Factors Effecting on Internet Banking Adoption: A Case Study

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ABSTARCT---- *Customer satisfaction is the key to market Internet Banking (IB) services and the banks in Sri Lanka by targeting the unique needs of customers to succeed in providing IB services. The purpose of this study is to determine the factors that influence the adoption of IB services for the benefits of the management. A theoretical model was first developed that conceptualizes the links between four types of different sections: demographic, convenience, risk and security and the adoption of IB. Two stage purposive random sampling method was adopted to acquire information through a structered questionaire. The attributes related to demographic gender, age, educational level, and monthly income were significantly influential vaiaibles on IB. More than 75% strongly agreed that convenience, risk and security directly influence on adoption of IB confirming our theorotical model is correct. The attributes related to convenience, "bank administration" and "easy banking" were found to be significant on the adoption of IB. The attributes related to risk, "reliability" and "confidential" were found to be significant on the adoption of IB. "Trust" and "instructions" were found as influential factors among the attributes in security. An understanding of the identified factors are more beneficial than attributes alone to improve the efficient of IB in the Commercial Bank of Ceylon PLC. Results are useful to the practitioners who plan and promote new forms of banking in the current competitive market. The statistical methodlogy applied in this study can be used to any other banks as well.*

Keywords--- Adoption, Convenience, Factor *Analysis,* Internet Banking, Perceived *R*isk*,* Security *P*erception*.*
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1. INTRODUCTION

Internet Banking (IB) is extremely beneficial to customers because of the savings in costs, time and space, quick response to complaints, and delivery of improved services. However, the biggest challenge faced by the IB is the customers' satisfaction on the security it provided (Booz & Hamilton, 1997; Black et. al., 2002). Deshpande (2002) has identified that operational risk, security risk, reputational risk, cross border risk and legal risk as major risks that the regulators and supervisors should pay their attention. Furthermore, customers still have a difficult time using IB. In many ways, IB is not unlike traditional payment, enquiry and information processing system. The only perceptible difference is that it utilizes a different delivery channel. So, any decision to adopt IB is normally influenced by a number of factors (Balanchandhe, et al., 2000). They further claim that the emergence of new forms of technology has created highly competitive market conditions for bank providers and the changed market conditions demand for banks to better understand the consumers' needs.

Internet Banking in Sri Lanka
Sri Lanka has realized rapid economic growth due to its diversification policies from agriculture to information technology and financial services. Today the financial services, the particularly banking sector plays a critical role in the economy of the country both in the provision of employment and also in foreign currency inflow to the economy (Central Bank, 2012). The country has a relatively well-developed domestic financial system and a growing offshore sector. There are 24 domestic commercial banks and 12 offshore banks in the country (Central Bank, 2012). The banking sector in Sri Lanka is monitored by the Bank Supervision Department of the Central Bank of Sri Lanka.

The Sri Lankan banking industry was changed during the late 1980s with the introduction of automated teller machines (ATMs) by private banks and such facilities were limited to higher end customers. Today, the entire banking sector in Sri Lanka offers the automated banking systems with ATMs for customers, for faster, and after-hour services. As a wave of new technology, IB is a substantial opportunity to expand their customers reach beyond traditional boundaries across national borders. Increased competitive pressures and the speed of technological changes are leading to rapid expansion of IB. Majority of the customers in the country are aware about IB facilities, but most of them had not been used such

facilities by themselves. In Sri Lanka, banks as the IB service providers and customers as the beneficiaries are still not making the real use of IB adequately in spite of a relatively good quality infrastructure for communication and high literacy rate among people.

Many studies on various aspects on the use of IB have been conducted by many authors (Wadie Nasri, 2011; Padaiachi, Rojid & Seetanah, 2007; Gan, et. al., 2006; Akinchi et al.,2004; Karjaluoto, et. al.,2002; Jayawardhena & Foley, 2000). A systemtic review of IB adoption carried out by Payam et. al (2014) concluded that the interest on IB adoption has grown significantly during recant past. Based on literature review, it can be concluded that the consumers' preference to adopt IB is dependent upon the availability of internet service and a number of several other social and psychological factors. However, comprehensive study on the relative importance of factors influencing the adoption of IB and other customer preferences has not been reported in Sri Lanka has not been reported . On view of the above, the objectives of this study was to identify the influential factors on the usage of IB in Commercial Bank of Ceylon PLC .

2. METHODS and MATERIALS

2.1   Data Capturing
The data used for the study obtained from two sources. Annual reports (Commercial Bank, 2012; Central Bank, 2012) play a vital role for the secondary data. Primary data were acquired by distributing a questionnaire for the eandomly selected customer.

2.2   Sampling Method
In order to acquire the necessary information purposively simple random sampling. method was adopted.   Based on resources and time frame, and considering margin of error is 5% at 95% significance level, minimum sample size required was limited to 200. The three districts (Colombo, Batticaloa and Amparai) were purposively selected due to easiness of handling through internal courier services and the sample size was distributed as 100, 50 and 50 to the three districts respectively. The sampling unit was a bank customer. Four branches from Colombo city (Wellawatte, Colpitty, Bambalapitty and Pettah) and two branches close to Colombo city (Maharagama and Moratuwa) were purposively selected. The only two branches in Ampara (Ampara and Kalmunai) and only one branch in Batticaloa were selected.

2.3   Structured questionnaire
Primary data were acquired through a structured questionnaire. The questionnaire was pre-tested initially with ten Executive Officers from different branches to ensure consistency and relevance to the Commercial Bank. Finally, questionnaire was designed and distributed to randomly selected retail users of banking services of different age group and of different educational level attained across selected districts. In order to check the accuracy of data send by customers randomly selected questionnaire from each branch was cross checked via telephone by Senior Manager/Manager of that branch. The questionnaire prepared for this exercise was divided into three sections. The first section concentrates about socio-economic factors of the respondents. The second section consists of issues related to the awareness and in section 3, affecting factors related on the case of adoption of IB in Commercial Bank. The respondents were provided with a list of factors and were required to rate each one, using a 5 point Likert scale (5 = strongly agree - SA, 4 = agree -A, 3 = neutral -N, 2 = disagree -D and 1 = strongly disagree- SD). The survey was carried out during March to May, 2013.

3. RESULTS and DISCUSSION

3.1   Conceptual Model
The Technology Acceptance Model (TAM) introduced by Davis (1985) is one of the most cited theoretical frameworks to predict the acceptance and use of new information technology within organizations derived from the theory of Reasoned Action (TRA). The TAM hypothesizes that system use, is directly determined behavioural intention to use, which is in turn influenced by users' attitudes toward using the system and the perceived usefulness of the system (Ajzen, 1991). The conceptual model used in this study is illustrated in Figure 1.

3.2   Influence of Basic Demographic Attributes on the Use of IB
The data set consists of 70.9% IB users and 29.1% non-user. The attributes used for demographic in this study are gender, age, education and monthly income. The influence of the each attribute was tetsed using 2-way chi-square statistics (Table 1).
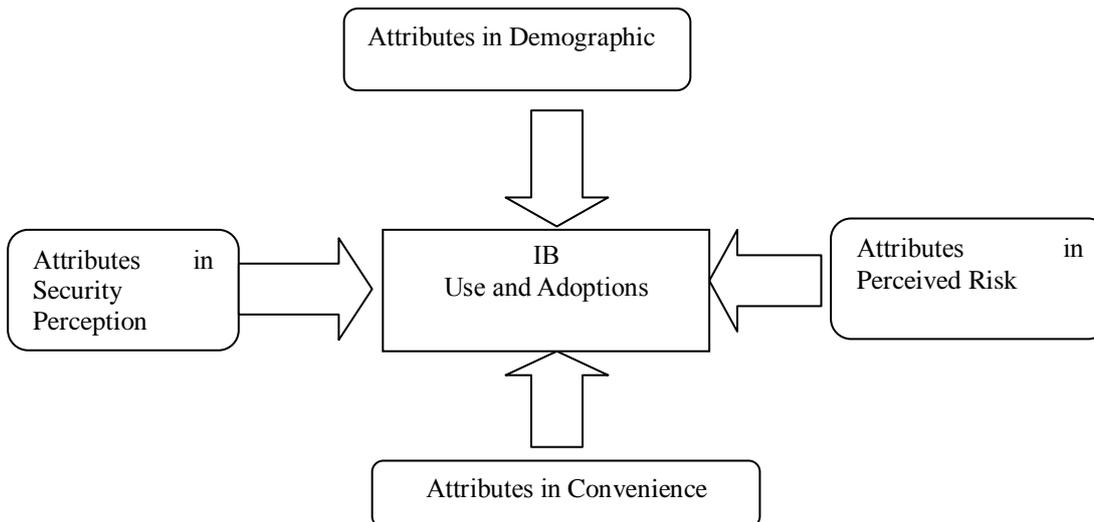
Figure 1- Conceptual research model

Table 1 - Association between use of IB and demogarphic attributes

Attribute in demographic	Levls of the attribute	Use of IB		Chi-square statistic (p values)
		Yes	No	
Gender	Male	83.0%	17.0%	
	Female	22.7%	77.3%	$x_1^2 = 28.1, p = 0.00$
Age (yrs)	20-25	100.0%	0.0%	
	26-35	100.0%	.0%	
	36-45	23.5%	76.5%	
	> 45	20.8%	79.2%	$x_3^2 = 89.1, p = 0.00$
Education	OL/AL	100.0%	0.0%	
	Gradutates	83.3%	16.7%	
	PG degrees	34.3%	65.7%	$x_2^2 = 38.9, p = 0.00$
Income	10k-25k	100.0%	0.0%	
	26k-35k	100.0%	0.0%	
	36k-45k	66.1%	33.9%	
	Above 45k	27.8%	72.2%	$x_3^2 = 39.6, p = 0.00$

OL/AL – General Certificate of Education Ordinary Level/ Advaced Level

As chi-square statistic is significant for all four attributes, it can be concluded that all four attributes significantly influence on adaptation of IB. The percentage of males used IB (83%) is significantly higher than that of female (27%). The majority of IB users are youths and young adults (< 35 years). The percentage users of IB significantly decrease as the level education increases. Simillaraly as income increases the precentage users of IB decreases. It is interesting to note that when almost 100% lower income group use IB, only 27.8% higher income group uses IB. It should be noted that interaction between attributes was not investigated in this study as our objective was to identify the influential demographic attributes on the use of IB.

It emerges from the research findings that youngsters and middle aged people are more inclined towards IB. This is in line with the findings of Fox and Beier (2006) and Hill (2008). Men are more likely to adopt IB as compared to women. This is also in line with the findings of Fox and Beier (2006). According to Sohail and Shanmugham (2004), the level of educational qualification does influence the use of IB and more qualified people have greater chances to use IB. This contradicts our findings, though it was also found that the level education is significantly influenc on the use of IB.

3.3   Influence of Convenience Attributes on the Adoption of IB
The eight attributes selected to identify the influential variables with respect to convenience on adoption of IB are shown in Table 2.

Table 2 - Convenience Attributes and Corresponding Variables

Attributes	Variable Name
User friendly website	User Friendly (UF)
E-Bank's transaction is easy to perform	Easy Transaction (ET)
Willingness to adopt technology	Adoption of Technology (AT)
Save time as compared to conventional banking	Time Saving (TS)
Range of services offered by bank	Services Offered (SO)
Cost of setup and annual charges	Setup/Annual (SA)
Accesssability at anytime and anywhere	Anytime/Anywhere (AA)
Convenient way of doing banking transaction	Convenient Banking (CB)

It was found that both median and mode are equal to 5 for all variables and the mean of each varaible are close to five (> 4.5) with a minimum of 4.53 for SO and maximum of 4.81 for TS indicating that the the respondents agreed or strongly agreed that those attributes influenc on the adoption of IB.   In order to identify any common factors to the above eight attributes, factor analysis (FA) was carried out. The FA is a popular statistical technique that permits the reduction of a large number of correlated variables to a smaller number of unobaserded variables called factors to explain the maximum amount of common variance in a correlation matrix. The results in Table 3 confirmed that data set is valid for carry out the FA.

Table 3 - Results of Bartlett's Test and KMO Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.884
Bartlett's Test of Sphericity	Approx. Chi-Square	885.120
	Df	28
	Sig.	0.000
Cronbach's alpha coefficients		0.830

The significance of the Bartlett Test (p=0.000) showed the correlation matrix is significantly different from identity matrix. Cronbach's alpha coefficients of 0.830 (Green et. al., 1977) confirmed that that there is good internal consistency in data for FA. As the KMO statistic is greater than 0.6 (0.884) also confirmed that data set is suitable for FA. The number of factors to be ratained was decided by the Kaiser's rule (James, et al., 2003) of which eigenvalues exceeding unity. This was also confirmed by scree plot. It was found that the two factors accounted for 87% the varaibility of the 8-D original system.   The factors were extracted using principal complonent factoring method in SPSS. As factor loadings of the unroated factors are not effective to decide common factors, factors were rotated using varimax rotation (Green, et. al., 1977). The results in 2-factor model with varimax rotation are shown in Table 4.

Results in Table 4 clearly indentify two factors based on eight variables used for convenience.   In each factor is constituted of all those variables that have factor loadings greater than or equal to 0.8 (Table 4). Thus variables AT, SO, SA and CB constitute the first factor, conceptualized as "Bank Administrative" and the variables UF, ET, TS and AA constitute the second factor conceptualized as "Easy Banking". The communalities of each variable is close to one (Table 4) also confirm the validity of 2-factor model. Furthermore, using equimax and quratimax rotations also found that the variables identified for two factors were invariant by the type of rotation. However, as varimax is the most popular rotation in FA, factor score coefficinet for the above 2-factor model were obtained using varimax rotation. Table 5 indicates the corresponding factor score coefficients for the selected two factors.   Thus two factors can be formed as:
Bank Administrative = (0.363*AT) + (0.378*SO) + (0.310*SA) + (0.281*CB) and Easy Banking = (0.282*UF) + (0.351*ET) + (0.367*TS) + (0.361*AA).

Table 4 -   Factor scores of the 2-factor model extracted using principal component factoring with varimax rotation

Variables related to convenience	Component		Communalities
	1	2	
UF	.426	.805	0.829
ET	.377	.895	0.943
AT	.918	.331	0.953
TS	.277	.867	0.828
SO	.906	.274	0.896
SA	.879	.418	0.947
AA	.330	.881	0.885
CB	.850	.453	0.929

Table 5 - Factors, Variables and Factor Score coefficients for attributes in conveniene

Factor Name	Variables	Factor Score Coefficient
Bank Administrative	Adoption of Technology (AT)	0.363
	Services Offered (SO)	0.378
	Setup/Annual (SA)	0.310
	Convenient Banking (CB)	0.281
Easy Banking	User Friendly (UF)	0.282
	Easy Transaction (ET)	0.351
	Time Saving (TS)	0.367
	Anytime/Anywhere (AA)	0.361

3.4   Influence of Security Factors on the Adoption of IB
The eight attributes identified for security (Table 6) were also analyzed using FA to identify the influential factors on IB.

Table 6 – Security Attributes and Corresponding Variables

Attributes	Variable Name
The Authorized username and password are important	Authorized User (AU)
Clear and understandable instruction	Easy Instruction (EI)
Security of Internet Transaction	Secured Transaction (ST)
Bank's policy to compensate for losses	Bank's Policy (BP)
Reliability of your bank (Trust)	Bank's Reliability (BR)
Ethical and professional conduct	Ethical Conduct (EC)
Internet Banking website provides problem solution menu	Problem Solution Menu (PSM)
Bank's reliability in correcting erroneous transaction	Erroneous Transaction (ET)

As expalined in Section 3.3, the results in Table 7 confirmed the statistical validity of data to carry out FA to extract common factors for security. The factors were extracted using principal component factoring method.

Table 7 -   Results of Bartlett's Test and KMO Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.840
Bartlett's Test of Sphericity	Approx. Chi-Square	493.246
	Df	28
	Sig.	0.000
Cronbach's alpha coefficients		0.879

The eigenvalue analysis of the correlation matrix of the eight variables indicated that 8-D systen can be reduced into 2-D space as the eigen values were greater than two only for the first two components. The 2 factors were able to acquire 78.5% of variance of the initial 8-D system. The factor loadings of the 2-factor model obtained using varimax rotation are shown in Table 8.

Table 8: Factor loadings (scores) of two factor model extracted using principal component analysis factoring with Varimax rotation

Variables Related Security	Loadings of the component	
	1	2
AU	.887	.166
EI	.506	.736
ST	.848	.287
BP	.280	.852
BR	.786	.297
EC	.355	.813
PSM	.133	.820
ET	.846	.406

Well distributed factor loadings can be seen after rotation (Table 8). These loadings correspond to the correlation between each variable with the corresponding factor. Taking 0.7 as a critical value, the variables AU, ST, BR and ET can form

the first factor conceptualized as "Trusts" and the variables EI, BP, EC and PSM can form the second factor conceptualized as "Instructions". It was also noted that the communalities of each variable is close to one which concluded that the 2-factor model well represents covariance of the initial system. The corresponding factor score coefficients are shown in Table 9.

Table 9: Factors, Variables and Factor Score coefficients for the attributes in security

Factor Name	Variables	Factor score Coefficient
Trust (F1)	Authorized User (AU)	0.306
	Secured Transaction (ST)	0.321
	Bank's Reliability (BR)	0.267
	Erroneous Transaction (ET)	0.264
Instruction (F2)	Easy Instruction (EI)	0.114
	Bank's Policy (BP)	0.431
	Ethical Conduct (EC)	0.372
	Problem Solution Menu (PSM)	0.460

Thus the two factors can be formed as, Trust = (0.306*AU) + (0.321*ST) + (0.267*BR) + (0.264*ET) and Instruction = (0.114*EI) + (0.431* BP) + (0.372*EC) + (0.460*PSM).

3.5 Influence of Risk Factors on the Adoption of IB

Table 10 - Attributes for risk and Corresponding Variables

Attribute for Risk	Variable Name
Confidence in the security of the existing online transaction network	Security of Existing Transaction (SET)
The risk of credit/debit card for online and payments are low	Credit/Debit Card Fraud (CCF)
Feel free to submit my personal details online	Feel Free (FF)
Server breakdown creates hurdles while operating Internet Banking	Server Breakdown (SB)
Legal Regulations for online transactions and payment can effectively protect my details privacy	Legal Regulation (LR)

Same analyses were carried out for data related to the above variables as expalined in Section 3.3 and 3.4. The final factor score coefficient for 2-factor model is shown in Table 11. The variables FF, SB and LR constitute the first factor conceptualized as "Confidential" and the variables SET and CCF constitutes the second factor conceptualized as "Reliability". Based on the factor score coefficient the two factors are, Reliability = (0.607*SET) + (0.554*CCF) and Confidential = (0.304*FF) + (0.431*SB) + (0453*LR).

The result accepting the findings of Black et al. (2002), Gerrard and Cunningham, (2003) and Liao and Cheung, (2002) where convenience was affecting the utilization of IB. Eastin (2002) found that perceived convenience was the strongest predictor of online banking usage. This study also providing evidence that perceived security is another important factor influencing customers' adoption of IB. Several researchers indicate that perceived security plays an important role when bank customers decide to adopt IB services (Liao and Wong, 2007; Altintas and Gürsakal, 2007). Liao and Cheung (2002) showed that the more secure the customer perceive IB to be, the more likely it is that customer will use IB. Our results also showed that perceived risk is one of the major influencing factors around the establishment and use of Internet Banking before perceived security.

4. CONCLUSION and RECOMMENDATIONS

4.1 Conclusions

Of the demographic variables gender, age, educational level and monthly income were identified as significant influential variables. An important finding of this study is that, among 'early adopters', convenience was a more important indicator of intentions to adopt IB. Further it was found that 'perceived security', 'perceived risk' and 'perceived convenience' are three main factors that significantly effects on behavioral intention to use IB. For each of the above three main factors two related sub factors were identified within the variables chosen for each main factor. The two significant sub-factors identified within perceived security are thrust and instructions. The two significant factors related to perceived risk are reliability and confidential. The two significant factors related to perceived convenience are easy banking and bank administrative. The computation of each sub-factors are given in the respective sections.

An understanding of the factors identified in this study allows bank management to direct efforts and resources in the most effective and efficient way to increase bank business in the long run and encourage their bank customers' to adopt IB. Bank management can make use of such information to develop appropriate strategies to attract new customers to use IB services. In general, if the bank management has greater knowledge about the factors affecting their customers' adoption of IB, then they have greater ability to develop appropriate strategies and hence increase the IB adoption rate.

4.2   Recommendations for Managerial Implication

(i)   As youngsters and middle aged people are more inclined to use IB, they should be specifically targeted by bank to propagate IB. Since, women are fast catching up with men on the use of IB, so that bank should adopt strategies that are appealing to both men and women.

(ii)   As security was found as a main significant factor, it might be important for bank to develop a marketing strategy on IB, however, bank need to visibly demonstrate concern for security, reliability, with concrete solutions to improve trustworthy secure IB systems, and specifically protect personal information or security for payment transaction.

(iii)   Perceived risk also appears to be an important inhibitor to the adoption of IB. This underscores the fact that concerns about fraud and identity thefts are foremost in the minds of IB users. Thus, providing encryption and strong authentication to prevent fraud and identity theft should be a priority in bank management.

(iv)   The sample size of this study has to be limited due to various reasons and consequently it was limited to customers in three districts in Commercial Bank's of Ceylon PLC. Thus it is suggested to repeat this study for other districts too.

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