Mobile Banking: A Tradeoff between Mobile Technology and Service for Consumers’ Behavioral Intention

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Abstract

Purpose: This current study examines multifaceted issues of mobile banking, from security and operation to trust and consumers’ behavioral intention through synthesizing the associated seminal studies on the interrelated issues of the vast area of mobile banking.

Design/methodology/approach: A total of 116 scholarly articles on different issues of mobile banking were selected to be reviewed and synthesized in this current research to reveal, postulate, and conceptualize the essential paradigms.

Findings: Many seminal studies have attempted to conduct research on this emerging mobile communication-oriented service delivery channel. However, a comprehensive picture of mobile banking which captures consumers’ behavior from psychological, technological, and operational perspectives, with potential threats related to security from users, devices, applications, mobile operators, and service providers, is explicitly absent.

Research limitations/implications: Weaknesses of the reviewed studies are revealed and future research guidelines are provided to contribute knowledge in the research gaps.

Practical implications: This study outlined the findings to develop a grounded theory of mobile banking research through a systematic approach.

Originality/value: Although this is an extensive effort to synthesize existing knowledge in mobile banking through a literature review, this study has successfully identified the major strengths and weaknesses of the current studies and developed and established a grounded theory of mobile banking for service design and customers’ satisfaction.

Keywords: Mobile Banking, Self-service, Literature Review, ICT, Mobile Communication, Bank

Article Type: Literature Review
Introduction

After successful initiation, application, and implementation of Internet-based banking, financial institutions like banks are keen to offer a mobile service that will meet customers’ dynamic and robust requirements (Ashraf, 2012; Laukkanen & Lauronen, 2005). Internet banking is the execution of virtual financial operations through an Internet network enabled by computers. Mobile banking, which presents an extended service of virtual banking, is generically a subset of Internet banking. Mobile banking can offer a very similar service to Internet banking by using smartphones’ capacity to access the Internet using wireless application protocol (WAP) (Chikomo et al., 2006). This WAP system of mobile phones can facilitate consumers to access banking services from anywhere, unlike Internet banking; they can even check the balance of their bank account from any retail store while paying their bill from that account (Ashraf, 2012). This new mobile banking service can offer almost a new pattern of service through short message service (SMS) or direct telephone calls with a unique identification password for checking or transferring a balance or paying bills (Ashraf, 2012). For mobile banking, financial services can also be made available through certain specifically designed apps in mobile data application systems (Ashraf, 2012; Laukkanen & Lauronen, 2005).

However, a comprehensive picture of mobile banking which captures consumers’ behavior from psychological, technological, and operational perspectives, with potential threats related to security from users, devices, applications, mobile operators, and service providers, is explicitly absent. Thus, this current study aims to examine multifaceted issues of mobile banking, from security and operation to trust and consumers’ behavioral intention, through synthesizing the associated seminal studies of the vast area of mobile banking.

The subsequent sections of this paper are organized as follows. The next section establishes a well-defined guideline to select research papers in the effort to synthesize potential studies. The following section postulates the summary with categorization of synthesized studies with representation of potential gaps in the sequence of reviewed studies. Further conceptual recommendation is outlined and discussed based on synthesis of the existing research reviewed in the next section. Finally, key conclusions and limitations are illustrated.

Guiding Principles of Literature Synthesis

This study captured scholarly articles from Google Scholar by using certain keywords related to mobile banking: mobile banking, security of mobile banking, privacy of mobile banking, risks associated with mobile banking, mobile banking technology, consumers’ value perception of mobile banking, acceptance of mobile banking, diffusion of mobile banking, adoption of mobile banking, consumers’ attitude toward mobile banking, and control measures of mobile banking. Through extensive searches, we accumulated 185 scholarly articles, proceedings of conferences, and book chapters. However, many of these studies were just a limited extension of previous studies or were repetitive in nature, as they investigated similar issues under similar contexts. So, we decided to exclude those non-potential or repetitive studies and consider only those studies which have significant academic and managerial implications in terms of their potential contribution to mobile banking research. We finally selected 116 scholarly journal articles, conference proceedings, and book chapters related to mobile banking from the last decade to review their findings and, in the light of meaningful research gaps, reveal future guidelines to direct the development of epistemological and ontological paradigms of mobile banking.
Theoretical Categorization of Existing Literature

This current effort to identify possible weaknesses of reviewed studies and develop a guiding principle of mobile banking has divided and categorized the studies into three broad segments:

1. Technology-related issues
2. Service provider issues (supply side — banks)
3. Service receiver issues (demand side — consumer)

Under purely technological concerns, for the first segment, the researchers were engaged in two broad categories: i) different security threats related to a technological point of view and their controlling measures; and ii) improvements of mobile banking services from a technological point of view, including device- and apps-related issues. In terms of the supply-side aspect, service providers of mobile banking, i.e., banks, are concerned about the appropriate business model design of mobile banking. In this generic category, researchers primarily explore the following two issues: i) concepts and basic mechanisms of mobile banking; and ii) the integrated design of mobile banking. Consumers are finally the key concern for the successful initiation of this new service delivery channel. Consumers’ aspects are deliberated over by many potential researchers in many countries through empirical studies. This major category of research can be classified under four primary issues: i) determinants for technological and behavioral intention to adopt mobile banking with another subgroup focusing on initial trust formation; ii) social and psychological behavioral intention focusing on cultural constructs and demographic variables and their impact; iii) consumers’ multichannel behavior for mobile banking; and iv) consumers’ perceptions of values of mobile banking, which is fundamentally a post-purchase behavior.

The aforementioned eight categories of research studies from three broad segments are listed in Table 1 with their primary objective, findings, and major weaknesses in the comprehensiveness of a parsimonious research study.

Segment 1: Technological Overview of Mobile Banking

Many scholarly researchers were engaged in designing the setup of mobile banking from the launch of this new emerging sector and are still keen to identify the loopholes of customer-centric and secure banking services with the synchronization of ever-changing mobile communication technology.

Category 1: Security Threats and Controlling Measures from Technological Perspectives

In mobile banking, sensitive information is communicated between consumers and financial institutions through communication networks. Consumers are very willing to accept this self-service of mobile banking, as it can provide time and location flexibility with personalization (Luo et al., 2010; Singh et al., 2010). Consequently a great bunch of research articles (for reference, see Table 1) are engaged in conceptualizing the overarching issues, effects, and probable controlling measures of security threats arising from technological and administrative
perspectives. They are engaged in addressing, defining, and speculating on severe security threats arising from the technological interface of mobile banking.

**Category 2: Upgrading the Technological Interface to Improve Mobile Banking Services**

While some engineering researchers are striving to detect and solve security-related issues to ensure secure mobile banking operations, many researchers involved in ICT and consumer behavior are dedicated to presenting heterogeneous technological frameworks to develop and establish an effective and improvised mobile banking service. These researchers find potential merit in conducting research for the improvement of mobile banking services by synchronizing continuously changing and upgrading mobile communication technology with the advent of self-service technology in the financial sector. Researchers (for reference, see Table 1) are primarily engaged in identifying and suggesting different apps for smartphones implemented by banks and their nominated third parties to synchronize the banking operation with customers’ availability, accessibility, and perception of easy usability.

**Segment 2: Functions, Concerns, and Requirements of Service Providers**

This segment of research articles conceptualized and postulated different operational issues of service providers from the supply-side perspective, such as financial institutions and banks. Primarily from multidisciplinary research areas like finance, marketing, and ICT, researchers were engaged in defining mobile banking, a close functional subset of Internet banking, formulating service patterns of mobile banking distinguishable from conventional online banking, and establishing different protocols of this emerging service at the time of inception.

**Category 1: Establishment of Foundation Service for Mobile Banking**

This category of mobile banking research (for reference, see Table 1) is rooted in the initial setup, scope of work and opportunities, stakeholder identification, level of involvement and functions, and defining and establishing mobile banking as a subset of Internet banking to offer flexible, robust, and time-and-location-independent service. By nature and based on research elements, this group of studies fundamentally focused on the primary streamlining of mobile banking research from the supply side, i.e., the financial sector or banks. Primary issues of mobile banking and different services offered through mobile and Internet banking are addressed, investigated, defined, categorized, and established for service providers, i.e., banks. Therefore, this category is the foundation of mobile banking research from the supply side.

**Category 2: Integrated Design of Mobile Banking from the Supply Side**

From the supply side, i.e., from the perspective of service providers of mobile banking, this research category deals with some advance research questions to design an overall strategy, service, structure, and operational functions so that this alternative service delivery channel will be effective in fulfilling consumers’ requirements and can provide effective operational performance and reduction of cost structures. This is a fundamental category of research which comprises both a theoretical framework and managerial applications for service providers. Many potential researchers (for reference, see Table 1) have been engaged in this fertile research area,
which has contemporary merit and always has demand for sequential progression to capitalize on competitive advantage in order to help banks to gain distinctive competitiveness based on deriving a match-winning strategy.

Segment 3: Requirements and Characteristics of Service Receivers

This segment of research papers articulates different concerns and behavioral intentions of demand-side stakeholders, i.e., consumers. Consumers are the primary concern of any service design of the financial industry. Mobile banking was fundamentally introduced to minimize the cost of providing services as well as to satisfy customers by delivering better, effective, and efficient service. So, the pragmatic success of this service operation primarily lies on the acceptance of this service.

Category 1: Determinants for Behavioral Intention to Adopt Mobile Banking

As the theoretical framework, this category widely applied technology adoption theories like the technology adoption model (TAM) (Davis, 1989), theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), theory of planned behavior (Ajzen, 1991), diffusion of innovation theory (DOI) (Rogers, 1995), unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003), model of PC utilization (MPCU) (Thomson et al., 1991), social cognitive theory (SCT) (Bandura, 1986), motivational model (MM) (Vallerand, 1997), combined TAM and TPB (CTAM-TPB) (Taylor and Todd, 1995), and eGov adoption model (GAM) (Shareef et al., 2011) to develop a list of critical factors which pursue behavioral intention to adopt this emerging mobile financial service. Researchers (for reference, see Table 1) in this group concentrated on revealing consumers’ attitudes and perceptions about mobile banking, simultaneously considering pursuing as well as inhibiting issues.

Category 2: Behavioral Intention Considering Demographic and Cultural Impact

The research studies of this category are theoretically an extension of the first category of this current segment. The researchers revealed different determinants for adoption of or resistance to mobile banking under a theoretical framework of behavioral theories through empirical investigation; however, they extended these studies to investigate the effect of moderating variables. These moderating variables were used in the theoretical framework to consider possible effects of culture and different demographic variables on consumers’ behavioral intention to adopt this mobile technology-dominated banking service, which is fundamentally available as self-service technology. In this connection, authors of studies (for reference, see Table 1) in this category used several demographic variables, like age, gender, income level, education, familiarity with mobile phone usage, and self-efficacy, to depict possible differences in constructs of behavioral intention and their level of magnitude for different segments of people.

Category 3: Consumers’ Multichannel Behavior for Adopting Mobile Banking

This category of research is also a clear extension followed by the research direction outlined in category one of this current segment. The authors of this group basically delineated consumers’ behavior; however, the objective is rooted in comparing different online service delivery channels as well as offline channels (sometimes). The studies are fundamentally empirical-investigation based and were conducted in different countries to explore the relative priority of
Different channels reflecting consumers’ perceptions. Following the sequence of research, this category is an advancement of research to postulate relative benefits and drawbacks of different service delivery channels which have significant managerial implications. Researchers of this category (for reference, see Table 1) developed theoretical frameworks for behavioral intention, but classified the constructs and their magnitude of effect for different self-service delivery channels managed by modern ICT, like automated teller machine (ATM), Internet banking, and Kiosk.

Category 4: Consumers’ Value Perception as a Post-Purchase Behavior

This category covers those research studies which are fundamentally investigating post-purchase behavior and consumers’ post-hoc perceptions of mobile banking. Researchers are also engaged in encapsulating the outcome benefits for consumers who use this service delivery channel. Again, the studies of this category are primarily empirical or interview based and conducted in many countries. They revealed consumers’ benefits and perceptions to outline the further development of this emerging service delivery channel. Several researchers (for reference, see Table 1) addressed this consumer-centric research question to follow up consumers’ post-purchase behavior in comparison to their expectation. So, this is some kind of conceptualization of consumer behavior in terms of perception versus expectation.

The above-mentioned primary research streams, classified into three segments with further categorization, are summarized in Table 1 below.

Table 1: Categorized and Summarized Findings of the Reviewed Literature

<table>
<thead>
<tr>
<th>Primary Research Concerns (Segment)</th>
<th>Research Area (Category)</th>
<th>Reviewed Articles</th>
<th>Conceptual Development</th>
<th>Key Observations</th>
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<tr>
<td>Segment 1: Technological Overview of Mobile Banking</td>
<td>Category 1: Security Threats and Controlling Measures from Technological Perspectives</td>
<td>Ashraf, 2012; Chikomo et al., 2006; Elkhodr et al., 2012; Islam, 2014; Kadušić et al., 2011; Kasemsa &amp; Hunngam, 2010; Paik, 2010; Saxena &amp; Chaudhari, 2013; Weerasinghe et al., 2010</td>
<td>The authors of this category describe different technical issues which can create potential threats to the implementation of mobile banking. Through synthesis of literature, they identified the most challenging security threats of mobile banking and suggested some technical measures. Some articles offered some security protocols and some security threats of unsecured networks. A few researchers advocated that both technical and managerial measures are required to control security. Researchers were also interested in addressing different kinds of security objectives, like confidentiality, integrity, and availability, and security threats relevant to i) users, ii) devices, iii) data applications, and iv) governance. Several research articles in this category suggested a matrix for risk management. The authors were focused on both the technological and the managerial solutions to keep mobile banking risk low.</td>
<td>Many research articles of this category are clearly lagging in offering a complete set of technical measures to control security threats. They are focused only on a particular type of country governance (the Netherlands), so the results might not be replicated all over the world. Some studies are more focused on technical issues related to some specific regions. Since security challenges can arise from different sources—like devices, data applications and software, banks, users, and mobile operators—without compiling their comprehensive association and functions, any scattered security measures will not be completely effective in minimizing identity theft and operational loss and gaining consumers’ trust.</td>
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<td>Category 2: Upgrading the Technological Interface to Improve Mobile</td>
<td>Ahmad, 2009; Claessens et al., 2002; Dass &amp; Muttukrishnan, 2011; Mohan et al., 2015; Sharma &amp; Dubey, 2009; Varshney &amp; Vetter, 2002</td>
<td>Researchers of this category have provided some design specifications for technological improvement in terms of better and more convenient design of apps. The authors primarily proposed a theoretical framework of integrated security issues and their measures for developing</td>
<td>The authors are focused on a particular area to facilitate adoption of mobile banking which is not at present consistent in terms of adoption of mobile phones. They, in this context, assumed that due to non-supporting technological conditions of mobile phones,</td>
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<td>Banking Services</td>
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<td>trust on mobile banking. They suggested that proper integration between technology and banking services is the key to successfully managing interoperability, fraud, and security for mobile banking. Few authors of this category have recommended improvement of the mobile app usability index (MAUI) to facilitate adoption of mobile banking.</td>
<td>particularly of mobile apps, mobile banking is not flourishing in India. The authors therefore claimed that non-functioning of mobile apps in India is an impediment in the diffusion of mobile banking. While proposing this hypothesis, the authors did not comprehensively consider different risks and security threats in mobile apps with banking operations.</td>
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<td>Segment 2: Functions, Concerns, and Requirements of Service Providers</td>
<td>Category 1: Establishment of a Foundation Service for Mobile Banking</td>
<td>Donner &amp; Tellez, 2008; Gupta &amp; Xu, 2010; Mallat et al., 2004; Rosmain et al., 2013; Sangle &amp; Awasthi, 2011; Shen et al., 2010</td>
<td>The researchers of this category identified different services possible through mobile banking in terms of technical aspects, as it is an emerging service. They asserted that security, convenience, and cost are the three prevalent issues for perception of service quality for self-service technology related to ATM transactions. Some authors suggested that although there are potential risks associated with mobile banking embedded with emerging technologies, convenience may offer greater scope to accept this mobile service. This finding contradicts the research (Shen et al., 2010), where the authors claimed that although mobile banking offers more ease of operation and access in terms of self-efficacy and device features in comparison to Internet banking, consumers have more interest in Internet banking. A few studies developed a conceptual model to establish better customer relationship management for the banking sector through empirical understanding of consumers’ requirements. According to these papers, customers will find this service system effective if they receive utility value from mobile banking. They developed a theoretical framework, shedding light on the technological interface for the development of usability of mobile banking.</td>
<td>This is a primary category of mobile banking study. This group of studies, as an emerging service of the financial sector, attempted to explore different services which can be designed technically through Internet and mobile banking. However, the fundamental limitations of this category of research are that they hardly tried to design the scope of the service considering the involvement of all stakeholders, like users, banks, governments, and mobile operators.</td>
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<td>Category 2: Integrated Design of Mobile Banking from the Supply Side</td>
<td>Alafeef et al., 2011; Al-Jabri &amp; Sohail, 2012; Daramola et al., 2014; Govindarajan et al., 2014; Lin, 2011; Liu et al., 2009; Poustchi &amp; Schurig, 2004</td>
<td>The authors of this category recognized the suitability of public cloud computing in mobile banking. It will minimize cost structure in operation and provide flexible service. However, usability and robustness are two prevalent requirements in this perspective. They recommended technical security, reliability, integrity, and operational performance for mobile banking operated through mobile phone SMS. Several authors have reviewed literature and presented an issue-based model for WAP (wireless application protocol), mobile banking via PDA, mobile banking with SIM-Toolkit, and...</td>
<td>Although a few research articles claimed that the quantitative model they propose includes four requirements, which indicates a parsimonious and complete model, the issues analyzed here are rhetorically focused on technical aspects of mobile banking related to convenience and risk. Design of mobile banking is a vast area which should incorporate different variables, including banks’ operational performance and cost structure, consumers’ convenience and resistance, overall security and risks, and their possible controlling...</td>
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<td>Segment 3: Requirements and Characteristics of Service Receivers</td>
<td>Category 1: Determinants for Behavioral Intention to Adopt Mobile Banking</td>
<td>Aderonke &amp; Charles, 2010; Afshan &amp; Sharif, 2016; Akturan &amp; Tezcan, 2012; Alemu et al., 2015; Bidar et al., 2014; Chung &amp; Kwon, 2009; Cruz et al., 2010; Dass &amp; Muttukrishnan, 2011; Donner &amp; Tellez, 2008; Dzogbenuku, 2013; Elbadrawy &amp; Aziz, 2012; Elkhodr et al., 2012; Hanafizadeh et al., 2014; Islam, 2014; Gill et al., 2011; Govender &amp; Sihlali, 2014; Gu et al., 2009; Gupta &amp; Xu, 2010; Ha et al., 2012; Jia-Bao, 2011; Kang et al., 2012; Kasemanz &amp; Hunngam, 2010; Kim &amp; Kang, 2012; Kim et al., 2009; Koenig-Lewis et al., 2010; Kumar &amp; Ravindran, 2012; Laforet &amp; Li, 2005; Laukkonen, 2015; Li, 2013; Lu et al., 2015; Luarn &amp; Lin, 2005; Luo et al., 2010; Mahad et al., 2015; Malaquias &amp; Hwang, 2016; Masrek et al., 2012; Njenga &amp; Ndlovu, 2012; Oliveira et al., 2014; Ratten, 2013; Sangle &amp; Awasthi, 2011; Shen et al., 2010; Shih &amp; Lin, 2015; Singh et al., 2010; Tingari, 2014; Vaithilingam et al., 2013; Wang et al., 2015; Wati et al., 2009; Wessels &amp; Drennan, 2010; Xiong, 2013; Yang, 2009; Zhou, 2012; Zhou, 2011</td>
<td>Through measurement and structural models of SEM, several researchers of this category have delineated a composite model of behavioral intention to adopt mobile banking through the inclusion of different determinants related to PU, PEOU, and trust. They postulated that initial formation of trust has the potential to encourage consumers to accept this highly sensitive financial service through their mobile phone. They examined the effect of risk associated with mobile banking with trust formation. Some studies conducted empirical studies among university students of different countries, like USA, Korea, Ghana, China, UK, etc. The researchers logically identified that trust has a more important role in transaction behavior than behavior for static banking. Exploring the effect of different categories of trust on behavioral intention for mobile banking, a few studies found that institutional trust is the primary driving agent for positive intention to adopt mobile banking. Some authors asserted that advertising, experience, and perceived risks are entrepreneurial issues for individual consumers to accept this mobile self-service technology. They also verified the effect of social influence on consumers to adopt mobile banking. They recommended that the tradeoff between benefits and security is the core assumption for the subscription of mobile banking by the consumers.</td>
<td>Most of the research models used as the base of empirical investigations are fragmented models. These did not reflect different types of threats comprehensively that might have a negative impact on both the affective and cognitive attitude of consumers. Most of the papers under this category did not comprehensively consider overall behavioral aspects related to cognitive and affective issues as well as social reference, facilitating conditions, perception of infrastructure, banking operations, and technological behavior. For three stages of mobile banking—namely, static banking, like viewing an account balance; interaction banking, like two-way communication between service providers and service users; and transactional banking, like money transfer—technological design and security features are not the same. So, researchers might investigate these different stages of mobile banking separately to figure out if consumers’ requirements are different.</td>
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<td>Category 2: Behavioral Intention Considering Demographic and Cultural Impact</td>
<td>Al-Kalbani &amp; Al-Shandouidi, 2008; Dass &amp; Pal, 2011; Laukkonen &amp; Kiviniemi, 2010; Luarn &amp; Lin, 2005; Mojtabeh et al., 2013; Mortimer et al., 2015; Negash, 2011; Riquelme &amp; Rios, 2010; Sharma &amp; Dubey, 2009; Wang et al., 2006</td>
<td>The research studies identified that the impact of social influence as a motivational factor in addition to regular TAM constructs and risk factors is different in different countries having different settings of cultural orientations. Therefore, the studies proclaimed that culture has a potential impact on adoption criteria. For instance, the authors Mojtabeh et al. (2013) acknowledged that for both the countries under</td>
<td>These studies, in general, have some significant limitations in validating the findings from a generalized perspective. While identifying cultural impact on adoption criteria, it did not consider infrastructure, financial structure, and rules and regulations of the compared countries. Precisely, the studies did not recognize the effect of country condition and financial</td>
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<td>Category 3: Consumers’ Multichannel Behavior for Adapting Mobile Banking</td>
<td>Adetiloye, 2014; Laukkonen &amp; Cruz, 2009; Lee &amp; Im, 2015; Lee et al., 2007; Luo et al., 2010; Mishra &amp; Singh, 2015; Natarajan et al., 2010; Shin et al., 2014</td>
<td>To design an effective business model of mobile banking, the researchers of this category attempted to develop theoretical frameworks by streamlining different challenges of mobile banking, like social norms, privacy, security, and health hazards. Authors of this category found that consumers’ behavioral intention differs in different service channels of the banking sector. According to the authors Lee &amp; Im (2015), for Internet banking, self-efficacy is more important, whereas for mobile banking, trust plays the crucial role. Several authors compared different formats of banking service delivery channels. The authors Mishra &amp; Singh (2015) identified that ATM is the most preferred channel for Indian consumers, followed by Internet and mobile banking. And consumers’ attitude and behavioral intention criteria are also potentially different for different service delivery channels. The researchers postulated that adoption factors for Internet banking and mobile banking differ in two issues: self-efficacy and device features. Generally, for mobile banking, consumers have fewer problems in relation to those two issues; however, they still prefer Internet banking in comparison to mobile banking.</td>
<td>Security issues related to technological arrangements and different technological measures are not considered while conceptualizing behavioral intention for the different service delivery channels of the financial sector. While contrasting multichannel behavior, different characterized features of different service channels may have mediating roles in the behavioral model. The studies of this category should incorporate technological features distinctive to different service delivery channels—like ATM, Internet, Kiosks, traditional telebanking, etc.—in the behavioral model to observe the differences in the effect of apparently unobserved issues such as risks of security associated with those service delivery channels.</td>
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<td>Category 4: Consumers’ Value Perception as a Post-Purchase Behavior</td>
<td>Alafeef et al., 2011; Al-Ghazali et al., 2015; Chen, 2013; Deb &amp; Lomo-David, 2014; Kadiušić et al., 2011; Laukkonen &amp; Lauronen, 2005; Marooﬁ &amp; Nazari-pour, 2013; McNeish, 2015; Rosmain et al., 2013;</td>
<td>The research studies of this category explored enormous benefits customers perceive from mobile banking in terms of economic, functional, and psychological values. They conducted surveys or interviews among customers of mobile banking. They identified that if security can be ensured and if it is easy to use, consumers are</td>
<td>The studies of this category primarily addressed some positive aspects of mobile banking and direct customers toward perceiving higher value from mobile banking. While analyzing and predicting post-purchase behavior of consumers in different cultural settings, the studies</td>
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<td>Shaikh et al., 2015; Yu &amp; Fang, 2009; Zhou, 2012</td>
<td>willing to perceive a higher value of mobile banking and accept this. The authors of this category identified that consumers perceive four values from mobile banking, namely, universal, value-added services, social value, and perceived enjoyment (for instance Maroofi &amp; Nazaripour, 2013). In exchange, compared to offline banking, they have perceptions of sacrificing two factors when adopting mobile banking, namely, fee and perceived risk. They also recognized that consumers have trust on mobile banking and they are satisfied. However, culture has an impounding effect on post-adoption perception. In this connection, some potential studies asserted that consumers have trust concerns in relation to mobile banking; however, they can keep using mobile banking if paper-based transaction statements are kept. This reflects that trust is still a vulnerable issue for the value perception of consumers for mobile banking, and post-purchase satisfaction in mobile banking is highly influenced by the trustworthiness of this mobile commerce.</td>
<td>sometimes did not consider national condition and banking sector management differences. They also often did not comprehend any behavioral issues in the post-purchase model. While conceptualizing perceived benefits or resistance behavior, both facilitating and inconvenient issues should be integrated in the same frame to depict their conjoint effects.</td>
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<td>There is a major weakness of this category of studies. These studies primarily failed to define the factors which might be used to measure post-purchase value perception. The concept of value has been used in these studies with different significance. Some studies use satisfaction as the value, while some studies use motivation; some others use intention for recurring use. Also, they did not specifically compare traditional offline banking with mobile banking through emotional, social, price/value, or performance/quality value indicators.</td>
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**Discussion and Theoretical Development**

From the analysis and synthesis, we observed that the first category of segment one is substantially engaged in identifying security problems and different kinds of risks associated with mobile banking. These research studies mostly came from engineering and technology-related researchers and have substantially discovered pure engineering-related security breaches and technological risks in the safe and secure operation of mobile communication for financial services. They also pointed out and recommended several technological administrations to control and curb these security challenges derived from mobile communication. However, these efforts were somehow scattered. One of the important stakeholders in mobile banking operations is the mobile operator, who is solely responsible for maintaining an open network of mobile communication. In many countries, government rules and information and communication technology (ICT) regulations have significant control over the governance of mobile communications and networks. However, while exploring security threats and their potential controlling measures, hardly any research has focused on the issues related to the mobile operator and respective governments’ controlling mechanisms connected with rules and regulations to articulate and foster a comprehensive controlling measure of technological security breaches associated with entire mobile banking operations. Since security measures sensitively depend on country rules and regulations and controlling mechanisms of any government on respective mobile operating systems, country-specific technological solutions might not be appropriate in the same magnitude for a generalized theoretical model. An application-based model should be derived from the transformation of protocol to suit the country-specific technological infrastructure and participation of different stakeholders. Most of the above researchers did not comprehensively consider technical or engineering, procedural or...
administrative, legal or country-specific rule and regulation, or behavioral or personal factors to establish a complete technological protocol of secure mobile banking operations. Any scattered security measures will not be completely effective in minimizing either technological threats of mobile banking related to identity theft or operational loss, or consumers’ trust related to engineering flaws and complexity.

The studies of the second category of the technology-driven first segment fundamentally focused on technological improvement for better and customer-centric service. While hypothesizing this phenomenal goal, different technological and engineering issues are synthesized to formulate technological development by introducing and improving several facilitating apps in mobile phones and data systems and applications. This is an effective flow of research which contributes significantly in advancing research on mobile banking to formulate and upgrade this service channel continuously. However, in this aspect, customers’ requirements from behavioral, technological, and social perspectives is an essential area to be penetrated and focused on. Nevertheless, these studies hardly attempted to integrate requirements from customers’ comprehensive behavior in the modeling of an improvised technological interface with effective and better apps. It should also explore and deploy functions, types, and levels of associations of different stakeholders in the entire operations of mobile banking to mitigate technological requirements in terms of their relation at different stages.

The studies of the second segment, which mainly comprised the service provider perspective, are divided into two categories. This is an important part of the research line, as it deals with the activities and strategies of the service provider, and the scholarly articles in this segment have accomplished the mission with enthusiastic effort. As the primary set of mobile banking with the determination of a clearly speculated boundary line, the first category of the second segment of studies has made excellent efforts to open the vast area of research for mobile banking for future researchers. However, the fundamental limitations of this category of research are that they hardly tried to design the scope of service considering the involvement of all stakeholders, like users, banks, governments, and mobile operators. As the initial effort to gather knowledge in mobile banking, the studies of this category have only minimally tried to determine the service periphery and scope of mobile banking. Future researchers in this group can advance research through extensive analysis of the scope of service of the financial sector, which can be accomplished through the mobile communication technology regarded as mobile banking. This research group can also explore any possibility of offering new service through mobile banking and recommend country-specific service patterns, functions, and designs of mobile banking.

As outlined earlier, the articles of the second category of research under segment two are an ongoing process of knowledge sharing, contribution, and recommending future research guidelines. However, although one of the potential intermediate members of the mobile banking supply chain is mobile operators, their inclusion and performance in relation to technological aspects is not properly considered, either in the design of mobile banking or in the technological concern of security threats for better banking operation. This area has established so far some scattered efforts to design mobile banking operations without considering service providers’ and service users’ requirements as well as intermediaries simultaneously. As an emerging area, potential risks are elaborated by many researchers; however, hardly any researchers have focused on how these potential risks can be transformed into the design of a winning strategy by the early adopters of mobile banking operations as an alternative service delivery channel. Effective
strategy formulation and implementation is a wide area to investigate, which substantially needs to streamline the overarching issues of consumer requirements, service providers’ interests, technological issues and challenges, functions of all intermediaries, service output demand, and service output supplied for this alternative and ever-changing channel of mobile communications; nevertheless, this comprehensive effort is still absent in this group of research. This is the most important but also the most neglected research category in terms of effort, theoretical outline, epistemological and ontological paradigms, and completeness. It can be safely remarked that this is an immature area, and future researchers should be encouraged to contribute to this category.

The third segment, which is centrally dealing with consumers’ service output demand, is classified into four categories. This is a valuable segment, and many researchers of this segment have potentially contributed to our understanding of knowledge about the service users, i.e., the customers. More than half of the researchers of mobile banking are engaged in determining consumers’ behavioral intention and initial trust formation, considering some other challenging issue like risk, security threats, and customer relationship management through this virtual medium. This is the first category of the third segment of the mobile banking research stream, which is pragmatically analyzing consumers’ perspectives. Their behavioral intention and value perception is nicely articulated in several phenomenal research articles with enormous empirical studies in many countries. This is a rich research area and many authors have significantly contributed to this category. However, the studies of this category, while primarily using TAM as the theoretical framework, did not consider comprehensively some essential features of mobile banking related to behavioral, marketing, financial, and technological aspects, like effect of personalization and customization, personality and self-concept, service output demand from any marketing channel, price value, and hedonic benefits. For predicting consumer behavior for any mobile channel, these concepts as constructs are very important (Dwivedi et al., Forthcoming; Rook, 1985). An exhaustive and parsimonious theoretical framework is essential to identify the paradigms of consumers’ requirements in order to adopt this alternative but emerging mobile channel. Issues related to engineering and administrative threats were considered from fragmented areas which cannot predict consumers’ actual behavior in relation to accepting mobile banking. Although some studies considered risks associated with mobile operation, inhibiting factors for accepting mobile banking were not reflected in the adoption behavior model.

The studies of the second category of the third segment consistently and unanimously postulated that demographic characteristics and culture have a potential impact on mobile banking adoption or resistance behavior. So, any attempt to theorize generalized consumer behavior, which the studies of category one of the third segment tried to do, cannot provide managerial insight, as it is culture bound. At the same time, the findings of the studies of this category signify that consumers’ behavior can be segmented based on their demographic similarities. So, clearly the authors of this category have attempted to advance practitioners’ and academicians’ understanding of versatile and continuously changing requirements of consumers and conceptualize their behavior. However, the research articles of this current category have failed to develop a grounded theory on consumers’ behavior for this mobile financial service. For mobile banking adoption or resistance behavior, while exploring cultural differences among countries, several governing issues of mobile banking—such as country specific rules and regulations, government intervention, banking service infrastructure and mobile operator
functions—must be considered to reveal whether the differences in consumers’ behavior are due to cultural differences or to the aforementioned governing issues. Demographic variables, which are examined in relation to adoption or resistance behavior to observe their moderating effect, are considered distinctly. It means the researchers of this group attempted to identify the effect of demographic variables without any systematic theoretical approach. They used those variables as moderators, but quite dispersedly. Future research in this connection should systematically develop a complete set of demographic variables which might have an impact on shaping consumer behavior for mobile banking, segment markets considering clusters of consumer behavior, and explain any differences in consumer behavior, shedding light on cultural traits.

This is an excellent effort of the researchers in the third category of the third segment to further advance the effort of developing paradigms for consumers’ behavioral intention to adopt mobile banking by comparing consumers’ preferences for other virtual service delivery channels which are also governed by modern ICT and mobile communication networks. Since mobile banking is an alternative service delivery channel, it is an important idea and research question to compare different existing and probable future channels on the basis of consumers’ perceptions. And the researchers of this category are partially successful in providing some insights into this required information through extensive studies. However, the studies of this category should incorporate technological features distinctive to different service delivery channels, like ATM, Internet, Kiosks, traditional telebanking, etc., in the behavioral model to observe the differences in the effects of apparently unobserved issues such as risks of security associated with those service delivery channels. Researchers should compare consumers’ behavior in relation to offline and online channel preferences, which is hardly focused on by any researchers (except Yang et al., 2014), because the mobile banking service delivery channel should also prove it has a competitive advantage in comparison to the offline channel. Service output supplied (Bucklin, 1966) by different service delivery channels and consumers’ preference to maximize values and benefits can be used as the predictor of consumer behavior.

Tracking consumers’ post-purchase behavior is a fertile research area and it has enormous managerial implications for professionals as well as for academia. This is the subject area of research for the fourth category of the third segment. To further advance the study of consumer behavior regarding mobile banking, a comparison between value expectations and perceptions can provide deep insight into the issues which are related to consumers’ dissatisfactions. It is also an effective knowledge-sharing area where studies have figured out consumers’ perceptions of values derived from mobile banking after using this service in comparison to traditional offline banking services. From the findings of this category, all three segments of studies can benefit, as it can provide substantial insights for them. Researchers of this category have engaged their efforts to determine consumers’ perceptions from experience and contribute this knowledge for future researchers. However, these studies can be improved by alleviating some obvious weaknesses. Although consumers’ perception is used as the theoretical framework to reveal consumers’ post-purchase behavior, the researchers of this group primarily used the technology adoption model or the extended model of adoption behavior, which cannot substantially predict consumers’ value perception. While engaged in identifying specific post-purchase value perception for mobile banking, researchers did not consider the performance of service providers. Consumers might not perceive high value of mobile banking due to the inefficiency of the service provider itself, i.e., the bank, not due to any other failure or loop-fault of the mobile banking operation. So, research should have been designed to distinguish this separate
phenomenon. Value perception can be highly dependent on demographic characteristics, which are ignored in these studies.

**Conclusion and Future Research Guidelines**

After summarizing the overall findings and contributions of the existing research studies gathered from this current literature review, we can confidently state that technological improvement for minimizing security risks, capitalizing on the enormous benefits of ever-changing communication technology and smartphones, and providing high-quality and customer-centric service consistent with generational changes in mobile communication technology is quite nicely articulated in the existing literature. They discovered many security threats—like replay, spoofing, denial of service, man in the middle, etc.—related to confidentiality, integrity, authenticity, non-repudiation, and availability (Chikomo et al., 2006). Researchers also established relations with those security risks associated with devices, users, service providers and their governance, and data and communication networks with applications. However, since this sector is continuously changing, this effort should be continued by future researchers. New security threats will always arise for mobile communication. This technology will be continuously upgraded, and thus future research always has space to contribute to upgrading our knowledge on successive applications.

Researchers have dealt with several issues of service providers and have revealed that operational performance and cost structure are the two governing issues of banks in designing this alternative channel. This service will be successful if the consumers can easily get access to this service and if security is ensured. So, to design an effective structure for this delivery channel, researchers defined scopes and types of service with their boundary line, and functions and associations of different stakeholders. In this connection, association and functions can significantly vary from country to country. So, generalized service design might not be effective, and thus country-specific research could be continued by future researchers. Mobile operators’ association in this delivery channel and their functions should be determined and considered in any effort to minimize gaps in channel design and develop a zero-based channel. Researchers have wide space in this continuum of research to contribute and offer some effective strategies for the practitioners to create a successful marketing channel for financial sectors, capitalizing on the ubiquitous benefits of mobile communication. Appropriate service delivery channel design is far from being reached, so researchers can continuously investigate this area and accumulate findings from other research segments and categories to establish a functional and effective mobile service delivery channel for widespread acceptance by consumers.

Researchers identified that in addition to the regular constructs of TAM and DOI, accessibility, availability, awareness, and time and location independency are the prevalent determinants for consumers to pursue their behavioral intention to accept mobile banking. Up to now, we have gathered a significant amount of information about consumers’ behavior in relation to mobile banking. Attempts have also been made to formulate post-purchase behavior. However, this area also needs a significant contribution from future researchers, particularly to gather knowledge about multichannel behavior, cultural effect considering a complete set of cultural traits, consumers value perception considering conjoint effect of other moderating variables like government rules and regulations, functions of intermediaries, breaches of security whether it is derived from the service provider, mobile operator, or from the government. Consumers behavioral intention models should consider specific customer service of a bank in offline and
online channel, cost structure in rendering banking service, service output demand and service output supplied. They should also consider more marketing and consumer behavior aspects in addition to regular technology related behavioral aspects derived from the theories like TAM, TPB, and DOI. In this connection constructs like personality and self-concept, price value, waiting time can be included. Future researchers can conduct research in these areas and can integrate these findings to accomplish the design of an effective and efficient mobile banking operation accentuating consumers’ requirements and behavioral intentions.

References


Laukkanen, T., & Cruz, P. (2009). Comparing consumer resistance to mobile banking in finland and portugal


Ratten, V. (2013). Mobile banking innovations and entrepreneurial adoption decisions. Modern entrepreneurship and E-business innovations (pp. 74-86)


Saxena, N. & Chaudhari, N. S. (2013), Security in Mobile Banking, A Conference on Mobile Telephony in Developing Countries, University of Jyväskylä, Finland, May 24-25.


