Understanding Consumers' Mobile Banking Adoption in Germany: An Integrated Technology Readiness and Acceptance Model (TRAM) Perspective

Roshan Khadka and Phanasan Kohsuwan

Abstract

Today, more than a billion of the world's population have access to mobile banking (KPMG, 2015). While people are embracing mobile banking services in their daily lives, the investigation of mobile banking from a behavioral perspective is a mystifying topic for research study. The purpose of this study is to propose and examine an integrated theoretical model to better understand consumer behavior regarding mobile banking adoption in Germany. This study integrates the multidimensional psychographic constructs of Technology Readiness Index (TRI) and the Technology Acceptance Model (TAM) with consequent consumer satisfaction and loyalty to provide a robust integrated framework of mobile banking adoption processes. Confirmatory factor analysis and structural equation modeling were employed to meticulously test the validation of constructs and their interrelationship with each other. The findings reveal that the Technology Readiness and Acceptance Model (TRAM) variables have a significant influence on adoption of mobile banking technology in Germany. The study concludes with a discussion on practical implications of the research across similar service providers, and suggests further research to improve their marketing and servicing strategies.

Keywords: *Mobile banking, Technology Readiness Index (TRI), Technology Acceptance Model (TAM), Technology Readiness and Acceptance Model (TRAM), Customer Satisfaction, and Customer Loyalty*

Introduction

The development of virtual technology has challenged banking and financial institutions to shift their channels from conventional banking to digital banking. With advancements in the telecommunication industry, contemporary banking and financial organizations are leveraging from smartphones and internet connectivity. Smartphones and the internet have enabled consumers to efficiently manage tasks with simple clicks and communications, ultimately saving time and enabling consumers to devote more time for other activities. Mobile banking is a financial channel offered to consumers to access banking services using a mobile device with the aid of a telecommunication network. It evolved in Germany during the late 1990's, when Deutsche Bank introduced the service in collaboration with a German tech company called Paybox (Shaikh & Karjaluoto, 2014). Today, millions of consumers simply login to the mobile banking site of banks or just send an instant text message to conduct a transaction. The 24/7 access to smart phones and improvement of internet connectivity in the telecommunication sector has supported the growing adoption of mobile banking services.

According to a KPMG mobile banking report (2015), approximately 1.1 billion people in the world are using mobile banking services, and usage is increasing every year. Financial firms around the world are aiming to tap a growing market segment that provides promising opportunities for further advancement. The United States is the market leader in financial technologies, with a market size of 13.8 billion euros, followed by the United Kingdom and Germany, putting together a shared market size of 11.3 billion euros, or 8.9 billion euros and 2.4 billion euro respectively (EY, 2016). This study focusing on the world's third largest mobile banking market, Germany, may provide a better understanding of this subject matter. It integrates multidimensional psychographic information regarding a construct known as the Technology Readiness Index (TRI) (i.e. Optimism, Innovativeness, Insecurity and Discomfort) and users' acceptance and usage of technology known as the Technology Acceptance Model (TAM) (i.e. Perceived Usefulness, Perceived Ease of Use, and Actual Usage) with consequent consumer satisfaction and loyalty to provide a robust integrated framework of mobile banking adoption processes.

Significance of the Study

This study focused on the world's third largest mobile banking market, Germany, and helps to provide a better understanding of this subject matter. The research investigation uses multiple dimensions of a modified Technology Readiness and Acceptance model (with the integration of satisfaction and loyalty) to assess mobile banking adoption behavior among actual adopters. It aims to bring holistic insights from consumers' viewpoints precisely on the factors that influence the adoption of mobile banking in Germany. The objective of the study is to test and deliver an integrated model, which provides a better understanding of adoption of mobile banking, revealing existing barriers and drivers from a consumer's perspective.

Literature Review

Background

Mobile banking is a self-service technology application which has brought dramatic transformation in the way banks build and maintain relationships with their customers (Mols, 2000). Mobile banking allows consumers to connect to a financial organization and view account balances, transfer funds between accounts, pay bills, or receive accounting alerts. Payments commenced in physical or virtual worlds can be made via Short Message Service (SMS), Multimedia Messaging Service (MMS), mobile Internet, software application, or Near Field Communication (NFC) chips (McGuire & Crowe, 2008). Looking at the past two decades, technology has evolved by inclusion or replacement of other related technologies. The expansion of mobile banking has had a great impact on the banking industry. Banking services have gone through drastic changes starting from the early 1980s when telephone and computer banking became prominent and progressed towards automated teller machines (ATM) and internet banking facilities. Today, electronic banking is at its peak with the transformation brought by mobile technologies such as SMS, Wireless Application Protocol (WAP), Third Generation (3G) and Fourth Generation (4G) technologies (Laukanen, Sinkkonen, Laukkanen, & Kivijarvi, 2008).

TAM (Technology Acceptance Model)

The TAM model proposed by Davis (1989) is one of the most widely accepted models to describe and understand how end users make decisions to use technology products or services (Chau & Hu, 2001; Svendsen, Johnsen, Sorensen, & Vitterso, 2013). TAM has been applied to a wide range of research studies to understand consumer behavior and adoption of technology, including products such as internet banking (Al-Ajam & Nor, 2013), mobile financial services (Lee, Park, Chung, & Blakeney, 2012), mobile advertising (Zhang & Mao, 2008), e-commerce (McCloskey, 2004), 3G mobile value-added services (Kuo & Yen, 2009) and many more. According to TAM, two cognitive variables, perceived ease of use and perceived usefulness, are the critical factors that determine the consumers' choice. *Perceived usefulness* can be explained as the extent to which an individual or organization believes that the application of technology will improve their performance (Davis, 1989). *Perceived ease of use* can be defined as the extent to which an individual or organization believes that application of technology will be effortless (Davis, 1989). Further, TAM hypothesizes that perceived ease of use contributes to perceived usefulness due to saved effort. According to Davis, the perceived characteristics are expected to influence intentions to use a system, which in turn influence actual system usage. Moreover, perceived ease of use is assumed to affect a user's perception regarding perceived usefulness. This hypothesis follows from the logic that improvements in ease of use of a system contribute to increased usefulness due to saved effort (Davis, 1989).

Technology Readiness Index (TRI)

The Technology Readiness Index (TRI) was developed through a wide-ranging multiphase research program in the United States. Research has found a positive relationship between technology readiness (TR) scores and technology-related behavior pertaining to the ownership, usage, and desirability of using technology (Parasuraman, 2000). TRI replication in Great Britain has further strengthened the soundness of the index. According to Parasuraman (2000), Technology Readiness

refers to people's propensity to embrace and accept new technologies to realize goals in home life and at work. It is determined by the positive and negative technology-related beliefs of people. These beliefs of technology users can be characterized under four principle dimensions: *optimism, innovativeness, discomfort*, and *insecurity* (Parasuraman, 2000). *Optimism* is users' confident view regarding a technology and a belief that it amplifies control, adaptability, and efficacy in their lives (Parasuraman & Colby, 2001). *Innovativeness* is the propensity of an individual to be a pioneer and thought leader in technology (Parasuraman & Colby, 2001). *Discomfort* is "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Parasuraman & Colby, 2001, p. 41). *Insecurity* is "a distrust of technology and skepticism about its ability to work properly" (Parasuraman & Colby, 2001, p. 44). Research outcomes confirm that each of the four dimensions are independent and significantly influence the technological readiness of an individual.

Technology Readiness and Acceptance Model (TRAM)

The Technology Readiness and Acceptance Model (TRAM) is an integration of TRI and TAM. Lin, Shih, Sher & Wang (2005) initially presented TRAM, which incorporates the general dimensions of TRI with system specific dimensions of TAM to explain how these can influence individual interactions, experiences, and usage of the new technology. Initially when integrating TRI and TAM, the technology readiness index was tested as a predictor of TAM (Lin et al., 2005). In recent studies, dimensions of TRI are directly connected with the dimensions of TAM (perceived usefulness and perceived ease of use), resulting in a more detailed model (Walczuch, Lemmink, & Streukens, 2007). The optimism and innovativeness dimensions are assumed to increase perceived usefulness and ease of use of particular technology, while the insecurity and discomfort aspects limit the dimensions of TAM (Parasuraman & Colby, 2001)

Satisfaction and Loyalty

When a consumer accepts and uses an innovative product/service, the perception after consumption should drive the evaluation of product/service performance (Bailey & Pearson, 1983). Thus, satisfaction and loyalty has been integrated in the research study to observe performance of mobile banking services and its influence on behavior of mobile banking adopters in Germany. Satisfaction is the marketing concept that has been proven as a good indicator to measure and predict the future purchasing behavior of consumers (McQuitty, Finn, & Wiley, 2000). According to Kotler and Armstrong (1996), satisfaction is a sentiment derived from the evaluation process of what has been perceived against what was expected from the purchase decision itself, also considering needs and wants associated with the purchase. Previous studies have proven that consumer satisfaction safeguards future revenues (Fornell, 1992; Bolton, 1998), eases future transaction costs (Reichheld & Sasser, 1990), minimizes price elasticity (Anderson, 1996), and diminishes the probability of consumers discarding the product or service if quality falters (Anderson and Sullivan, 1993). On the other hand, Oliver (1987) and Nyer (1999) found that dissatisfied consumers are inclined to complain to organizations, and recall cognitive dissonance and bad consumption experiences with the product.

According to Oliver (1999), loyalty is a deeply held commitment for consistent repurchase or to re-patronize a preferable product/service that repeatedly leads to purchase of the same brand despite any situational influence on marketing efforts. Satisfied consumers can be lost to competitors due to indifference which might arise from pure neglect (Clemes, Gan, Kao, & Choong, 2008). However, a loyal consumer base ensures continuity of sales and benefits for the organization. Today, banks and financial companies' product offerings are evolving to satisfy and retain their consumers. Winning consumers with marketing campaigns is expensive, while retaining existing consumers and building a loyal consumer base allows them to reduce the customer acquirement cost.

Relationship of Research Variables and Hypothesis – TRI and TAM

Individuals who have an optimistic and innovative orientation to technology are supposed to embrace positive attitudes to new technology and technological use. Thus, it is reasonable to

hypothesize optimism and innovativeness as an enabler which has a positive influence on how individuals perceive and relate to new technology (Parasuraman & Colby, 2001; Tsikriktsis, 2004). On the contrary, emotions associated with insecurity towards technology lead to ambiguity and low usage of the technology (Parasuraman & Colby, 2001; Tsikriktsis, 2004). Hence, this study has assumed insecurity as the restraint, which induces lower levels of perceived usefulness and perceived ease of use. In addition, technology that creates unmanageable systems is not user-friendly, and hence discomfort is anticipated which would affect ease of use (Parasuraman & Colby, 2001; Tsikriktsis, 2004). Thus, based on above discussions, this study hypothesized that:

H1A: The Optimism dimension of TRI has a positive influence on Perceived Usefulness of mobile banking service among consumers in Germany.

H1B: The Innovativeness dimension of TRI has a positive influence on Perceived Usefulness of mobile banking service among consumers in Germany.

H1C: The Insecurity dimension of TRI has a negative influence on Perceived Usefulness of mobile banking service among consumers in Germany.

H1D: The Discomfort dimension of TRI has a negative influence on Perceived Usefulness of mobile banking service among consumers in Germany.

H2A: The Optimism dimension of TRI has a positive influence on Perceived Ease of Use of mobile banking service among consumers in Germany.

H2B: The Innovativeness dimension of TRI has a positive influence on Perceived Ease of Use of mobile banking service among consumers in Germany.

H2C: The Insecurity dimension of TRI has a negative influence on Perceived Ease of Use of mobile banking service among consumers in Germany.

H2D: The Discomfort dimension of TRI has a negative influence on Perceived Ease of Use of mobile banking service among consumers in Germany.

Perceived Ease of Use and Perceived Usefulness of TAM

Previous research studies have shown that higher perceived ease of use increases the perceived usefulness of applications (King & He, 2006; Lin et al., 2005; McFarland & Hamilton, 2006; Schepers & Wetzels, 2007; Venkatesh & Davis, 2000). Thus, based on these previous studies, the following statement is hypothesized:

H3: Perceived Ease of Use has a positive influence on Perceived Usefulness of mobile banking service among consumers in Germany.

Perceived Usefulness and Satisfaction

According to Doll & Torkzadeh (1988), when users perceive ease of use of a computing system, users are most likely to feel satisfied. Similarly, Devaraj, Fan, & Kohli's (2002) study on e-commerce concluded that both perceived usefulness and perceived ease of use have an influence on user satisfaction with e-commerce. In a study of an information system at a university, Rai, Lang, & Welker (2002) found that information quality, perceived ease of use, and perceived usefulness influenced user satisfaction. Thus, this study hypothesized that:

H4A: The Perceived Usefulness dimension of TAM has a positive influence on Satisfaction among mobile banking consumers in Germany.

H4B: The Perceived Ease of Use dimension of TAM has a positive influence on Satisfaction, among mobile banking consumers in Germany.

Satisfaction and Loyalty

Consumer loyalty is largely determined by consumer satisfaction (Anderson, Fornell, & Lehmann, 1994). When satisfaction among consumers increases, they are more likely to recommend

the product/service, are less likely to switch to substitutes, and are more likely to repurchase the product/service in the near future (Russell-Bennett & Rundle-Thiele, 2005: Sivadas & Baker Prewitt, 2000). Thus, this study hypothesized that:

H5: Satisfaction among mobile banking consumers in Germany has a positive influence on Loyalty.

Based upon the above discussion, a theoretical model (Figure 1) for the study is derived showing all the hypotheses. The model consists of eight variables to investigate the adoption process of mobile banking in Germany.

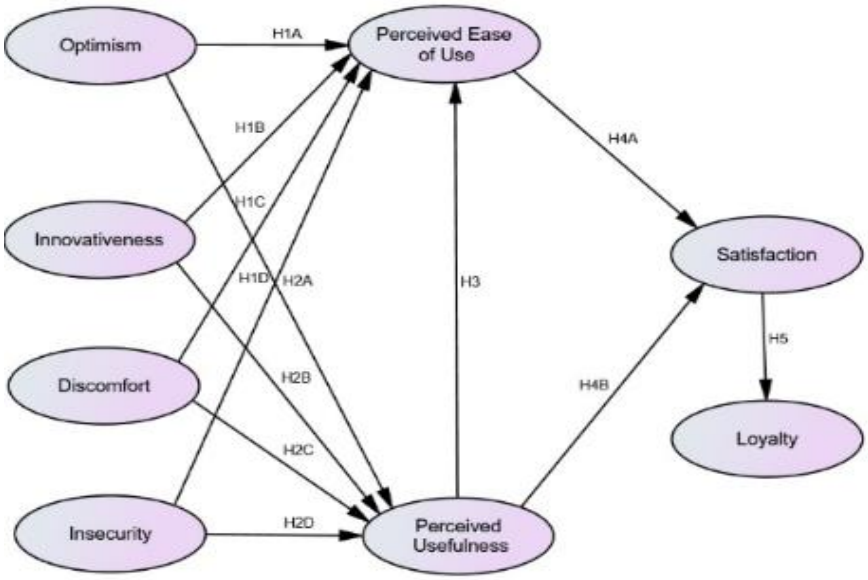

Figure 1. Theoretical Framework (adapted from Parasuraman, 2000; Davis, 1989)

Methodology

Sample and Data Collection

For the research purpose, respondents were selected from Germany – the world's third largest mobile banking market; as such, investigation could provide better insights on the subject matter. The portion of the populace living in Germany were considered as the study's population. The respondents for the study are actual mobile banking adopters rather than individuals who are intending to adopt the technology, as the information gained from non-adaptors could not be based upon their real experience. The minimum sample size of 400 was calculated by using Yamane's (1973) formula with a 95 percent confidence level. However, to maintain the reliability of the data, the study's sample size was increased to 412 persons.

According to Sue and Ritter (2007), an online survey is an appropriate choice to conduct the study when sample population is large and widely dispersed geographically. Non-probability sampling – or more precisely – a web-based, self-selected online survey was used. In a self-selected online survey, questionnaire links are sent to target populations and respondents have a choice regarding their inclusion as part of the sample for a study (Callegaro, Manfreda, & Vehovar, 2015). It is a form of convenience sampling which facilitates access to information from people of the target group who are out of reach because of geographical and demographic challenges (Hughes, 2012). The online survey was organized through Google Docs survey tool, the Google Form. A questionnaire was developed and distributed in the English language. To ensure the survey was completed by the targeted group, firstly people were informed about the research with a short description in the questionnaire. They were instructed to proceed only if they have used German mobile banking services. Accessibility to the internet has created more prospects for large numbers of respondents

(White & McBurney, 2012). The questionnaire was distributed via the internet on Facebook groups and forums that specifically address people living in Germany. The data from online surveys was collected from December 2016 to January 2017.

Measures

The questionnaire for the study was separated into three sections: demographic information, technology readiness and acceptance, and user satisfaction and loyalty. The questionnaire consists of 16 questions. Eight constructs of the research model were measured with a total of 60 scale items (36 items for four dimensions of TRI, 12 items for two variables of TAM, 5 items for satisfaction, and 7 items for the loyalty construct). The items of each construct were measured using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Analysis Techniques

Firstly, a reliability analysis of the scale items was conducted using Cronbach's alpha test. Secondly, the validity of the questionnaires was measured utilizing factor analysis. And finally, a Structural Equation Modeling (SEM) technique was applied to examine the theoretical framework and hypotheses of this study.

Data Analysis

The majority of respondents (41.75%) were 21-30 years old, followed by those who were between 31-40 years old (33.74%). Respondents under 21 years old accounted for 13.83 percent of the total, followed by those between 41-50 years old (9.95%) and those over 50 years old (0.73%). The majority of respondents (61.89%) were male, while 38.11 percent were female.

The study utilized Cronbach's alpha to test scale reliability. The Cronbach's alpha value of all constructs were within the range of 0.714 to 0.839. To assure internal consistency of scales, Cronbach's alpha value must be above 0.70 (Bagozzi, 1994; DeVellis, 2012; George & Mallery, 2003; Hair et. al, 2010; Kline, 2000). Hence, all constructs in the research framework are acceptable in terms of internal consistency.

The Kaiser-Meyer-Oklin (KMO) Test was employed to assess the data's suitability for factor analysis. For sampling adequacy, the KMO value should be either 0.6 or above, along with a significant result from Bartlett's Test of Sphericity of less than 0.05. Both the KMO and Bartlett's test results showed that the survey data obtained were both adequate and significant. Further, to ensure normal distribution, normalization testing was performed. According to George and Mallery (2010), values for asymmetry and kurtosis of between -2 and +2 are considered acceptable to prove the normal univariate distribution of data. The results of normality testing showed that out of 60 items, 56 data items had a skewness and kurtosis value between -2 and +2, and so further analysis was not performed. Utilizing Principal Component analysis with the Promax rotation method, Exploratory Factor Analysis was conducted with all related items. The analysis revealed three items with low factor loadings, which were carefully considered for further analysis. All other scale items ranged from between 0.536 to 0.99, which were above the recommended level of 0.5 (Hair et al., 2010).

Finally, to assess the data's convergent and composite validity, Average Variance Explained (AVE) and Composite Reliability (CR) were calculated utilizing the factor loadings of each item. According to Fornell and Larcker (1981), AVE should be above 0.50, and CR should be above 0.70 to assure convergent and composite validity of the data. Results from these criteria for AVE and CR were achieved for all constructs except for Innovativeness, which had an AVE value of 0.49 that was rounded up to a numerical value of 0.50.

Confirmatory factor analysis (CFA) was conducted to test constructs of the proposed theoretical framework utilizing the maximum likelihood technique. CFA and SEM can be an iterative procedure when modifications are indicated in the initial results, and parameter constraints are altered to improve the fit of the model (Schreiber, Stage, King, Nora, & Barlow, 2006). Hence, a few original scale items were removed from the constructs to obtain acceptable results for the model. A

summary of the modified CFA results is shown in Table 1, which indicates that all constructs fit well within the measurement model, and was established as a critical precondition for the validity of following the Structural Model Estimations.

Table 1. Summary of Refined Confirmatory Factor Analysis Developed for Research Study

Variables	χ2/df	GFI	NFI	RFI	IFI	TLI	CFI	RMR	RMSEA
Criteria	**< 3**	**>.90**	**>.80**	**>.80**	**>.80**	**>.90**	**>.90**	**<.080**	**<.080**
Optimism	0.00	1.00	1.00	_	1.00	_	1.00	0.00	0.73
Innovativeness	0.00	1.00	1.00	_	1.00	_	1.00	0.00	0.05
Discomfort	0.19	1.00	0.99	0.99	1.003	1.01	1.00	0.00	0.00
Insecurity	0.00	1.00	1.00	_	1.00	_	1.00	0.00	0.66
Perceived Usefulness	0.00	1.00	1.00	_	1.00	_	1.00	0.00	0.71
Perceived Ease of Use	0.89	0.99	0.99	0.99	1.00	1.00	1.00	0.005	0.00
Satisfaction	0.00	1.00	1.00	_	1.00	_	1.00	0.00	0.04
Loyalty	0.00	1.00	1.00	_	1.00	_	1.00	0.00	0.47

Note. Key to abbreviations: Degrees of Freedom (df), Goodness of Fit Index (GFI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Residual (RMR), and Root Mean Square Error of Approximation (RMSEA)

All constructs in the research framework of the study were tested to establish whether the proposed model can predict the adoption of mobile banking services in Germany. The Goodness of Fit (GOF) of the model was tested along with the hypothesized paths between research variables.

The research framework generated a sufficient Chi-square to degree of freedom ratio (χ2/df) i.e. 2.62, which was below the threshold of 3.0. The model also generated acceptable values for GFI, Adjusted Goodness of Fit Index (AGFI), CFI, NFI, RMR and RMSEA measures, i.e., 0.906, 0.874, 0.913, 0.868, 0.016 and 0.063 respectively (Figure 2). According to Holye (1995), the GFI and CFI values should be at or above 0.90. Further, he mentioned that the value of AGFI and NFI for goodness of fit has to be just 0.80 or above. Similarly, the values of RMR and RMSEA are acceptable as a good fit up to 0.08 (Hair et al., 1998). Analyzing the result of goodness of fit indices, the theoretical model of the study can be considered as a good fit, which is a reasonable fit to the real-world data.

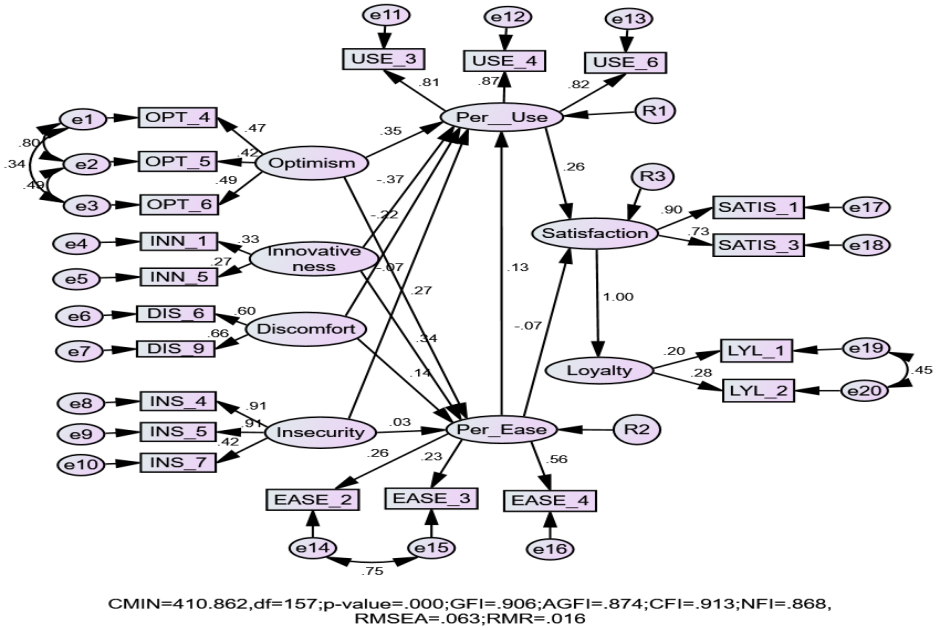

Figure 2. Structural Model Developed from This Research Study

The standardized path coefficients and their critical ratios (t-values) were used to examine the hypothesized paths, and vice-versa. The cut-off level of more than 1.96, along with a p-value of less than 0.05, is recommended to achieve a statistically significant hypothesis (Chin, 1998).

The results showed that the *Optimism* dimension of TRI had a positive influence on Perceived Usefulness (β=0.35, t-value=5.28, p<0.001), and the *Discomfort* dimension of TRI had a negative influence on Perceived Usefulness (β=-.22, t-value=-3.20, p<0.05). The *Innovativeness* dimension had a positive influence on Perceived Ease of Use (β=0.35, t-value=5.28, p<0.05), while the Perceived Ease of Use had a positive influence on Perceived Usefulness (β=0.13, t-value=5.28, p<0.001). The Perceived Usefulness dimension of TAM had a positive influence on *Satisfaction* (β=0.26, t-value=4.05, p<0.001), and it was also confirmed that satisfaction level of the mobile banking consumers in Germany had a positive influence on *Loyalty* (β=1, t-value=5.28, p<0.001). Thus, hypotheses H1A, H1D, H2, H3, H4A and H5 were supported. The results are portrayed in Table 2.

Discussion

The current study shows that there is a high level of relevancy among the TRI and TAM dimensions. Further, users' personality dimensions from TRI like *Optimism*, *Innovativeness*, and *Discomfort* were found to have a significant indirect influence on satisfaction and loyalty levels among German mobile banking consumers. In the case of TAM, Perceived Usefulness had a direct – and Perceived Ease of Use had an indirect – influence upon the satisfaction and loyalty levels of German mobile banking consumers.

Table 2. Summary of Hypotheses Tests Developed from SEM Analysis

Hypothesized Path	Standardized Coefficients(β)	C.R. (t-value)	Results
H1			
A. Optimism → Perceived Usefulness	0.35	5.28*	Supported
B. Innovativeness → Perceived Usefulness	-0.37	-1.87	Rejected
C. Discomfort → Perceived Usefulness	-0.22	-3.20	Supported
D. Insecurity → Perceived Usefulness	-0.07	-1.26	Rejected
H2			
A. Optimism → Perceived Ease of Use	0.27	1.309	Rejected
B. Innovativeness → Perceived Ease of Use	0.35	5.28***	Supported
C. Discomfort → Perceived Ease of Use	0.14	1.10	Rejected
D. Insecurity → Perceived Ease of Use	0.03	0.35	Rejected
H3			
Perceived Ease of Use → Perceived Usefulness	0.13	5.28***	Supported
H4			
A. Perceived Usefulness → Satisfaction	0.26	4.05***	Supported
B. Perceived Ease of Use → Satisfaction	-0.07	-0.80	Rejected
H5			
Satisfaction → Loyalty	1	5.28***	Supported

Model Goodness-of-fit Statistics:
χ2=410.862 (p < 0.000); df=157; χ2/df = 2.617; GFI=0.906; AGFI=0.874; CFI=0.913; NFI=0.866, RMR=0.063; RMSEA=0.016

Note. Cut off t-value is 1.96 (*p < 0.05, ***p<0.001)

The assessment of relationships between TRI dimensions and Perceived Usefulness revealed that the *Optimism* and *Discomfort* dimensions of TRI have a significant influence on Perceived Usefulness. Although, the *Innovativeness* dimension of TRI did not have a significant influence on Perceived Usefulness of mobile banking, it had an indirect influence on Perceived Usefulness when mediated through Perceived Ease of Use of mobile banking services.

The assessment of hypothesized relationships between TRI dimensions and Perceived Ease of Use reveals that only the *Innovativeness* dimension of TRI influenced Perceived Ease of Use. The result possibly implies that people living in Germany are highly exposed to advanced and new technologies, and such exposure to innovativeness has contributed to consumers' ability to understand and use banking technology. Similarly, each small innovation applied by German service providers to improve mobile banking technology is expected to be user-friendly. Hence, *Innovativeness* had a positive influence on Perceived Ease of Use among mobile banking users in Germany.

As hypothesized in H3, the Perceived Ease of Use has a positive influence on Perceived Usefulness of mobile banking among consumers in Germany. The result replicates similar findings from King & He (2006) , Lin et al. (2005), McFarland & Hamilton (2006), Schepers & Wetzels (2007) and Venkatesh & Davis (2000).

As opposed to previous studies, the study found that only the Perceived Usefulness dimension of TAM had a significant influence on consumers' satisfaction. The result showed that there is no direct relationship between Perceived Ease of Use and satisfaction among mobile banking users. However, Perceived Ease of Use had a significant and positive influence on Perceived Usefulness of mobile banking technology. Thus, the research concluded that Perceived Usefulness had a direct and positive influence on consumers' satisfaction, and Perceived Ease of Use had an indirect influence on the satisfaction level among German mobile banking users.

The satisfaction factor had a significant positive influence on consumer loyalty intentions for a wide variety of products and services, including telecommunication-related services (Fornell, 1992; Fornell, Johnson, Anderson, & Bryant, 1996). Satisfaction influence on loyalty is the strongest indicator in the whole model, with the β equal to 1, t-value equal to 3.71, and p-value less than 0.001.

Conclusions and Recommendations

This research provides an in-depth theoretical perspective pertaining to adoption behavior of mobile banking consumers in Germany. It offers a new approach to comprehend the adoption of mobile banking technology utilizing consumers' psychographic dimensions (optimism, innovativeness, discomfort and insecurity), cognitive dimensions (perceived usefulness and perceived ease of use), and behavioural dimensions (satisfaction and loyalty) at the same time. The importance of creating satisfied and loyal consumers in the process of mobile banking adoption is emphasized; especially for new players in the market. The study demonstrated that consumers' personality, cognitive and behavioural dimensions have significant impact on adoption of mobile banking service among German consumers. Thus, when a consumer opts to use a mobile banking service, the consumer's personality needs to be explicitly taken into account, as personality forms the cognition/perception about the service, and perception determines satisfaction and loyalty towards mobile banking technology.

Users' optimism has a direct and positive impact on the perceived usefulness of mobile banking service. Managers should allocate their marketing resources and put forth an effort to create an optimistic veiw among consumers, with regard to mobile banking technology. This way they can positively influence the cognition of mobile banking users and increase their satisfaction and loyalty levels. The differential effects of innovativeness in the adoption process of mobile banking suggest that there is no one way to approach creating commercially viable innovations. Sometimes, innovativeness doesn't make a difference on perceived usefulness of technology (possibly because targeted user groups are very innovative, so such innovations integrated in a product or service are percieved as too basic). Nevertheless, innovativeness in technology has a significant positive influence on the perceived ease of use. Hence, management and mobile banking developers have to meet the high standards of consumers and create user friendly innovations.

The findings of a relationship between discomfort and percieved ease of use with respect to percieved usefulness of mobile banking technology suggests that mobile banking service providers need to understand and analyze each constituent of the whole service, and improve those fragments that are possibly creating inconvinence when a consumer uses the service. Thus, eliminate the discomfort and amplify the perceived ease of use when a service is consumed. This will increase the

percieved usefulness of mobile banking technology among consumers; hence, it will increase their satisfaction level. The fit analysis of this research study ascertained that understanding the adoption of mobile banking technolgy among users – including their satisfaction and loyalty levels – requires a holistic approach. Managers must consider multiple relevant variables and rationalize their association and impact on each other to gain insight into motives that influence consumers and persuade them to stay loyal. Therefore, organizations must develop an integrated strategy at a corporate as well as functional level – one that is aligned with the key influencing factors as noted above, to facilitate a positive mobile banking adoption process among users.

Despite a large collection of sample data, the samples were possibly limited to a few regions of Germany beacause of the use of a self-selected online sampling method. Individuals participating anonymously in the survey may have possibly provided inaccurate information, hence creating biased and dishonest responses (Saunders, Lewis, & Thornhill, 2009). A longitudinal study to research the adoption of mobile banking is suggested over a longer period. The research study put forward possibilities for future research to explore other relevant variables that influence adoption of mobile banking. Additionally, the conceptual model that emerged from the research should be extended to understand the adoption of other technological products/services such as e-wallets, smart watches, smart keys, and so on.

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