Sri Lankan Consumers' Acceptance of M-Internet Services

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Abstract -- *This study mainly aims to determine the factors that drive the intention of consumers in Sri Lanka to use mobile Internet services. A through literature review was performed on the possible factors that may influence the behavioural intention of consumers including performance expectancy, effort expectancy, awareness, hedonic motivation, and social influence, all of which are presented as the study variables in the proposed conceptual framework. Data collection was carried out by posting the online survey questionnaire on Facebook and WhatsApp groups of numerous Internet users in the country. The proposed model and the developed hypotheses were tested by employing the Structural Equation Modelling using the AMOS software by IBM. The findings indicate that all the theorized factors have a significant effect on the behavioural intention of the consumers in using mobile Internet services. The findings provide valuable practical implications in driving the Sri Lankan consumers to adopt and use mobile Internet services.*

Keywords -- *Consumers' Acceptance, M-Internet, UTAUT, Awareness, Sri Lanka*

I. Introduction

This paper is an extension of work originally presented in *2019 3rd International Conference on Computing and Communications Technologies* [1]. Mobile technology is increasingly being utilized in delivering and accessing the various Internet services provided to consumers via mobile devices i.e. Mobile Internet Services of m-Internet Services [2]. The key characteristic of mobile devices is their omnipresence whereby users can enjoy m-Internet Services anytime and anywhere [3] provided that connectivity is accessible. Mobile Internet Services enable the delivery of mobile services which explains its massive global scale popularity. Business operations have been transformed with the advent of mobile technology particularly in the aspect of consumer-supplier interaction. Traditionally, consumers and suppliers interact directly without the involvement of much technology; in contrast, m-Internet services rely heavily on technology with very little requirement for physical meetings [4]. Mobile technologies have enabled businesses to operate more effectively, delivering consistent and apt services that suit their consumers ' expectations [5]. All these are made possible by the technological advances of today and accessible infrastructures required for effective mobile technology implementation [6]. Customer value and trust are perceived to be improved with the use of m-Internet services hence leading to the market share development of businesses [3]. M-Internet services allow for more widespread reach geographically, but with less

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need for human capital and financial resources thus rendering it as an attractive cost-, time- and effort-saving option [7].

The implementation of m-Internet services is deemed as a part of modern life for people who value innovation. It is regarded as a significant implementation due its benefits for consumers and businesses, particularly for a country like Sri Lanka that has just started to rebuild itself following a three-decade civil war. A majority of the nation's population live remotely away from the capital city of Colombo where most of the country's businesses are concentrated; customers in the remote areas cannot be reached individually without incurring high costs.

More than 6 million of the country's population use the Internet, more than 25 million have Internet connections, approximately 4.5 million have registered Facebook accounts, and about 800,000 are on LinkedIn [8]. As of September 2017, approximately 4.5 million of the population have mobile broadband subscriptions and about 28 million are registered cellular mobile phone users [9]. According to [10], there are five mobile phone operators in the country. Mobile Internet entails the usage of mobile devices such as smartphones and tabs to access the Internet via cellular phone service providers; this is increasingly taking over the traditional role of desktop devices using stationary Internet connections. The smart mobile devices which often come with cameras and location detection capability enable mobile Internet access from anywhere at any time. Mobile Internet is deemed as a 3G mobile communication technology and its services are projected to enable users to carry out similar activities using traditional fixed line Internet access. People and organizations including those in the fields of education, healthcare, publishing, entertainment, social networking, communication and even the government are benefitting from this technology which allows ubiquitous communication. One can search for information while on the go (or not) from anywhere as long as there is Internet connection.

However, despite the availability of all the needed resources (e.g. devices, operators, infrastructures) for successful m-Internet services adoption, very few had adopted the technology for actual use. There is a need to examine this unfavourable phenomenon so that vendors can devise ways to attract consumers and so that the costs spent by businesses in introducing the service can be justified. This study therefore sets out to examine the factors driving the behavioural intention of consumers in using m-Internet services in Sri Lanka.

II. Literature Review

Mobile Internet can be enabled with the use of various mobile devices or smartphones. Numerous studies have examined the intention of consumers to adopt m-Internet services including [11]. Some have investigated the use of m-Internet among organizations [12]. The perceived usefulness and user satisfaction of the mobile service offered have been cited as the precursors to the degree of loyalty shown by the user towards the m-service provider [13]. The innovative capabilities of the service provider significantly determine m-Internet adoption. One of the features of such innovative capability entails the level of technical complexity [14]. When the complexity level is reduced, perceived usefulness and perceived ease-of-use improve. In turn, this will improve the user's inclination to adopt m-Internet services particularly in remote areas where branches are difficult to set up [15]. Hence, there is a need to improve the favourable attitude of consumers towards adopting m-Internet.

It has been suggested that several variables influence the likelihood of consumers in adopting m-Internet [11, 15]. The aforementioned studies which are focused on the factors that drive behavioural intention towards mobile Internet acceptance and usage in Saudi Arabia had integrated variables taken from the Unified Theory of Acceptance and Use of Technology (UTAUT) model as well as other variables with the likes of perceived value, perceived playfulness, and attention focus. However, similar studies in the context of Sri Lanka are still lacking thus motivating this current study to fill that gap.

III. Theoretical Framework and Hypotheses Development

Researchers have resorted to several theories in examining the phenomenon of new technology adoption among consumers. In the fields of IS and IT, researchers have attempted to define the behaviour of users and improve it with regards to technology usage [17]. Various theoretical models have been employed towards this end including the UTAUT [17], the Technology Acceptance Model (TAM) [18], and the Theory of Planned Behaviour (TPB) [19]. The aforementioned models are used as the basis for the current study's conceptual framework which consists of the five factors of Performance Expectancy (PE), Effort Expectancy (EE), Awareness, Social Influence (SI) and Hedonic Motivation (HM) which were derived from numerous past studies including UTAUT2 by [20]. All the five factors are suggested to directly affect the Behavioural Intention (BI) of consumers in adopting m-Internet.

Performance Expectancy (PE):

PE entails the extent to which a user perceives that the usage of a given system can help improve his/her job performance [17] in terms of reducing his/her time and effort as a result of the system's greater accessibility, convenience, efficiency, and customization capability [20, 21]. PE reflects the utility of using m-Internet as a result of its ubiquitous nature which enables users to access the Internet anytime and anywhere leading to their improved efficiency and performance [16]. The inclination to use m-Internet is heightened when the users have a positive perception of its value and benefits [23]. The effect of PE on the BI of consumers towards adopting m-Internet has been proven by several studies [11, 15]. Based on the discussion above, the hypothesis below is proposed:

H1: Performance Expectancy positively impacts Behavioural Intention use M-Internet.

Effort Expectancy (EE)

EE entails the extent to which the use of a given technology is associated with ease [20]. It reflects the ease-of-use in using a certain technology [20, 21] specifically the perceived complexity in using m-Internet services such as those caused by the small screens and keypads that hinder efficient information searches [24]. EE determines the user's inclination in using m-Internet as certain skills are needed in doing so [25]. In [26], it was found that EE positively affects the intention of consumers to use Mobile Stock Trading. In [27], the behavioural intention to adopt m-Internet was also found to be positively driven by EE. Based on the discussion above, the hypothesis below is proposed:

H2: Effort Expectancy positively impacts Behavioural Intention use M-Internet.

Awareness:

Sufficient understanding or knowledge about a given system determines whether a user will adopt or reject it [28]. This awareness forms the basis of the consumer's attitude towards the given technology [29]. Therefore, the same factor i.e. individual awareness determines the acceptance or non-acceptance of m-Internet services [12]. In [30], it was found that system awareness significantly determines the decision of users in adopting mobile payment services. Likewise, [31] suggested the same correlation in the context of mobile banking services adoption. Hence, it can be said that users will be more inclined to use m-Internet when they have adequate awareness or knowledge about it. Based on the discussion above, the hypothesis below is proposed:

H3: Awareness positively impacts Behavioural Intention use M-Internet.

Social Influence (SI):

SI entails the extent to which a user values the perception of others that he/she should adopt a given system [17]. This entails the influence of the opinion of others on the user's behavioural intention [13]. The theory states that people tend to conform to the opinions of others [32]. Therefore, a user is likely to use m-Internet when there is recommendation from people in the immediate surroundings. It is the influence of family members, relatives or friends on one's decision about adopting a certain technology [33]. Numerous studies have noted SI as significant factor in driving one's intention towards technology adoption [34]. Based on the discussion above, the hypothesis below is proposed:

H4: Social Influence positively impacts Behavioural Intention use M-Internet.

Hedonic Motivation (HM)

HM entails the sense of enjoyment attained from using a given technology [20]. Such sense of fun and enjoyment derived from using a new technology significantly determines the actual acceptance and usage of the said technology [35]. The theory refers to it as a sense of joy, happiness and exuberance, which collectively has been proven as a driving factor in the choice of the customer to embrace and use a given technology [20]. HM has been noted to positively affect the use of mobile TV applications [36]. Based on the discussion above, the hypothesis below is proposed:

H5: Hedonic Motivation positively impacts Behavioural Intention use M-Internet.
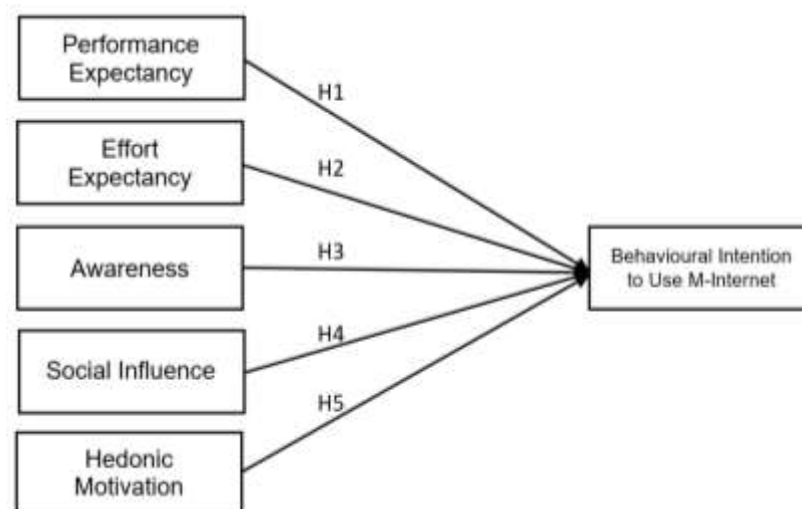

Figure 1: Research Model

Behavioural Intention (BI):

BI entails the behavioural intention of a user towards using a given system [17]. It is the measure of likelihood that one will engage in certain behaviour [37]. In this current study, BI is taken as the dependent variable. Figure 1 presents the research model as conceptualized from the developed framework and proposed hypotheses.

IV. Methodology

This study employs a questionnaire survey for collecting data. The items for measuring the model's constructs were derived from past research. Quantitative studies enable researchers to test the variables' relationships towards supporting or rejecting the proposed hypotheses [10]. The study population involves all Sri Lankan mobile device users. Since a proper sampling frame is unavailable, this study employs a non-probabilistic sampling technique as used in past works such as [38] and [39]. Since a sample size greater than 30 and lower than 500 are adequate for a majority of studies [40], this current study hence employs approximately 400 mobile device users in Sri Lanka. Google Forms are used for developing the questionnaire and the link is posted on Facebook and several WhatsApp groups.

V. Data Analysis

Data analysis is carried out using IBM SPSS 25 and AMOS 22. The respondents' profiles are obtained using descriptive statistics. The measurement model is tested using the Confirmatory Factor Analysis (CFA) whilst the proposed research model is tested using the Structural Equation Modelling (SEM).

Preliminary Examination of the Data

A total of 379 respondents are surveyed for data collection. Out of the total responses returned, eight responses were rejected for being incomplete. Hence, a total of 371 responses were deemed valid for data analysis. Missing values and abnormalities got screened and treated appropriately. The clean data was then imported for initial analysis using SPSS. AMOS Graphics was then used to develop the model for performing the Structural Equation Modelling.

The profile of the respondents was obtained via descriptive statistics. About 74% (274) of the total respondents were male whilst another 24% (89) were female. A majority of 57% of the total respondents were in the age bracket of 40-49 years old, 23% (86) in the age bracket of 50-59 years old, 18% (67) in the age bracket of 20-39 years old, 1% (3) were less than 20 years old, and another 1% (2) were above 59 years old. A majority of 95% of the respondents used smartphones as their main mobile device whilst 4% used netbooks and PDAs, and only 1% (2) used laptops.

Analysis of the Structural Model

In order to validate the conceptual model and to test the hypotheses, the two-stage structural modelling was used. The firstly measurement model was evaluated and then structural modelling was carried out [41]. For the measurement model, a test for model fitness was conducted to evaluate the reliability as well as validity of the

constructs. Confirmatory Factor Analysis (CFA) and test of structural model are the two phases in Structural Equation Modelling [42]. The association between the factors and their measurements was calculated using CFA whilst the theorized relationships between the variables were determined via the structural model test.

Confirmatory factor analysis

The assessment of the goodness-of-fit (GoF) indices and the test of construct validity are two CFA assessments to determine the model's validity [42]. The GoF is assessed by taking into account many indices [42]. Initially, χ^2 is used to assess the model's fitness, but it turns out to be not the best indicator because of its sensitivity towards the sample size [43]. Therefore, (χ^2/df), which is ratio of χ^2 to degree of freedom (df), is used. The result showed the value of CMIN/DF (χ^2/df) of 2.160 which is ≤ 3 i.e. excellent [42]. The results for the other indices of fitness are: GFI = 0.908; this is above the threshold value of 0.900 , AGFI = 0.880; this also above the cut off value of 0.800, NFI = 0.923; which means it is greater than 0.900 cut off, CFI = 0.957; ensuring its value was above the cut off of 0.950 and RMSEA = 0.056 which is below the ceiling value of ≤ 0.06 [41, 42]. Since all the fitness indices are within the proposed threshold value, the fitness of the model is hence confirmed.

Construct validity assessment

The CFA results must be validated via the construct validity assessment [42] which determines whether the variable's fundamental concept is properly denoted by the scales [44]. In this study, the adequacy of the measurement model's psychometric properties are evaluated and assessed using the convergent and discriminant validity tests. Convergent validity is achieved when the factor loading value is higher than 0.50 [42]. Composite reliability (CR) is achieved with a minimum value of 0.70 whilst the Average Variance Explained (AVE) is confirmed when its value is larger than 0.50 [43] and when the CR value is greater than the AVE value [42]. Table 1 shows that the model has adequate convergent validity. The maximum variance amount shared between the latent variables is referred to as the Maximum Shared Variance (MSV). The validity of a construct is determined when its AVE value is larger than the MSV value shared with another construct. For the current study's model, all the constructs' MSV value is lower than the AVE value; therefore, the model's Discriminant Validity is confirmed [42].

Table 1: Validity Assessment Measures

Variable	Measures	Factor Loadings	CR	AVE	MSV
PE	PEx1	0.887	0.925	0.711	0.203
	PEx5	0.839			
	PEx3	0.799			
	PEx2	0.856			
	PEx4	0.833			
EE	EEx3	0.856	0.926	0.713	0.274
	EEx5	0.842			
	EEx4	0.876			

	EEx2	0.864				
	EEx1	0.781				
AWAR	AWAR2	0.938		0.945	0.708	0.136
	AWAR1	0.934				
	AWAR3	0.899				
SI	SInf1	0.965		0.889	0.803	0.152
	SInf2	0.821				
HM	HMot2	0.789		0.907	0.662	0.287
	HMot5	0.816				
	HMot4	0.788				
	HMot1	0.861				
	HMot3	0.813				
BI to Use	BInt1	0.895		0.904	0.826	0.169
	BInt2	0.923				

Structural Model and Hypotheses Testing

All the hypotheses are tested using the Path Estimate, t-Values and p-Values. The relationships between the variables are considered as significant when their t-Values are higher than 1.96 and their p-Values are lower than 0.05.

Table 2: Results of the Test of Hypotheses

			Estimate	Standard Error	t-Value	p-Value	Finding
BI	<---	PEx	0.137	0.041	3.341	0.000	Accepted
BI	<---	EEx	0.247	0.033	7.484	0.000	Accepted
BI	<---	AWAR	0.229	0.038	6.026	0.000	Accepted
BI	<---	SInf	0.284	0.037	7.676	0.000	Accepted
BI	<---	HMot	0.132	0.041	3.219	0.01	Accepted

The path estimate results for the five proposed hypotheses are presented in Table 2. All the five hypotheses show statistical significance considering that the t-value for each is greater than 1.96 and the *p-value* for each is lower than 0.05. H1 is accepted considering the significant correlation between Performance Expectancy and Behavioural Intention towards using m-Internet (β = 0.137, t value = 3.341, p < 0.001). H2 is accepted considering the significant correlation between Effort Expectancy and Behavioural Intention towards using m-Internet (β = 0.247, t value = 7.484, p < 0.001). H3 is accepted considering the significant correlation between Awareness and Behavioural Intention towards using m-Internet (β = 0.229, t value = 6.026, p <0.001). H4 is accepted considering the significant correlation between Social Influence and Behavioural Intention towards using m-Internet (β = 0.284, t value = 7.676, p <0.001). And lastly, H5 is accepted considering the significant

correlation between Hedonic Motivation and Behavioural Intention towards using m-Internet ($\beta = 0.132$, t value = 3.219, p <0.05).

VI. Discussion and Conclusion

This study is motivated by the need to attain comprehensive insight about the key factors that drive the behavioural intention of Sri Lankan consumers towards using m-Internet services. The key factors identified based on the substantial responses provided by the consumers in Sri Lanka are performance expectancy, effort expectancy, awareness, social influence and hedonic motivation. Apart from all the above, the statistical results also confirmed the proposed model's predictive power in satisfactorily explaining the variance in Behavioural Intention towards using m-Internet. BI showed a squared multiple correlations value of 0.53, indicating that it explains 53% of the variance i.e. more than the recommended cut-off value.

Based on the findings, the number one key factor in influencing the Behavioural Intention of consumers towards using m-Internet is Social Influence (SI). The recommendations by family and friends to use m-Internet services are highly likely to affect the BI of consumers to do so. This result is supported by [16]. The second most significant key factor is effort expectancy (EE) whereby the consumers are more likely to use m-Internet services when they perceive it to be effortless. This result is supported by many other studies such as [12], [21] and [22]. The third most significant key factor is awareness i.e. when consumers have an in-depth understanding about m-Internet they are more likely to use it. This result was also proven by [12]. The fourth most significant key factor is performance expectancy (PE) i.e. when the consumers perceive that the usage of m-Internet services would improve their efficacy, productivity and utility. With the use of m-Internet, the consumers can enjoy ubiquitous and superior quality services. The significant effect of PE on the intention to use new technologies has also been proven in past studies such as [21] and [23]. Finally, HM is also statistically significant in influencing the intention of consumers to use m-Internet. Since more than 30% of the Sri Lankan population have proper Internet access [8], the adoption of m-Internet would prove to be valuable for them as a whole. This result is supported in similar past studies including [45].

Overall, the findings of this study indicate that consumers are likely to use new mobile-based technologies such as m-Internet if it can help improve their performance, is relatively effortless, and is user-friendly. The possible benefits arising from the utilisation of this service must also be properly conveyed.

VII. Contribution of This Study

This study provides in-depth insights about the main factors that influence the behavioural intention of consumers towards using m-Internet services. The literature review on the subject revealed that no prior works had investigated the factors that influence m-Internet adoption in the context of Sri Lanka. Therefore, the results of this study have enriched the current body of literature on the factors affecting the usage of m-Internet services particularly from the perspective of Sri Lankan consumers. This study has provided empirical evidence that performance expectancy, effort expectancy, awareness, hedonic motivation and social influence are statistically significant key factors that influence the behavioural intention of Sri Lankan consumers towards adopting and using m-Internet services.

VIII. Limitations of The Study

Despite being successful in meeting its objectives, this study is also mired with several limitations. The generalizability of the findings to Sri Lanka as a whole is questionable due to the sampling method used whereby the attainment of the respondents as well as the publishing and collection of the survey questionnaire had relied largely on Facebook, Facebook Messenger and WhatsApp. Future studies could instead use the triangulation method for data collection so that the respondents would cover wider backgrounds from larger geographic areas in the country. The second limitation is related to the use of the quantitative approach in identifying the key factors. The incorporation of a qualitative approach could have resulted in a more in-depth insight about the consumers' intent to adopt m-Internet. Finally, a large portion of the respondents were in the age bracket of between 40–60 years of age; the inclusion of respondents from other age brackets could have provided more insightful findings. Future works could take the limitations above into consideration to arrive at more comprehensive results with regards to m-Internet adoption.

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