageous to the adoption probability unlike other innovation characteristics. Hence, SMEs predisposition to implement SaaS services is increased by the decreased complexity of SaaS. So, it leads to the following research hypothesis which is in accordance with the research Hypothesis;

H5: There is a positive and significant relationship between Complexity and SaaS adoption Services

According to Rogers [35], the extent to which an invention is witnessed as being enhanced than the suspected. It is taken as an essential needle for the new IS inauguration. The result of relative improvement on employment occupation has been systematically observed in aforementioned benefits that were accepted by some research scholars [27,38]. According to Lee [38], when dealings have a qualified improvement of invention then the chances of implementation will spontaneously increase. Cloud computing notably presents several benefits upon its adoption. Cloud computing can offer several advantages that can be linked to issues of capacity, reliability, as well as flexibility. Having this ensures that there is immense reduction in cost of entry for the SMEs and thus the businesses can access several resources within a short time span [37]. Relative advantages that accrue from Cloud computing are many. So, the following research hypothesis which is in accordance with the research Hypothesis;

H6: There is a positive and significant relationship between Relative Advantages and SaaS adoption Services

3. RESEARCH METHODOLOGY

Adoption of SaaS is broadly a topic under information technology service adoption and it is an aspect of firms' innovativeness. To examine the factors that influence the adoption of SaaS, this study hence broadly adopted two prominent theories namely diffusion of innovation (DOI) theory of Rogers (1962), and the technology, organization, and environment (TOE) framework of Tornatzky and Fleischer [31]. The DOI theory holds that individual, structural and external characteristics of organizations are important antecedents to organizational innovativeness. The TOE framework on the other hand affirms that three such contexts namely technological, organizational and environmental contexts of an enterprise impact on technological innovation of a firm. There are previous studies that have employed TOE framework to explore the IT adoption [32,38,4,39]. Accordingly, the conceptual framework of the present study can be represented in the diagram Fig. 1.

In line with previous similar studies on this subject [14,20,6,18,34], this research too adopts a quantitative approach. Self-administered questionnaire were issued among selected ICT employees in executive positions
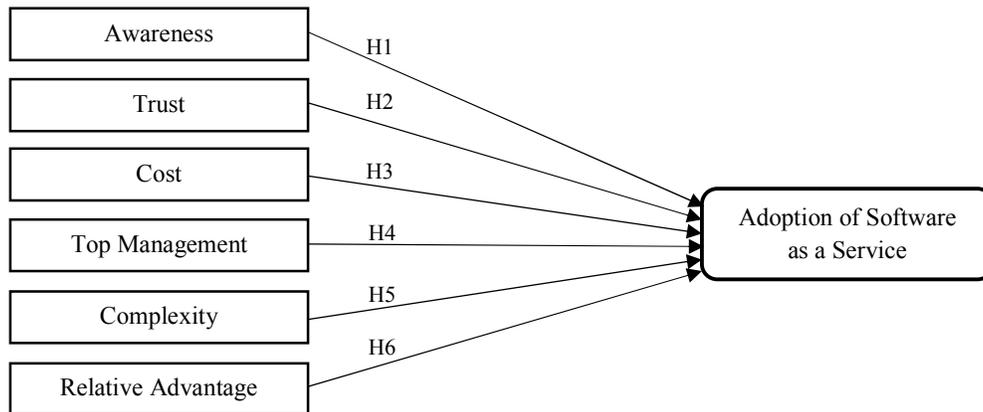
Fig. 1. Conceptual Framework of the

and managers capable of making ICT decisions in the firms. Some of the matter touched in the questionnaire include the demographic profile of the SMEs, impact of factors of DOI and TOE on their Cloud computing adoption strategies. The questionnaire contained five Likert scale questions to measure the DOI and TOE considerations related to adoption of this technology. According to many researchers [40,41,42,43,44], the total number of SMEs adopting Cloud Computing is 489 which constitute to the population of this research and thus the appropriate size of sample for this study was determined as 250 firms [45,46]. The collected data were analyzed using statistical computer programs known as SPSS Version 21. The study first examined the measurement model to test reliability and validity, and followed by the multiple linear regression analysis to test research hypotheses and research model of this study.

3.1 Data Analysis and Discussion of the Findings

A total of 250 questionnaires were issued and 231 returned. However, only 224 was used for data analysis after data screening was completed. Several items were used to measure all variables and for each item, a corresponding Likert Scale with anchors ranging from 1 as "Strongly Disagree" and 5 as "Strongly Agree" was used. For each item listed, the respondents were requested to mark any of the five options given. The study first examined the measurement model to test reliability and validity, and followed by the multiple linear regression analysis was to test research hypotheses and research model of this study.

3.2 Descriptive Statistics

This section present the demographic characteristics of the respondents of this study.

Table 1a describes the demographic characteristic of the respondents participated in this survey. Most of the participants were men, 182 (81%) and female participants 42 (19%). It is important to consider the age of participants in this study. Most of the respondents were young people, 73% of the total. As far as the Educational level of the respondents are concern, more than 51% are degree holders. IT experience is concerned, around 76 (34%) of the respondents are having 1 to 5 years of experience while around 112 (50%) of the respondents are having 6 to 10 years of IT experience. Others around 36 (16%) of the respondents are having 11 to 15 years of experience. This could be considered as an evidence towards adoption Cloud computing technology. Even though the success of the study may be depending on other factors as well.

3.3 Adopter and Non-adopters of SaaS

To determine whether the respondent's organizations are currently using SaaS, the respondents were asked to indicate whether they currently use or intend to use SaaS in the business. Based on the questions, three categories of respondents'' SMEs were identified in this study.

From the Table 2, 152 (69%) SMEs have been identified as the adopters of SaaS in this survey study. Around 55 (25%) SMEs are expressed their intention n to use SaaS in the near future,

Table 1a. Demographic characteristic of the respondents

Description	Frequency	Percentage
Gender		
Male	182	81%
Female	42	19%
Age		
18 - 25	28	13%
26 - 35	59	26%
36 - 45	77	34%
46 - 56	42	19%
Above 56	18	8%
Educational level		
Ordinary Level (O/L)	47	21%
Advance Level	62	28%
Bachelor Degree	85	38%
Master Degree	23	10%
PhD	07	3%
IT experience		
1 - 5 years	76	34%
6 - 10 years	112	50%
11- 15 years	36	16%

Table 2. SMEs' intention to adopt SaaS

Description	Frequency	Percentage
SMEs adopted SaaS	152	69%
SMEs having Intention to adopt SaaS in the near future	55	25%
SMEs have no intention to adopt in the near future	17	6%

a few number of SMEs (17) expressed their idea as no intention to adopt SaaS even in the near future. Hence, the descriptive analysis it is apparent that most of the SMEs have adopted SaaS as it is useful. Moreover, in this study, the researcher has focused on the SMEs who were adopted SaaS, for further analysis.

3.4 Reliability and Validity of the Construct

Validity and reliability are two important steps that determine the quality and usefulness of data collected. Generally, the higher value of Cronbach's Alpha illustrates a higher reliability. For reliability test, the normal standard value is 0.7 [47,48,49]. Therefore, if the value of alpha more than 0.7, then a high reliability has been proved (Refer Table 3). For the six constructs: Awareness (AW), Trust (TS), Cost (CT), Top Management Support (TM), Complexity (CX), Relative Advantage (RD) and ADP.

3.5 Validation Test of the Constructs

This section reveals the results of the factor analysis based on both independent and dependent variables. As shown in Table 4, the KMO for both the independent and dependent

variables exceeded the threshold value of 0.6. Discriminant and convergent validity was measured by means of average variance extracted (AVE). Convergent validity is adequate when the AVE value of each construct exceeds 50%, [2,49,46]. As shown in Table 4, the AVE values for all of the study's constructs were well above the threshold. Consequently, both discriminant and convergent validity was acceptable in this study. Thus, the scales used in this study are both reliable and valid.

Table 3. Reliability of the constructs

Constructs	Cronbach's Alpha	N of Items
AW	0.734	5
TS	0.701	5
CT	0.715	5
TM	0.812	6
CX	0.802	5
RD	0.799	5
ADP	0.770	5

3.6 Regression Analysis and Hypothesis Testing

Regression analysis is used to understand which among the independent variables are related to

Table 4. Validity of the constructs

Constructs	Kaiser-Meyer-Olkin (KMO)	Average variance (AVE)	No of items
AW	0.727	53%	5
TS	0.701	51%	5
CT	0.716	53%	5
TM	0.761	57%	6
CX	0.739	56%	5
RD	0.750	55%	5
ADP	0.749	57%	5

Table 5. Analysis of coefficient

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. error	Beta		
(Constant)	.225	.438		.515	.608
AW	.059	.077	.048	.760	.449
TS	.099	.072	.084	1.374	.172
CT	.299	.071	.296	4.210	.000
TM	.098	.081	.092	1.202	.231
CX	.229	.089	.213	2.833	.000
RD	.387	.080	.348	4.808	.000

the dependent variable, at the same time to explore the forms of these relationships. Table 5 describes the results of the linear regression analysis was used to test research hypotheses.

Awareness (AW): According to the Table 5, the p-value for AW is more than 0.05 and the coefficient value is 0.059. Hence ADP does not depend on AW. Therefore, the hypothesis was rejected and there is an insignificant relationship between AW and ADP. Hence, it is confirmed that AW was not identified as one of the major factors in order to adopt SaaS in SMEs in Sri Lanka. *Thereby rejecting H1 that "There is a significant relationship between the Awareness (AW) and the SaaS adoption in SMEs in Sri Lanka.* **Trust (TS):** In Table 5, the p-value of TS is more than 0.05 and the coefficient value is 0.099. Hence ADP does not depend on TS. Therefore, the hypothesis H2 was rejected and it is confirmed that there is an insignificant relationship between TS and ADP. Hence, it is confirmed that TS was not identified as one of the major factors in order to adopt SaaS in SMEs in Sri Lanka. *Thereby rejecting H2 that "There is a significant relationship between the Trust (TS) and the SaaS adoption in SMEs in Sri Lanka.* **Cost (CT):** Table 5 implies that the p-value for CT is less than 0.05 and the coefficient value is 0.299. In Sri Lankan context SMEs have been realized that adopting SaaS is not expensive and the tendency of Cost is natural. Hence ADP depends on CT. Therefore, the hypothesis H3

was accepted and there is a significant relationship between CT and ADP. Hence, it is confirmed that CT is identified as one of the major factors in order to adopt SaaS in SMEs in Sri Lanka. *Thereby accepting H3 that "There is a significant relationship between the Cost (CT) and the SaaS adoption in SMEs in Sri Lanka.* **Top Management Support (TM):** According to the Table 5, the p-value for TM is more than 0.05 and the coefficient value is 0.098. This implies that the support of the Top level management in Sri Lanka in particular in SMEs is unfortunate. Hence ADP does not depend on TM. Therefore, the hypothesis H4 was rejected and there is an insignificant relationship between TM and ADP. Hence, it is confirmed that TM is not identified as one of the major factors to adopt SaaS in SMEs. *Thereby rejecting H4 that "There is a significant relationship between the Top Management Support (TM) and the SaaS adoption in SMEs in Sri Lanka.* **Complexity (CX):** In Table 5, the p-value for CX is less than 0.05 and the coefficient value is 0.229. Hence ADP depends on CX. Therefore, the hypothesis H5 was accepted and there is a significant relationship between CX and ADP. Hence, it is confirmed that CX is identified as one of the major contributor to adopt SaaS in SMEs. *Thereby accepting H5 that "There is a significant relationship between the Complexity and the SaaS adoption in SMEs in Sri Lanka.* **Relative Advantage (RD):** The Table 5 implies that the p-value for RD is less than 0.05 and the coefficient value is 0.387 which is the heist value among the constructs. Hence ADP

depends on RD. Therefore, the hypothesis H6 was accepted and there is a significant relationship between RD and ADP. Hence, it is confirmed that RD is identified as one of the major contributor to adopt SaaS in SMEs. *Thereby accepting H6 that "There is a significant relationship between the Relative Advantage and the SaaS adoption in SMEs in Sri Lanka.*

3.7 Explanatory Power of the Model Fitting

Regression analysis helps to identify, how the dependent variable changes when there is a change in independent variables, the researcher has built up several hypotheses to prove the relationship in between adoption of SaaS with AW, TS, CT, TM, CX and RD. Regression analysis is the ideal tool to identify the impact or significance of one variable to another. The Multiple Linear Regression (MLR) analysis was

carried out to investigate the impact of these six independent variables to the dependent variable. The Table 6, presents the model fitting of this study. The R-square value was 0.521. This implies that around 52% of the variation in SaaS adoption by R-squared might be estimated and predicted by this Model in SMEs in Sri Lanka and can be explained by the factors AW, TS, CT, TM, CX and RD in this study. Hence it can be concluded that model is accurate and it can be used for further analysis.

3.8 ANOVA in Multiple Regression Analysis

The p-value from the ANOVA Test in Table 7 is less than 0.05, which means that at least one of the six variables can be used to model SaaS adoption in SMES in Sri Lanka and also it can be assumed that there is a linear relationship between the independent and dependent variables is not violated.

Table 6. Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.721[a]	.520	.501	.45287	1.243

Table 7. ANOVA test

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	32.274	5	5.379	26.227	.000[b]
Residual	29.739	145	.205		
Total	62.013	151			

3.9 Hypothesis Testing Summary

Table 8. Summary of the hypothesis testing

Hypothesis	B	t	p-value	Outcome
H1: There is a significant relationship between the Awareness (AW) and SaaS adoption in SMEs.	0.059	.760	0.449	Not Supported
H2: There is a significant relationship between the Trust (TS) and SaaS adoption in SMEs.	0.099	1.347	0.172	Not Supported
H3: There is a significant relationship between the Cost (CT) and SaaS adoption in SMEs.	0.299	4.210	0.000	Supported
H4: There is a significant relationship between the Top Management Support (TM) and SaaS adoption in SMEs.	0.098	1.202	0.231	Not Supported
H5: There is a significant relationship between the Complexity (CX) and SaaS adoption in SMEs.	0.229	2.833	0.000	Supported
H6: There is a significant relationship between the Relative Advantage (RD) and SaaS adoption in SMEs.	0.387	4.808	0.000	Supported

4. DISCUSSION

The study found Awareness as not important factor in predicting implementation of Cloud SaaS computing in SMEs in Sri Lanka. The awareness that is insignificant was (p=0.449 in the research model). It contradicts previous work of Ondiek [14] that emphasized that for adoption to take place consumers must become aware of new brand. Hence the findings indicated that hypothesis H1was rejected. Trust was discovered to be important consideration when predicting Cloud SaaS Computing acceptance in the study and was insignificant (p=0.172 in the investigation model). It contradicts previous study by Poon and Swatman [26] who indicates that approximately 70% of the respondents agree that Trust. In another empirical study in Singapore by Fock and Woo [50], the authors found out that advanced levels of trust are important and are related with greater willingness to try SaaS. The findings indicated that H2 having insignificant influence towards adoption of SaaS in SMEs in Sri Lanka, hence the Hypothesis was rejected. The study has been observed Cost as significant factors in order to adopt SaaS. The finding of this study in line with [14], the application of evidence systems (IS) such as ERP is measured a safe strategy for SMEs in relationships of as long as both a substance for transaction-based innovativeness and as a foundation of cost investments and practical improvement [34,6]. The findings indicated that H3 was accepted as the p-value is less than 0.05. The study found that Top Management support is not an important factor in predicting implementation of Cloud SaaS computing in SMEs in Sri Lanka. The Top Management support was insignificant (p=0.231 in the research model). It contradicts previous work that has demonstrated that technology development selection can be prevented by top administration [30]. In the present study the p-value of TM is more than 0.05 (p=0.231). Hence the findings indicated that hypothesis H4 was rejected. Most of the present finding is consistent with past research which do not report difficulty. According to Tiwana and Bush [36] Harindranath et al. [32], this is seen as an imperative characteristics for SMEs decision making in the implementation of a new know how. The Cloud SaaS service is easy to operate since these SMEs are scared about the implementation of this program. Based on the acceptance secondhand on Cloud SaaS based this could have reduced the complexity for the organization as its hardware and software support is undertaken by the Cloud SaaS solution vendor. The finding indicates that p-value of this construct is less than 0.05, hence, it was significant contributor of this study. Relative advantage is completely associated with the employment pronouncement on Cloud SaaS figuring and is significant. It is anticipated that SMEs are supposed to see Cloud SaaS service as a new as computing prototypical that could build their benefit before they take a positive reception choice. Given that the vast majority of utilizations that were accounted for as embraced had a tendency to be those on the essential end of the range it might be that members did not trust that these applications would really offer them an upper hand [14,19]. The finding indicates that the p-value of this construct is less than 0.05, hence, it was significant important to explain SaaS adoption in SMEs.

5. RESEARCH CONTRIBUTION

The research contributes to literatures on the adoption of SaaS computing in SMEs in Sri Lanka. Any researcher can enrich their knowledge and understanding of the SMEs adoptions by viewing the adoption of new IS innovations adoption. This research has developed an SME SaaS computing acceptance model, which is observed in the background to DOI and TOE in a challenge to find out the whole idea of cloud computing. This study, may also help organizational managers to develop practices which assess various risks that are involved in adopting cloud services. Since this research affords good understanding of the factors that contributes to the successful adoption of SaaS in SMEs, therefore, SMEs can prioritize their value and low resources efficiently and efficiently. Furthermore, this research contributes to technology experts and software vendors. Software vendors have to develop strategy that effectively promotes of SaaS computing without wasting time by conducting special classes, presentations, workshops, and on location visits to the interested party in Sri Lanka as quickly as possible. Hence, SaaS computing suppliers may need to expand their connection with SMEs required in the SaaS computing background, to make a sound domain for SaaS computing reception, and to evacuate any unclearness that encompasses this sort of technology. As far as government and policy makers are concerned, SaaS computing selection, requires the best government approaches and directions with the goal that it can exist. Further, policy makers have to create new room to the formal and informal business

organizations to extent SaaS Technology Island wide by conducting awareness programs. When all the above variables are put into thought, this examination accordingly gives some vital data to organizations, vendors and policy, innovation specialists and is along these lines, seen as being noteworthy to the present period of fast improvements of SaaS computing advances. Finally, the discourse on the suggestions and commitments of this study was to give rules to arrangement producers, experts and innovation merchants in executing and quickening SaaS computing improvement and usage among different SMEs. Therefore, this particular study has been found to be efficient in improving knowledge on adoption of SaaS innovation among SMEs in Sri Lanka. However, there were still some areas that needed further and elaborate studies.

6. CONCLUSION AND RECOMMEND-ATION

This research has made an effort to discover and construct a SMEs' SaaS Computing implementation ideal that is reliant on the DOI theory and TOE framework. While undertaking the research, a validated conceptual framework was drawn to help in the determination of the six contextual factors in regards to SaaS computing adoption in SMEs within the island. The SaaS computing adoption is affected by different factors and therefore, making a conclusion that it depends on three context is fallacious. SaaS computing is considered by many to be a vital for ICT invention. This can dispute both the premeditated and operational benefits, for important rates of implementation amongst SMEs. The research reviewed adoption theories and various frameworks so as to develop some of the constructs and models the two theories selected for the study included DOI theory and TOE framework. In order to investigate the implementation of SaaS computing services, a conceptual model of the SMEs and the developed hypotheses outlined. The model consist of six major variable such as Awareness, Trust, Cost, Top Management support, Complexity and Relative Advantage, that are considered to be significant influencing SaaS adoption in SMEs in Sri Lankan context. Finally, statistically analyzing, the research concluded that only three constructs such as Cost, Complexity and Relative Advantage are having positive and significant impact on SaaS adoption in SMEs in Sri Lanka. It is worth noting that this research covered just a small chunk or part of

the wide knowledge concerning SaaS innovation adoption. Future research should be carried out in future need to mainly concentrate on the various companies and firms that have big data.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Dakshina Tharanga CHM, Indika Perera. Factors determining the intention to adopt Cloud computing by finance companies in Sri Lanka. International Conference on Business Research, University of Moratuwa, Sri Lanka; 2018.
2. Ayoobkhan ALM, David A. Adoption of cloud computing services in healthcare section: Special attention to private hospitals in Colombo District, Sri Lanka. Current Journal of Applied Science and Technology. 2017;23(2):1-10.
3. Irshad MBM, Md Gapar Md Johar, Naleer HHM. A review on cloud computing adoption: An exploratory. International Journal of Advanced Research in Computer Science and Software Engineering. 2015;5(1):160-166.
4. Oliveira T, Martins M. Understanding e-business adoption across industries in European countries, Industrial Management & Data Systems. 2014;110(9):1337-1354.
5. Ayoobkhan ALM, Asirvatham D. Issues and challenges faced by online business organizations in adopting cloud computing: A research agenda. International Journals of Advanced Research in Computer Science and Software Engineering. 2017; 7(8):260-264.
6. Alshamaila Y, Papagiannidis S, Li F. Cloud computing adoption by SMEs in the North east of England: A multi perspective framework. Journal of Enterprise Information Management. 2013;26(3):250–275.
7. Low C, Chen Y, Wu M. Understanding the determinants of cloud computing adoption‖. Industrial Management & Data Systems. 2011;111(7):1006-1023.
8. Irshad MBM, Md Gapar Md Johar. A study on awareness and adoption of cloud computing by academics in Sri Lankan Universities. International Journal of Advanced Research in Computer Science and Software Engineering. 2017;7(5).

9. Li X, Li Y, Liu T, Qiu J, Wang J. The method and tool of cost analysis for cloud computing. Proceedings of IEEE International Conference on Cloud Computing. 2010;93-10087.

10. Makris P, Skoutas D, Rizomiliotis P, Skianis C. A user-oriented, customizable infrastructure sharing approach for hybrid cloud computing environments. Third IEEE International Conference on Cloud Computing Technology and Science; 2011.

11. Government of Sri Lanka, GOSL; 2017.

12. Vaquero L, et al. A break in clouds towards a cloud definition in ACM. SIGCOMM Computer Communication Review. 2009; 39(1):50-55.

13. Son, Lee D. Assessing a new IT service mode, cloud computing. 3rd Edition India; 2011.

14. Ondiek CO. The factors influencing the adoption of software as a service (SaaS) by small and medium size enterprises (SMEs): A case study of Nairobi County in Kenya; 2016.

15. Wyld DC. The cloudy future of government IT: Cloud computing and the public sector around the world. International Journal of Web & Semantic Technology; 2010.

16. Lin HF, Lin SM. Determinants of e-business diffusion: A test of the technology diffusion perspective. Technovation. 2008; 28(3):135-145.

17. Siau K, Shen Z. Building consumer trust in mobile commerce, communications of the ACM. 2003;46(4):91-93.

18. Buyya R, Voorsluys W, Broberg J, Buyya R. Introduction to cloud computing. In: Broberg J, Goscinski A. (Eds) Cloud Computing, John Wiley & Sons, Inc. 2011;1-41.

19. Bhat MA, Ahmad B, Shah RM, Bhat RI. Cloud computing: A solution to information support systems (ISS). International Journal of Computer Applications. 2010; 11(5):5-9.

20. Nabeel Khan, Adil Al-Yasiri. Framework for cloud computing adoption: A road map for SMEs to Cloud migration. International Journal on Cloud Computing: Services and Architecture (IJCCSA). 2016;5(6).

21. Premkumar G, Ramamurthy K. The role of inter-organizational and organizational factors on the decision mode for adoption of inter-organizational systems. Decision Sciences. 1994;26(3):303-336.

22. Mahlindayu T, Siti Zaleha AR, Bakhtiar A, Rusli RAR. Cloud computing awareness and adoption among accounting practitioners in Malaysia, International Conference on Accounting Studies, ICAS; 2014.

23. Moore G, Benbasat I. Development of an instrument to measure the perceptions of adopting an information technology innovation. Information Systems; 1999.

24. Sathye M. Adoption of e-banking by consumers: An empirical investigation. International Journal of Bank Marketing. 1999;324-331.

25. Ayoobkhan ALM. Factors contributing to the adoption of Mobile Banking in Sri Lanka: Special reference to Sampath Bank in Ampara District. International Journal of Latest Engineering and Management Research (IJLEMR). 2018;3(8):47-57.

26. Poon S, Swatman PMC. An exploratory study of small business Internet 215 commerce issues. Information and Management. 2008;9-18.

27. Premkumar G, King WR. Organizational characteristics and information systems planning: An empirical study. Information Systems Research. 1994;5(2):75-109.

28. Erisman RM. SaaS adoption factors among SMEs in Indonesian manufacturing industry. Unpublished Master's Thesis, Delft University of Technology; 2013.

29. Wang Jian-Jun, Yang De-Li. Using a hybrid multi-criteria decision aid method for information systems outsourcing. Computers & Operations Research. 2003; 34(12):3691-3700.

30. Eder L, Igbaria M. Determinants of intranet diffusion and infusion. Omega. 2001;29(3): 233-242.

31. Tornatzky L, Fleischer M. The process of technology innovation, Lexington, MA. Lexington: Lexington Books; 1990.

32. Harindranath G, Dyerson R, Barnes D. ICT in small firms: Factors affecting the adoption and use of ICT in Southeast England SMEs, Proceedings of the 2008 European Conference on Information Systems (ECIS). 2008;167.

33. Young R, Jordan E. Top management support: Mantra or necessity, International Journal of Project Management. 2008; 26(7):713-725.

34. Annuka Unhelkar B. Lessons in implementing green business strategies with ICT. Cutter IT Journal. 2008;21(2):32-39.

35. Rogers E. Diffusion of innovations 5th edn. New York: Free Press; 2003.

36. Tiwana A, Bush A. A comparison of transaction cost, agency, and knowledge-based predictors of IT outsourcing decisions: A U.S-Japan cross-cultural field study. Journal of Management Information Systems. 2007;24(1):259-300.

37. Sahin I. Detailed review of Rogers's diffusion of innovations theory and educational technology related studies based on Rogers's theory. The Turkish Online Journal of Educational Technology. 2006;5(2):14-23.

38. Lee J. Discriminant analysis of technology adoption behavior: A case of internet technologies in small businesses. Journal of Computer Information Systems. 2004; 44(4):57-66.

39. Caldeira MRM, Ward JM. Using resource-based theory to interpret the successful adoption and use of information systems and technology in manufacturing small and medium-sized enterprises. European Journal of Information Systems. 2013;12: 127 - 141.

40. Business Directory of Sri Lanka; 2016.

41. Chamber of Commerce Sri Lanka; 2016 - 2017.

42. Available:www.lankayp.com

43. Available:www.slt.lk
Available:www.lankabusinessonline.com

44. Available:www.ips.lk

45. Hair JF, Black B, Anderson RE. Multivariate data analysis. Prentice Hall; 2010.

46. Haleem A, Raisal I. The study of the influence of information technology sophistication on the quality of accounting information system in bank branches at Ampara District, Sri Lanka. Annual International Research Conference. South Eastern University of Sri Lanka; 2017.

47. Haleem A, Kevin LLT. Impact of user competency on accounting information system success: Banking sectors in Sri Lanka. International Journal of Economic and Financial Issues. 2018;8(6):167-175.

48. Raisal I, Arun Kumar T, Silva DAC. Exploring critical effect of knowledge inflows capacity and absorptive capacity on product innovation through innovative culture: A quantitative examination. OPCION; 2018.
[ISN1012-1587]

49. Habeeb Mohamed Nijam, Athambawa Jahfer. IFRS adoption and financial reporting quality: A review of evidences in different jurisdictions. International Letters of Social and Humanistic Sciences; 2016.

50. Fock HKY, Woo KS. The China market: Strategic implications of Guanxi. Business Strategy Review. 2006;9(3):33-43.