Influence of Perceived Ease of Use and Perceived Usefulness of Service Quality in Internet Banking: A Structural Equation Modelling Approach

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Abstract

The advent of Information Technology has led to the emergence of multiple delivery channels like ATMs, telebanking, internet banking and mobile banking. Internet banking (IB) is a product of e-commerce in the field of banking and financial services. Statistics reveal that IB is one of the fastest rising e-banking services globally and in India too it is gathering momentum. Therefore, it is essential that service providers must understand how customers evaluate IB service quality for improving service delivery and what are the factors influencing service quality. The specific objective of the present study was to investigate the influence of Technology Acceptance Model (TAM) constructs on service quality in internet banking. The study revealed that Perceived Ease of Use (PE) has significant positive direct effect on service quality and Perceived Usefulness (PU) has significant positive indirect effect on service quality in internet banking.

Keywords: Internet Banking, Perceived Ease of Use, Perceived Usefulness, Service Quality, Technology Acceptance Model

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1. Introduction

The transition from the 'brick and mortar' structure to 'click and order' model started with the emergence of Information Technology and its use in the financial sector. The use of technology in banking has resulted in availability of multiple delivery channels like ATMs, tele-banking, internet banking, and mobile banking. Technology adoption in banks has shifted banking to more of a capital intensive, fixed cost industry from a labour intensive, variable cost industry. With the rapid penetration of internet in India, banks are now focusing to deliver banking service, via internet, what is often referred to as internet banking. It is not an exaggeration to mention that traditional brick and mortar bank building and face to face interaction between bank's staff and their customers will soon become relics of the past, replaced by electronic communication. Internet has facilitated banks to share the databases and maintain a centralised database at a low cost. With the help of internet it becomes easy for banks to create their own web pages and customers can access these web pages through the web browsers by sitting at home.

Internet banking (IB) is a product of e-commerce in the field of banking and financial services. In what can be described as Business-To-Customer (B2C) domain for banking industry, internet banking offers different online services like balance enquiry, requests for cheque books, recording stop-payment instructions, balance transfer instructions, account opening and other forms of traditional banking services. Mostly, these are traditional services offered through internet as a new delivery channel. After the wedding of Indian banks with information technology, a large percentage of the transactions are not taking in the physical premises of the banks. The total value of e-commerce transactions in India was about ₹450 crores in the year 1999-2000. But the total value of e-commerce transactions stood at whopping ₹47,000 crores in 2011. Analysts predict that this upward swing will continue over the next years too (Kaur & Joshi, 2012). Similarly financial services over the net increased from ₹1,200 crores in 2008 to ₹2,680 crores in 2011, registering a growth rate of 123 per cent in 3 years (Internet and Mobile Association of India, 2011, March 15) which is a clear manifestation of the growing interest of Indian customers to conduct transaction over internet. The rising volumes of e-banking transactions in India may be viewed as an indication that banking customers, particularly the young, have almost tasted the benefits of e-banking services. Statistics revealed that IB is one of the fastest rising e-banking services globally and in India too it is gathering momentum.

2. Survey of Literature

The literature on innovation adoption shows that there are several theories that explain the factors influencing the adoption of new technologies. Important among them are; Theory of Reasoned Action (TRA), Innovation Diffusion Theory (IDT), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB) and Decomposed Theory of Planned Behaviour (DTPB). The most widely used among researchers is TAM. Davis (1989) developed Technology Acceptance Model (TAM), according to which 'users' adoption of computer system depends on their behavioural intention to use, which in turn depends on attitude, consisting of two beliefs, namely Perceived Ease of Use (PE) and Perceived Usefulness (PU). TAM is an adaptation of TRA in the Information System (IS) field. TAM theorizes that a technology that is easy to use, and if found to be useful will have a positive influence on the intended user's attitude which in turn increases intention towards using the technology that generates the adoption behaviour. Perceived Usefulness is defined as the degree to which 'a person believes that using the system will enhance his or her performance'. Perceived Ease of Use, on the other hand, is defined as 'the degree to which a person believes that using the system will be free of mental effort'. TAM has been the instrument in many empirical studies and it has been found that its ability to explain intention and attitude towards using IT is better than TRA (Theory of Reasoned Action) and TPB (Theory of Planned Behaviour) (Mathieson, 1991). TAM is one of the most utilized models for studying IS (Information System) acceptance (Al-Gahtani, 2001). TAM is a powerful, highly reliable, valid and robust predictive model that may be used in a variety of contexts (King & He, 2006). Suh and Han (2002) used TAM model and found that PE and PU were significant determinants of attitude which in turn had significant effect on intention and finally intention had significant effect on actual usage of IB in Korea. Bomil and Ingoo (2002) found that PE has significant effect on use of IB. Significant effects of PE and PU on behavioural intention to use IB were observed by Wang et al., (2003) and Aldas-Manzasno et al., (2009). Online Banking (OB) acceptance in Finland was mainly influenced by PU (Pikkarainen et al., 2004) and PU was found to be the primary reason that Estonian bank customers use IB (Kent et al., 2005). It was also found that PU has significant impact on continued usage of IB in UAE (Awamleh and Fernades, 2006) and PU and PE respectively emerged as the first and second determinants of customer intention to use IB in Hong Kong (Edwin et al., 2006). Acceptance of IB in India was found to have been significantly influenced by PE and PU (Sudeep, 2008).

3. Conceptualizing Service Quality in Internet Banking

The concept of service quality has a journey of a number of decades and has aroused attention from the part of researchers owing to lack of consensus in both defining and measuring it. According to Bitner and Hubert (1994) "service quality is consumers' overall impression of the relative inferiority/superiority of the organization and its services". Traditional service quality refers to the quality of all non-internet based customer interactions and experiences with companies (Parasuraman et al. 1988). The advent of internet paved the way for the emergence of the concept of e-service. E-services have two main characteristics: the service is accessible with electronic networks and the service is consumed by a person via the internet (Batagan et al., 2009). Internet Banking satisfies the above two characteristics and therefore service quality in IB denotes e-service quality. Santos (2003) defined e-service quality as "the consumers' overall evaluation and judgment of excellence and quality of e-service offerings in the virtual market place". Two schools of thought concerning the measurement of quality in relation to services are found in literature. Parasuraman et al., (1988) developed SERVQUAL scale and measure service quality as the difference or disconfirmation between the customers' perception (P) and expectations (E) along 22 variables divided into five dimensions. The problem of measuring expectation was felt by many researchers in the sense that expectations change from time to time, and they were also confronted with the problem of when to measure it, either before or after receiving the service. Babakus and Booler (1992) and Cronin and Taylor (1992) found that perceptions are a superior predictor of service quality than disconfirmation and subsequently Cronin and Taylor (1994) developed SERVPERF (SERVice PERFormance) model to measure service quality based only on customer perceptions. The present study used SERVPERF approach to measure service quality in the internet banking context. Plenty of research has been carried out on service quality dimensions in traditional 'brick and mortar' banking environment (Cowling & Newman, 1995) but service quality dimensions in an internet banking environment, where the interaction between customers and bank is impersonal, have not been investigated enough especially in the context of measuring the influence of TAM variables on service quality.

4. Model Development

Lin and Wu (2002) examined the links between online service quality (information content, customization, reliability & response, and security) of portal site and PU and PE but their model used online service quality dimensions

as antecedents to TAM constructs. Tao Zhou (2011) found that system quality is the main factor affecting perceived ease of use, whereas information quality is the main factor affecting perceived usefulness. Service quality and PE correlated positively (Al-Momani & Noor, 2009; Hilmi et al, 2012). Since service quality, PU and PE are positively correlated it is hypothesized that:

H1: Perceived Ease of Use has a positive effect on service quality in internet banking

H2: Perceived Usefulness has a positive effect on service quality in internet banking

Davis (1993) postulated that perceived ease of use had a direct impact upon perceived usefulness, not vice versa. However, significant bivariate correlation between perceived ease of use and usefulness was observed in many studies (for e.g. Henderson & Divett, 2003; Farmani et al, 2012). Hence it is hypothesized that:

H3: Perceived Usefulness has a positive effect on Perceived Ease of Use

5. Research Gap and Objectives

Though there is plenty of literature that predicts the intention to use IB using TAM model, studies that examine the influence of TAM constructs on service quality in internet banking is rarely found in literature. Similarly, studies that explore service quality dimensions in a traditional 'brick and mortar' context are many but similar studies in an internet banking context are scant in literature and no such study was found to have been undertaken in the state of Kerala in India. It is essential that service providers must understand how customers evaluate IB service quality and the determinants of service quality, if they want to improve service delivery. A survey of literature showed that there is dearth of empirical studies that used TAM constructs as antecedents to service quality in internet banking. This study thus aims to fill the gap in literature and tests a model comprising of the hypothesized relationship between TAM constructs and service quality and hence the study is found relevant and timely. The study attempts to address the following research questions. What are the service quality dimensions in IB? Whether the twin TAM constructs (Perceived Ease of Use and Perceived Usefulness) have any influence on service quality? Based on the above research questions, the specific objective of the study was to investigate the influence of TAM constructs on service quality in internet banking.

6. Materials and Methods

The study is empirical in nature and survey method was used to collect primary data from 406 IB users. The respondents were identified through different stages of selection. In the first stage of sample selection, banks were divided into two

strata (categories) – public sector banks and private sector banks. State bank of India, State Bank of Travancore, Canara Bank and Punjab National Bank were selected from the public sector. Federal Bank, South Indian Bank, HDFC Bank, ICICI Bank and Axis Bank were selected from the private sector banks. These banks were selected because they are in the forefront in harnessing technology and have won accolades for their excellence in banking technology from Institute for Development and Research in Banking Technology (IDBRT) in various years.

The study area is limited to the state of Kerala and the rationale for selecting the State of Kerala is the existence of a well organized and large network of banks, increasing usage of internet and surge in e-literacy among the people. Kerala has a wide network of banks with a total of 4053 bank branches, of which, 331 are rural branches, 2692 are semi urban branches and 1030 are urban branches (RBI, 2009). The increasing usage of internet in Kerala is evident from the fact that Bharath Sanchar Nigam Limited (BSNL) has provided 7,70,000 connections in rural India as on 31-1-2011, of which, 2,27,164 connections are in Kerala, the highest among all the States in India (Ministry of Communication and Information Technology, 2011). People of Kerala are becoming e-literate through 'Akshaya' project, undertaken by Government of Kerala in 2005, which imparts training to one person from one family to make people aware of the basics and scope of IT, hands-on-skill in operating a computer and use of internet. As per the website of Akshaya, 100 per cent e-literacy was achieved in eight districts, out of the 14 districts (Government of Kerala, 2012). Both availability of access to internet and e-literacy are essential prerequisites for the adoption of internet banking. The more access to computers and the internet, the greater is the possibility of the use of internet banking (O'Connell, 1996). Similarly, the more the people becoming e-literate, the more is the possibility of doing internet banking.

To accommodate geographical importance, as the second stage of sample selection one district each from North Kerala, Central Kerala and South Kerala were selected. Accordingly North Kerala is represented by Kozhikode, Central Kerala by Ernakulam, and South Kerala by Thiruvanathapuram. A sampling frame which contains the contact details of IB users could not be obtained from banks because of bank's privacy, topic sensitivity and competition reasons. The frequency of visit to bank branches by IB users are found to be rare since they carry out most of their transactions online and hence it was decided to contact IB users from ATM outlets rather than bank branches. The customers who use IB for a period of one year or above, visiting ATM outlets on the days of survey

were selected to participate in the survey. The questionnaire was piloted on 40 respondents. Based on the review of literature, 16 items were identified and included under seven dimensions Fulfillment (FU), Reliability (RE), Efficiency (EY), Responsiveness (RP), Website Attributes (WA) and Privacy (PY) to measure service quality and 6 items to measure the twin TAM constructs – Perceived Ease of Use (PE) and Perceived Usefulness (PU). The responses on these items were captured on a five point Likert scale from 'Strongly Agree' (5) to 'Strongly Disagree' (1). Responses were obtained from 406 respondents and Structural Equation Modeling was used to test the hypotheses.

7. Sample Profile

Out of 406 respondents, 76 per cent were male and 24 per cent were female. About 74 per cent of the respondents were below 35 years of age and 26 per cent were above 35 years of age. About three fourth (74 per cent) of the total respondents were post graduates/professionals and out of the remaining, 22 per cent were graduates and a meager 4 per cent were undergraduates. This indicates that most of the IB users were well educated banking customers. About 71 per cent of the respondents were employees, 16 per cent were self employed professionals like chartered accountants, cost accountants, company secretaries, doctors, lawyers etc, and the rest 13 per cent were students and businessmen. Majority (66 per cent) of the respondents have monthly income ranging from 15,000 to 45,000.

8. Data Analysis and Hypotheses Testing

Confirmatory Factor Analysis (CFA) was performed to test the fitness of the measurement model and is portrayed in Figure 1. The model was formed using eight latent constructs viz., Website Attribute (WA), Reliability (RE), Fullfillment (FU), Efficiency (EY), Privacy (PY), Responsiveness (RP), Perceived Ease of Use (PE) and Perceived Usefulness (PU). The first six latent constructs denote service quality dimensions and the last two denote TAM constructs. The indicators used to capture the latent constructs, their standardized regression weights and their co-variances are shown in Figure 1.

The reliability and validity of the measurement model was assessed in terms of composite reliability, convergent validity and discriminant validity. Absolute fit indices directly assess how well a model fits the observed data (Weston & Gore Jr., 2006). The most commonly reported absolute index is chi-square and a non significant chi-square is indicative of a model that fits the data well. However, the chi-square statistic is particularly sensitive to sample size and researchers

have sought alternative indices to assess model fit. One example of a statistic that minimizes the impact of sample size on the model Chi-square is relative/normed chi-square (chi-square/df; df=degrees of freedom) (Hooper et al., 2008). The additional indices from the literature such as Comparative Fit Index (CFI), Goodness of Fit (GFI), Adjusted GFI (AGFI), Normed Fit Index (NFI) and Root Mean Square Error of Approximation (RMSEA) are also considered for assessing the model fit. The fit indices of the measurement model shown in Table 1 indicate that all the fit indices were within the acceptable level suggested by previous research.

Table 1: Fit Indices of the Measurement and Structural Model

Fit Indices	Measurement model	Structural model	Recommended value	References
Chi-square/df	2.175	2.676	< 5	Bentler, 1989
GFI	0.916	0.945	> 0.90	Hair et al. 2010
AGFI	0.882	0.915	> 0.80	Gefen et al. 2003
NFI	0.882	0.904	> 0.90	Bentler, 1992
CFI	0.931	0.937	> 0.90	Bentler, 1992
RMSEA	0.055	0.065	<0.08	Hu & Bentler, 1999

The composite reliability (Hair et al. 1998) of each constructs was calculated and found to be above the threshold value of 0.70 (Straub, 1989) as shown in Table 2. The Average Variance Extracted (AVE) of each construct was calculated and was above the cut off 0.50. The discriminant validity was assessed using Fornell and Larcker's (1981) criteria as presented in Table 2. The AVE for each construct is more than the squares of inter construct correlations, thus satisfying discriminant validity.

Table 2: Composite Reliability (CR) and Discriminant Validity

	CR	WA	RE	RP	FU	EY	PY	PE	PU
WA	0.73	**0.58**							
RE	0.78	0.292	**0.54**						
RP	0.82	0.135	0.176	**0.70**					
FU	0.80	0.221	0.293	0.249	**0.51**				
EY	0.77	0.108	0.278	0.336	0.340	**0.52**			
PY	0.74	0.116	0.167	0.190	0.208	0.291	**0.59**		
PE	0.67	0.149	0.424	0.095	0.140	0.326	0.163	**0.52**	
PU	0.81	0.036	0.233	0.038	0.118	0.106	0.161	0.421	**0.51**

Diagonal values are Average Variance Extracted (AVE) and off diagonal values are the squares of inter construct correlations.

The standardized regression weights of all the indicators in the measurement model were above 0.50 (Hair et al. 1992) and the t-values are above 1.96 indicating significance. This suggests good convergent validity thus ensuring that the indicators truly represent the intended latent construct.

Figure 1: Measurement Model with Standardized Regression Weights and Co-variances
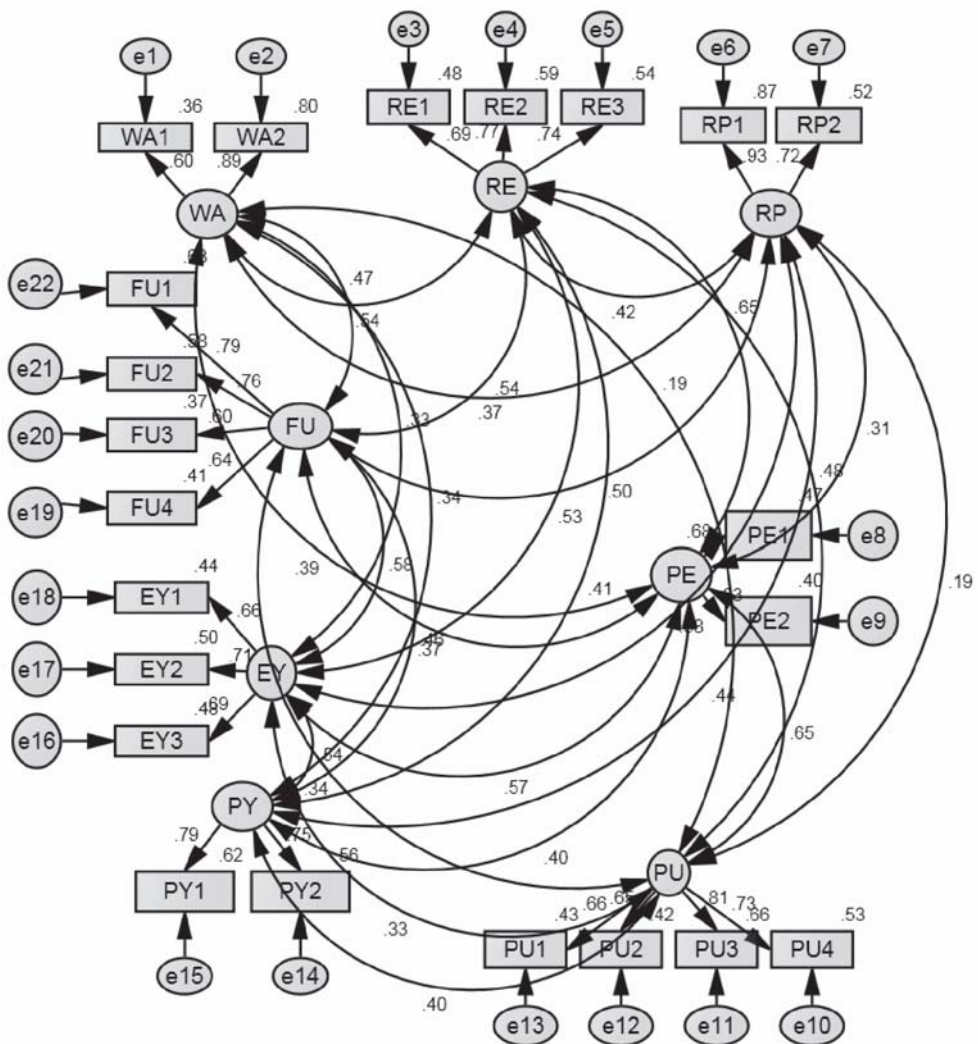
The hypotheses were tested using the structural model and shown in Figure 2. The construct index for service quality dimensions was calculated by averaging the indicators in the construct. The fit indices of the structural model are given in Table 1 and were found to be within the acceptable levels. The results revealed that H1 is supported (t = 4.56, β = 0.591, p < 0.01), H2 is not supported (t = 1.08, β = 0.108, p > 0.05) and H3 is supported (t = 8.534, β = 0.650, p <0.01). Perceived Usefulness has no significant direct effect on service quality but the indirect effect of PU on service quality via PE is (0.65 * 0.59) 0.38.

Figure 2: Structural Model with Standardized Regression Weights
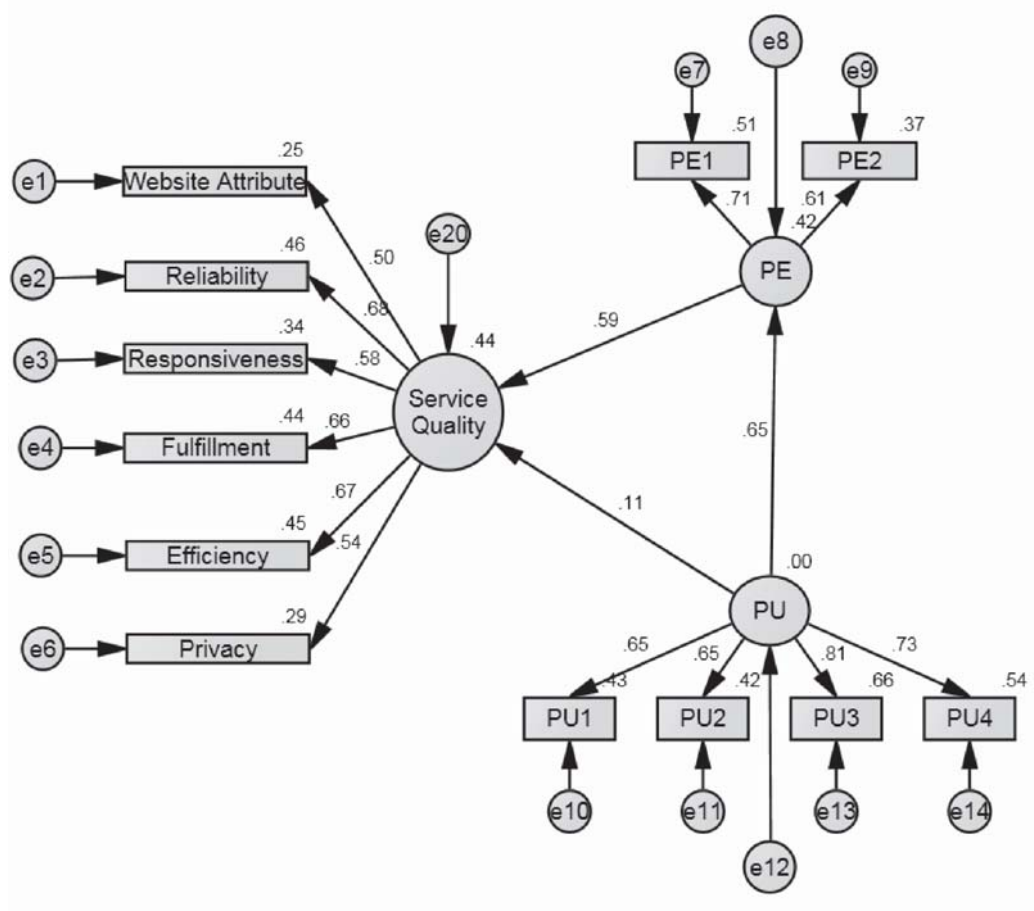
9. Implications of the Findings

The finding that PE has significant effect on the service quality perceptions of IB users suggests that banks can enhance service quality perceptions by bringing

more clarity in the contents of their websites and making it more user' friendly so that they may perceive that it is easy to use and become skillful in using IB. The indirect effect of PU mediated through PE indicates that there is scope for banks to enhance service quality perceptions of IB users by making them more aware of the advantages of using IB, compared to 'brick and mortar' banking, particularly on the cost saving aspect and ubiquity. Improvement in service quality perceptions of IB users will lead to customer satisfaction (Jun & Cai, 2001; Liao & Cheung, 2008; Quan et al., 2009; Nuseir et al., 2010; Gupta & Bansal 2012) and therefore every effort by banks to enhance service quality perceptions will result in increased customer satisfaction and this will help them to retain existing customers and to attract new users.

10. Limitations and Scope for Further Research

The study considered the perceptions of only retail banking customers and the perceptions of wholesale banking customers who use IB were not considered. Future research may replicate this study with wholesale banking customers to evaluate the validity of the findings of this study. Wholesale banking customers may use IB more frequently and therefore to enquire whether their perceptions are similar to those of retail banking customers would be of interest to future researchers. The study did not explore all the service quality dimensions and examine the effect of service quality on customer satisfaction and customer satisfaction on customer retention. Therefore future research may explore whether there are more dimensions of service quality and also investigate the effect of service quality dimensions on customer satisfaction and then on customer retention.

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