

Technology Adoption and Indian Consumers: Study on Mobile Banking

Rahmath Safeena, Hema Date, Abdullah Kammani, and Nisar Hundewale

Abstract—Information technology is considered as the key driver for the changes taking place around the world. Mobile banking is the latest and most innovative service offered by the banks. The transformation from the traditional banking to e-banking has been a 'leap' change. The evolution of e-banking started from the use of Automatic Teller Machines (ATMs) and telephone banking (tele-banking), direct bill payment, electronic fund transfer and the revolutionary online banking. This study determines the consumer's perspective on mobile banking adoption.

Index Terms—Mobile banking, information and communication technology (ICT), perceived usefulness, ease of use, risk, awareness.

I. INTRODUCTION

The proliferation of, and rapid advances in, technology-based systems, especially those related to the internet, are leading to fundamental changes in how companies interact with customers [1]-[3]. Mobile phone usage has spread in a very broad manner both in developing and developed countries. With mobile communications already as a prime case for leapfrogging traditional infrastructure, mobile banking (M-Banking) has great potential for extending the provision of financial services to unbanked people through a technology that is both familiar and widespread.

One of the first commercial applications of the mobile commerce was mobile banking (m-banking) [4], [5]. The rapid growth of mobile applications has given rise to a new term: m-commerce. M-commerce is defined as the application of wireless communications networks and devices to the execution of transactions with monetary value – either direct or indirect [6]. Internet banking and mobile banking (m-banking) has become the self-service delivery channel that allows banks to provide information and offer services to their customers with more convenience via the web services technology. The new world of electronic banking is changing day by day. It is important to understand the customer's perception on mobile banking. Today, many financial services organizations are rushing to become more customer focused. A key component of many initiatives is the implementation of Customer Relationship Management (CRM) software [7]. Many companies in the financial services sector have been quick to implement Internet capabilities, and electronic service is becoming a viable

option for interaction between financial service providers and their customers [8]. The challenging business process in the financial services pressurized banks to introduce alternate delivery channel to attract customers and improve customers' perception.

Many banks have implemented Internet and mobile banking to offer their customers a variety of online services with more convenience for accessing information and making transactions. Customer satisfaction and customer retention are increasingly developing into key success factors in e-banking [2]. Technology, in particular, has been increasingly employed in service organizations to enhance customer service quality and delivery, reduce costs, and standardize core service offerings [1], [2], [9], [10]. There will be huge acceptance of online banking with the passage of time with growing awareness and education. A great many people are shifting to online banking and are readily accepting the usefulness of this bounty. Online banking service allows customers to manage their accounts from any place at any time for minimum cost; it gives abundant compensation to the client in terms of price and ease.

II. BACKGROUND AND OBJECTIVE

Stated that the diffusion of electronic banking is more determined by customer acceptance than by seller offerings. Not enough is known regarding how customers perceive and evaluate electronically delivered services. [9] have also recently highlighted the need for further research to measure the influence of e-service on customer-perceived service quality and satisfaction [1]. This study considers the four factors perceived usefulness, perceived ease of use, consumer awareness about mobile banking and perceived risks associated with mobile banking. Half of the people that have tried mobile banking services will not become active users. Highly publicized cases involving major security failures might have contributed to the public's concern and lack of acceptance of mobile banking. The present study aims at examining the impact of perceived usefulness, perceived ease of use, consumer awareness on mobile banking and perceived risk on the acceptance of mobile banking by the consumers.

III. MOBILE BANKING

Mobile banking is a subset of electronic banking which underlies not only the determinants of the banking business but also the special conditions of mobile commerce. Mobile Banking has been gaining increasing popularity amongst various sections of the society for past few years, having recovered from the shock of the dot-com burst [12]. Mobile Banking refers to provision and availment of banking- and

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financial services with the help of mobile telecommunication devices. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customized information [13]. With mobile technology, banks can offer services to their customers such as doing funds transfer while travelling, receiving online updates of stock price or even performing stock trading while being stuck in traffic. Smart phones and 3G connectivity provide some capabilities that older text message-only phones do not.

The convergence of mobile communications and distributed networked computing has provided the foundation for the development of a new channel of electronic business – mobile business [14]. Mobile business (m-business) is defined as the use of the mobile information technologies, including the wireless Internet, for organizational communication and coordination, and the management of the firm [15]. Mobile banking (also known as M-Banking, m-banking, SMS Banking etc.) is a term used for performing balance checks, account transactions, payments, credit applications etc. via a mobile device such as a mobile phone or Personal Digital Assistant (PDA). It is the convenient, simple, secure, anytime and anywhere banking. Many new e-commerce applications will be possible and significantly benefit from emerging wireless and mobile networks. These applications can collectively be termed wireless e-commerce or mobile commerce [16]. Mobile banking is the latest in the series of technological wonders of the recent past. ATMs, Tele-Banking, Internet Banking, Credit Cards and Debit Cards have emerged as effective delivery channels for traditional banking products. It is the newest delivery channel to be offered by retail banks in many developed countries, and there is a wide agreement that this channel will have a significant impact on the market.

The earliest mobile banking services were offered via SMS. With the introduction of the first primitive smart phones with WAP (wireless application protocol) support enabling the use of the mobile web in 1999, the first European banks started to offer mobile banking on this platform to their customers [13]. SMS Banking is a Mobile technology that allows you to request and receive banking information from your bank on your mobile phone via Short message service (SMS) [17]. WAP banking is another form of the Electronic banking that enables the user to communicate interactively with the bank. For this communication the client uses only GSM mobile phone with WAP service. With its options and the method of controlling WAP banking reminds an easy form of Internet banking. WAP is a universal standard for bringing Internet-based content and advanced value-added services to wireless devices such as phones and personal digital assistants (PDAs) [18].

IV. CONSUMER ATTITUDE TOWARDS MOBILE BANKING

Technological innovations are having significant importance in human general and professional life. This era can safely be attributed as technology revolution. The quick expansion of information technology has imbedded into the lives of millions of people. Rapid technology advancements have introduced major changes in the worldwide economic and business atmosphere [19].

Research on consumer attitude and adoption of mobile banking showed there are several factors predetermining the consumer's attitude towards online banking such as person's demography, motivation and behavior towards different banking technologies and individual acceptance of new technology. It has been found that consumer's attitudes toward online banking are influenced by the prior experience of computer and new technology [20]. The adoption of electronic banking forces consumers to consider concerns about password integrity, privacy, data encryption, hacking, and the protection of personal information [21]. Electronic banking requires perhaps the most consumer involvement, as it requires the consumer to maintain and regularly interact with additional technology (a computer and an Internet connection) [22]. Consumers who use e-banking use it on an ongoing basis and need to acquire a certain comfort level with the technology to keep using it [23].

Customer adoption is a recognized dilemma for the strategic plans of financial institutions. Several studies have investigated why individuals choose a specific bank. Important consumer selection factors include convenience, service facilities, reputation and interest rates [24],[25]. According to [26], customers have less time to spend on activities such as visiting a bank and therefore want a higher degree of convenience and accessibility. The service-quality attributes that the Internet banks must offer to induce consumers to switch to online transactions and keep using them are perceived usefulness, ease of use, reliability, responsiveness, security, and continuous improvement [27].

In another study by [28], they found that individual expectations regarding accuracy, security, network speed, user-friendliness, and user involvement and convenience were the most important quality attributes in the perceived usefulness of Internet-based e-retail banking. The crucial factors that affect an individual's decision to use or not to use online services the individual's age, the difficulties of using the Internet, the fear of changes in the banking sector due to technological development and the lack of information concerning products and services provided to customers through electronic delivery channels. Factors such as the speed of transactions or the cost of using the Internet have little impact on an individual's final decision [29]. In the study by [1], revealed six composite dimensions of electronic service quality, including the provision of convenient/accurate electronic banking operations; the accessibility and reliability of service provision; good queue management; service personalization; the provision of friendly and responsive customer service; and the provision of targeted customer service. Perceived usefulness, security and privacy are the main perusing factors to accept online banking system [19]. According to a study by WAP, GPRS and 3G features from mobile devices are of no significance or influence in the adoption of e-banking services [30].

V. RESEARCH MODEL AND HYPOTHESES

Perceived usefulness and perceived ease of use are the two components of Technology Acceptance Model (TAM). According to [31], "perceived usefulness is the extent to which a person believes that using a particular system will enhance his or her performance, while perceived ease of use

is the extent to which a person believes that using a particular system will be free of effort". TAM has been widely used by information system researcher; there is a common agreement among them that the model is valid in predicting the individual's acceptance of new technologies [32]-[35]. Perceived usefulness and perceived ease of use is significant factors affecting acceptance of an information system or new technologies. Prior research has empirically found positive relationship between perceived ease of use and perceived usefulness as critical factors on the use of e-banking [30], [36]-[38]. Hence an application perceived to be useful perceived to be easier to use than another is more likely to be accepted by users. By applying these into online banking context we hypothesize:

H1: Perceived usefulness has a positive effect on intention to adopt and use MB.

H2: Perceived ease of use has a positive effect on intention to adopt and use MB

Adoption is the acceptance and continued use of a product, service or idea. According to [39], [40], consumers go through "a process of knowledge, persuasion, decision and confirmation" before they are ready to adopt a product or service. The adoption or rejection of an innovation begins when "the consumer becomes aware of the product". Consumers will seek out those financial products and suppliers which offer the best value for money and they are educated about it. Hence, for adoption of mobile banking, it is necessary that the banks offering this service make the consumers aware about the availability of such a product and explain how it adds value relative to other products of its own or that of the competitors. Consumers must become aware of the new brand or technology. An important characteristic for any adoption of innovative service or product is creating awareness among the consumers about the service/product [40]. The amount of information consumers have about online banking has been identified as a major factor impacting the adoption. According to [40], while the use of online banking services is fairly new experience to many people, low awareness of online banking is a major factor in causing people not to adopt online banking. In an empirical study of Australian consumers found that consumers were unaware about the possibilities, advantages/disadvantages involved with online banking. Hence, we posit that:

H3: Awareness about MB has a positive effect on intention to adopt and use MB

Perceptions of risk are a powerful explanatory factor in consumer behavior as individuals appear to be more motivated to avoid mistakes than to maximize purchasing benefits [41]. The construct Perceived Risk reflects an individual's subjective belief about the possible negative consequences of some type of planned action or behavior, due to inherent uncertainty. [42] refers to perceived system risk as the overall amount of uncertainty perceived by an organization in a particular purchase situation. The Perceived Risk associated with online transactions may reduce perceptions of behavioral and environmental control, and this lack of control is likely to negatively influence e-commerce usage intentions. E-commerce applications should be enhanced by reducing the level of perceived risk [43]. Similar is with m-commerce applications. Owing to the open Internet technology infrastructure and lack of sufficient laws

concerning m-commerce activities, the trust and trust related-concepts (that is, perceived risk, credibility, image and reputation) have been integrated with the adoption models to explain MB adoption behavior. Diffusion of innovation literature is often silent on perceived risk as a factor influencing the diffusion of an innovation, despite adoption behavior often being a process of dealing with the uncertainty about incorporating an innovation into ongoing practice [44]. Services are inherently more risky than products and that the major reason for this is the higher levels of uncertainty which are associated with services [41], [45], [46], [47] also found that perceived risk was one of the major factors affecting consumer adoption, as well as customer satisfaction of mobile banking services. Perceived risk usually arises from uncertainty. Hence we hypothesize:

H4: Perceived risks have a negative impact on intention to adopt and use MB.

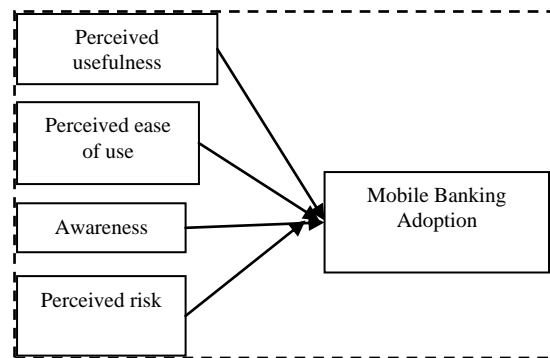


Fig. 1. Research model.

VI. RESEARCH METHODOLOGY

The key intention of this paper is to evaluate those factors that manipulate the nature of customers towards mobile banking and their growing tendency towards the online financial institutions. A survey instrument in the form of questionnaire was developed through data collected from previous studies on acceptance of mobile banking. We constructed several questions in the questionnaire based on the objectives of the research. Likert scale is used in order to identify the respondents' perceptions towards mobile banking adoption. During the interviews we sought general information from the managers about mobile banking and asked them to discuss the reasons for undertaking mobile banking and to highlight mobile banking development challenges. We also asked them to discuss the issues relevant to the future of the initiative. The questionnaires were based on customers' intention to adopt mobile banking.

TABLE I: PROFILE OF THE RESPONDENTS.

Demographics	Items	No. of Respondent	Percent
Gender	Male	42	78.84
	Female	11	21.15
Age group	20-30	43	82.7
	31-40	6	11.5
	41-50	2	3.8
	>50	1	1.9
Education	Graduate	15	28.8
	Postgraduate	29	55.8
	PhD	6	11.5
	Other	2	3.8

VII. SAMPLE

Convenience sampling method was used. It is a type of non-probability sampling which involves the sample being drawn from that part of the population which is close to hand. That is, a sample population selected because it is readily available and convenient. The reasons of using this sampling type are twofold. First, it offers an easy way to obtain the raw data for the further analysis. Second, it saves times and costs since the respondents can be randomly selected. Choosing this campus is because of two reasons. First, those business and economics student are revealed with the knowledge of applied business and economics. At the same time, they are equipped with the knowledge of computer science, where the concept of mobile banking is not an alien for these students. Second, it was found that there is no study ever conducted in the campus, it leaves a motivation to the research to perform a study in order to investigate the students' adoption for mobile banking in the near future.

Table I shows the profile of the respondents. The sample shows that the number of male (78.84%) respondents is higher than the number of female (21.15%) respondents. The sample shows that the largest age group that responded was from 20 to 30 years of age (82.7%), followed by age 31 to 40 (11.5%), then 41 to 50 (03.8%) and >50 (1.9%). In the education background more than 55% of the respondents were postgraduate students and more than 28% were graduate students and 11.5% were PhD students.

VIII. DISCUSSIONS AND FINDINGS

Although mobile banking provides flexibility in performing financial transaction, fast and easy, however individuals are still reluctant to adopt the system because of several reasons. First, the security and privacy are two elements in the perceived risk. Without a proper knowledge of the system, individuals are not interested to test the system. Perceived usefulness, ease of use and consumer awareness has positive impact on the intention to adopt mobile banking while perceived risk has negative impact on it. When online banking is perceived as useful, customer's intention to adopt it would be greater. Likewise bank customers are likely to adopt mobile banking when it is easy to use. This shows that bank customers anchor their online banking adoption intention to the beneficial outcomes and ease of use process of the system. Further, the research instrument was tested for reliability using Cronbach's coefficient alpha estimate.

TABLE II: RELIABILITY RESULTS.

Determinants	No. of items	Reliability
PU	7	0.834
PEU	5	0.760
AW	7	0.836
PR	6	0.600

The Cronbach's alpha values for all dimensions range from 0.60 to 0.93, exceeding the minimum alpha of 0.6 [48], thus the constructs measures are deemed reliable. Principal component factor analysis with a varimax rotation was conducted. The aim of factors analysis is to confirm the construct validity of the scales could be performed adequately by using principle component analysis. In order to

reach this, the minimum factor loading of 0.6 on its hypothesized constructs is proposed (Nunnally, 1978). A number of analyses were conducted for factors analysis. Factor loading values were obtained using varimax rotation. According to the above table, most of the factor loading for each instrument exceeded 0.6, meeting the essentially significant level of convergent validity.

TABLE III: FACTOR LOADINGS.

Perceived Usefulness	Perceived ease of use	Consumer awareness	Perceived risk
PU1-0.680081	PEU1-0.558357	AW1-0.850832	PR1-0.8337
PU2-0.681054	PEU2-0.577729	AW2-0.711179	PR2-0.6582
PU3-0.761725	PEU3-0.537585	AW3-0.6588387	PR3-0.7597
PU4-0.827245	PEU4-0.569031	AW4-0.600542	PR4-0.6508
PU5-0.664396	PEU5-0.824878	AW5-0.662101	PR5-0.6795
PU6-0.735373		AW6-0.662596	PR6-0.7418
PU7-0.647373		AW7-0.658444	

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations.

Using an eigenvalue greater than 1 as a selection criterion, four factors emerged. Each has cumulative frequency of 22.51, 41.63, 59.85 and 69.94 percent respectively. These character factors accounted for 69% of the variance and the factor loading for all items were greater than 0.6. Hence the results show that H1, H2, H3 and H4 are confirmed. The results are consistent and are supported by previous studies.

IX. CONCLUSION

The result of this study shows that perceived usefulness, perceived ease of use, consumer awareness and perceived risk are the important determinants of mobile banking adoption. This study meets the desired objective; but it suffers from one setback. Study concludes that majority of customers are accepting online banking because of many favorable factors. Analysis concluded that usefulness, ease of use of the system awareness about mobile banking and risks related to it are the main perusing factors to accept online banking system. These factors have a strong and positive effect on customers to accept mobile banking system. The relatively small size of the sample limits generalization of the outcome of the study. The study is concentrated on a particular location and hence the result may vary with location and the demography of the people. Similar study can be conducted in other colleges and universities and results can be compared.

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