Exploring the Factors That Affect M-Banking Adoption Through Smartphone App Among Young Indian College Students-an Extended UTAUT2 Approach

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Abstract: Increasing sales of smart phone in developing country like India has brought marketing researcher's attention towards mobile banking apps usage. Mobile internet technology has been very effective in revolutionizing the banking services throughout the world. In developing economy like India, how far the consumers are making use of m-Banking app for transaction purposes needs to be investigated. The main objective of this study is to understand factors affecting Mobile Banking Adoption (MBAD) through smartphone app among young consumers in India. An extended Unified Theory of Acceptance and Use of Technology (extended UTAUT2) Model of slade was used as a theoretical base to examine factors affecting m-Banking app adoption. The questionnaire was distributed to college students of a private college in South India and a sample of 286 were collected. A Structural Equation Modelling (SEM) analysis was carried out using smart PLS 2. Finally the results and implications were discussed at the end.

Key words: Mobile Banking Adoption (MBAD), young consumers, m-Banking app, Unified Theory of Acceptance and Usage of Technology 2 (UTAUT2), extended Unified Theory of Acceptance and Usage of Technology 2 (extended UTAUT2), young consumers, smartphone, Structural Equation Modelling (SEM), behavioral intention, smart PLS 2, India

INTRODUCTION

Usage of mobile has become more common and important part of human life. Mobile banking was introduced in the year 2000 with the help of wireless mobile technologies such as Short Messaging Service (SMS), Wireless Access Protocol (WAP) or General Packet Radio Service (GPRS) (Siddhartha *et al.*, 2011). Banking transactions conducted through use of communication devices such as cell phones and Personal Data Assistants (PDA) with the help of wireless mobile technology such as Short Messaging Service (SMS), Wireless Access Protocol (WAP) or General Packet Radio Service (GPRS) (Siddhartha *et al.*, 2011) is called Mobile-Banking. There are numerous terms used by researchers for mobile banking such m-Banking (Liu *et al.*, 2009), Branchless banking (Ivatury and Mas, 2008), m-Payments, m-Transfers, m-Finance (Donner and Tellez, 2008) or pocket banking (Amin *et al.*, 2006). Porteous (2006) says "there are more people with mobile phones than with bank accounts". Ubiquitous nature of mobile devices is the main driving force for its rapid adoption (Veijalainen *et al.*, 2006).

Banking transactions done through the use of smartphone app with the help of wireless mobile internet technology (such as 2G, = 3G, 4G/LTE etc.) is called m-Banking app adoption. The banking apps can be easily downloaded from google play store or apple I store. The list of current active mobile banking apps of the Indian public and private sector banks has been shown in Appendix 1. The ericsson consumer lab report 2015 shows adoption of the smartphone application services has become a new trend among Indian consumers and also there is an increase in adoption of smartphone among people of lower socioeconomic segment in India. About (30%) of mobile internet user's in urban India uses financial service weekly through their smartphone. There is mix of opinions on perceived value among Indian consumers towards adoption of mobile Internet. There is also a tremendous increase in adoption of smartphone among old aged people in India and also there is an increase in adoption of smartphone among females in urban India. E-shopping and mobile payment usage have recently started gearing up in India. According to an e-marketer report December 2014 predicted that smartphone user's penetration in India would cross 279.2 million in the year 2018.

This large penetration of the smartphone and its application use in India has brought marketers attention towards consumer's smartphone app usage especially

Table 1: Reserve bank of India technical report 2014

Years	No. of users (million)	Volume (million)	Value (billion Rs.)
2010-11	5.96	6.85	6.14
	12.96	25.56	18.21
2011-12 (%)	-117.45	-273.14	-196.58
	22.51	53.30	59.90
2012-13 (%)	-73.69	-108.53	-228.94

Figures in brackets indicate the growth over the previous year; Reserve bank of India

mobile banking applications. According to the latest reserve bank of India technical report published in Feb 2014 shows increase in m-Banking usage in India (Table 1). Zhang *et al.* (2012) says high acceptance rate of electronic devices such as smartphones, laptops, phablets and computers, mobile technologies such as 3G has created new business opportunities so it is necessary to understand the adoption behaviour of such technologies. Setting out of 3G mobile technology has brought immense development in mobile commerce across the world (Zhou *et al.*, 2010; Zhou, 2011). Gillespie found adoption of mobile phones in India is high but the usage of mobile banking was found to be low. Mobile banking will have a huge impact on microfinance banks in developing country like India says Safeena *et al.* (2012).

Harma and Dubey (2009) discussed about strategic implications and positioning of m-Banking services in India wherein they concluded that the ubiquitous nature of m-Banking service will have a huge impact on the Indian retail banking sector. The effect of TRT, SI and PRISK on m-Banking adoption should be investigated in the future (Dash *et al.*, 2015). The effect of TRT and gender on MBAD needs to be investigated in future studies (Upadhyay and Jahanyan, 2016). Mohan and Potnis (2015) evaluated three companies which provides innovative banking services (such as a human agent was equipped with advanced mobile technology devices like near field communication and smart cards) to rural communities in India wherein they concluded that mobile technology will have major economic impact through which billions of poor customers who don't have the basic access to banking system can get benefitted. There is a need for more research on different mobile banking technology (Shaikh and Karjaluoto, 2015) and among different culture (Baptista and Oliveira, 2015). The effect of HBT, HEMO and TRT and SQ needs to be investigated on MBAD in future studies (Alalwan *et al.*, 2015).

The main objective of this study is to explore the factors affecting MBAD among young Indian consumers through smartphone apps. The extended UTAUT2 Model of Slade *et al.* (2014) was used as a theoretical background for this study. Slade *et al.* (2014) has recommended to empirically validate their extended UTAUT2 Model and also to extend their model with other relevant variables with different technologies. The younger people are more tech savvy and they have more willingness to adopt new technologies (Cho and Chung, 2005). Yang (2005) stated that "university students are likely to be the 1st customer segment to adopt mobile commerce because of their high educational level and income potential". So this study was done with the young college student samples. This study is divided into eight parts, the 1st part consists of an introduction, the 2nd part consists of the theoretical background of the study, followed by the 3rd part consists of the literature review, the 4th part consists of methodology, the 5th part consists of the data analysis and results, the 6th part consists of the theoretical contributions, the seventh part discusses about the conclusions and management implications and the final part consists of limitations and future research.

Theoretical background: Venkatesh *et al.* (2003) proposed a new theory called The Unified Theory of Acceptance and Use of Technology (UTAUT) in the year 2003. The important constructs of UTAUT are Performance Expectancy (PEXP), Effort Expectancy (EEXP), Social Influence (SI) and Facilitating Conditions (FCON). The critical part of UTAUT Model is that the explanatory part was found to be 70% (Venkatesh *et al.*, 2003). UTAUT served as a base model for many year after its establishment in the year 2003.

Later in the year 2012 UTAUT was extended to UTAUT2 exclusively in the consumer context for the 1st time by incorporating few additional constructs such as Hedonic Motivation (HEMO), Price Value (PVAL) and Habit (HBT) (Venkatesh *et al.*, 2012). Some scholars have extended UTAUT2 such as Slade *et al.* (2014) extended the UTAUT2 Model in the m-Payment context and recommended for future research to empirically validate their model in different technology context (such as m-Banking). Alalwan *et al.* (2015) used UTAUT2 Model in Internet banking adoption context had also suggested to assess UTAUT2 using different technologies and to extend the UTAUT2 with other relevant constructs. UTAUT2 showed substantial improvements in the variance (Venkatesh *et al.*, 2012). In this study, we examined the determinants of MBAD through smartphone app by extending UTAUT2 Model of Slade *et al.* (2014) who recommended to extend their model with other relevant factors, using different technologies and in different cultural settings (Table 2).

Literature review
Performance Expectancy (PEXP): Performance Expectancy (PEXP) is defined as "the degree to which an

Table 2: MBAD related studies in Indian context

Researchers and years	Types of study	Factors
Singh *et al.* (2010)	Conceptual	PUSE, PEASE, SN, SEF, PCOST, SEC and TRT
Bhattacherjee (2000)	Empirical	Time effectiveness, safety, convenience, operational simplicity and ease of navigation
Kumar and Ravindran (2012)	Empirical	SQ, PUSE and CRED
Dash *et al.* (2015)	Empirical	COM, TRY
Bhardwaj and Aggarwal	Conceptual	PUSE, PEASE, SYSQ, SEC and TRT
Rajan and Kannan (2016)	Empirical	PUSE, PEASE,SQ, SEC and TRT
Kishore and Sequeira (2016)	Empirical	PEXP,EEXP,SI and PRISK
Upadhyay and Jahanyan (2016)	Empirical	Structural assurance
Ketkar *et al.* (2012)	Empirical	Time, regular updates of information, fee, telecom distribution and customer loyalty
Shankar and Kumari (2016)	Empirical	Awareness, PUSE, PEASE, COM, SI, PRISK, PCOST and SEF

SQ = Service Quality, SYSQ = System Quality, PUSE = Perceived Usefulness, PEASE = Perceived Ease of use, COM = Compatibility, SI = Social Influence, PRISK = Perceived Risk, PCOST = Perceived Financial Cost, PEXP = Performance Expectancy, EEXP = Effort Expectancy, SEC = Security, TRT = Trust, CRED = Credibility, SEF = Self-efficacy, TRY = Trialability, ATT = Attitude

individual believes that using the system will help him or her to attain gains in job" (Venkatesh *et al.*, 2003, 2012). PEXP is one of the vital construct and highly investigated in technology acceptance studies right from the UTAUT (Venkatesh *et al.*, 2003) to extended UTAUT2 Model of Slade *et al.* (2014). PEXP was found to have no significant relationship on MBAD (Akturan and Tezcan, 2012; Afshan and Sharif, 2016). PEXP plays significant role in MBAD studies (Chitungo and Munongo, 2013; Yu, 2012; Shaikh and Karjaluoto, 2015; Alalwan *et al.*, 2016) and found to have positive significant impact on MBAD among Indian (Gu *et al.*, 2009; Deb and Lomo, 2014; Kishore and Sequeira, 2016), Malaysian (Tan *et al.*, 2016), Saudi Arabian (Alsheikh and Bojei, 2014), Jordanian (Alalwan *et al.*, 2015, 2016) and Portugal bank clients (Baptista and Oliveira, 2015). Therefore, we set hypothesis as:

- H₁: PEXP will have a positive significant impact on MBAD intention through smartphone app

Effort Expectancy (EEXP): Effort Expectancy (EEXP) is defined as "the degree of ease associated with the use of the system" (Venkatesh *et al.*, 2003, 2012). EEXP is most important construct and highly investigated construct in technology adoption studies (Deb and Lomo, 2014). EEXP was found to have no significant impact on MBAD among Malaysian, Saudi Arabian bank clients (Jabri, 2015), Pakistani students and Portugal bank users (Baptista and Oliveira, 2015). Increase in ease of use in technology increases trust on m-Commerce adoption. Effort expectancy was found to have significant positive impact on MBAD among Indians (Deb and Lomo, 2014; Kishore and Sequeira, 2016), Malaysians (Tan and Lau, 2016), Saudi Arabian bank clients (Alsheikh and Bojei, 2014) and jordanian consumers (Alalwan *et al.*, 2015). Therefore, we set hypothesis as:

- H₂: EEXP will have will have a positive significant impact on MBAD intention through smartphone app

Social Influences (SI): In this study, we divided Social Influence (SI) into 2 dimensions such as External (EXSI) and Interpersonal Social Influence (INSI) based on Hsu and Chiu (2004) and Bhattacherjee (2000) suggestions. From the theoretical perspective we can see that the SI component of Slade *et al.* (2014) extended UTAUT2 Model measures only INSI part (such as influence through friends, family and colleagues, etc.) whereas EXSI (such as influence through mass media, newspaper ads, social media networks and expert blogs) were not measured. In order to fill this gap, the EXSI variable was added to the extended UTAUT2 Model of Slade *et al.* (2014) to predict MBAD through smartphone app context.

A Interpersonal Social Influence (INSI): Social Inuence (SI) is defined as "the degree to which an Individual perceives that important others believe he or she should use the new system" (Venkatesh *et al.*, 2003, 2012). INSI refers to "influence by friends, family members, colleagues, superiors and experienced individuals known to the potential adopter'' (Bhattacherjee, 2000). INSI was considered as one of the important construct in technology adoption studies (Tobbin, 2012). Social norms are important components and have significant positive impact on m-Services (Kim, 2010) and m-Banking adoption (Chitungo and Munongo, 2013; Yu, 2012; Alalwan *et al.*, 2015, 2016). INSI was found to have significant positive impact on MBAD among South African students (Govender and Sinhali, 2014), Malaysian students (Tan *et al.*, 2016), UAE students (Aboelmaged and Gebba, 2013) and also among urban (Deb and Lomo, 2014) and rural (Kishore and Sequeira, 2016) Indian bank users. INSI was found to have no significant impact on m-Banking adoption among Pakistan (Shaikh *et al.*, 2015), Pakistani students and Portugal (Baptista and Oliveira, 2015) bank clients. Hence, 4th we set hypothesis as:

- H₃: interpersonal social influence will have a significant positive impact on MBAD intention through smartphone app

External Social Influence (EXSI): External influence (EXSI) refers to "mass media reports, expert opinions and other non-personal information considered by individuals in performing a behaviour'' (Bhattacherjee, 2000). EXSI plays important role technology adoption studies (Hsu and Chiu, 2004; Tran and Corner, 2016; Kim, 2010). Kim (2010) found EXSI to have a positive significant impact on m-Service adoption. Yu (2014) investigated the factors that affect mobile fitness app adoption among USA gym clients wherein he found EXSI to have no significant impact on mobile fitness app adoption. Tran and Corner (2016) investigated the effect of mass media and social media on MBAD wherein they found both to have no significance among New Zealand consumers. Recently, we have seen lots of promotion of mobile banking app is being done from the public and private sector banks through various channels such as social media, Internet blogs, print media, newspaper, magazine and print/online catalogues in India. So in order to check is there is any influence of external sources we set hypothesis as:

- H_4: EXSI will have a significant positive impact on MBAD intention through smartphone app

Facilitating Conditions (FCON): Facilitating Conditions (FCON) are "defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system". (Venkatesh *et al.*, 2003, 2012). FCON refers "to consumer's perceptions of the resources and support available to perform a behaviour". FCON was found to have no significant impact on MBAD among Jordon (Alalwan *et al.*, 2016), UAE students (Aboelmaged and Gebba, 2013) and Portugal (Baptista and Oliveira, 2015) bank users. FCON was found to have a significant positive relationship with MBAD. Therefore, we set hypothesis as:

- H_5: FCON will have significant positive impact on MBAD intention through smartphone app

Hedonic Motivation (HEMO): Hedonic Motivation (HEMO) is defined as "the fun or pleasure derived from using a technology". HEMO was found to have a positive relationship with behavioural intention in m-Commerce adoption studies (Cheng *et al.*, 2014; Song, 2009; Venkatesh *et al.*, 2012). HEMO plays important component and has a positive significant impact on MBAD (Chemingui and Lallouna, 2013; Amin *et al.*, 2006; Alalwan *et al.*, 2016; Baptista and Oliveira, 2015). Thakur and Srivastava (2013) state that there is a need for further investigation on HEMO in MBAD in Indian context. Therefore we set hypothesis as:

- H_6: HEMO will have a positive significant impact on MBAD intention through smartphone app

Price Value (PVAL): Price Value (PVAL) as "consumer's cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them" (Dodds *et al.*, 1991). Hsu and Chiu (2004) states that PVAL acts as an important construct which influences consumers to adopt any new technology. PVAL was found to have a significant negative impact on MBAD (Chitungo and Munongo, 2013). PVAL was found to have a positive impact on MBAD among South African university students (Govender and Sihlali, 2014) and Jordanian bank users (Baptista and Oliveira, 2015). Therefore, we set hypothesis as:

- H_7: price value will have significant positive impact on mobile banking intention through smartphone app

Habit (HBT): Habit (HBT) has been defined as "the extent to which people tend to perform behaviours automatically because of learning" (Venkatesh *et al.*, 2012). HBT is an important construct in technology adoption studies and found to have a substantial positive impact on behavioural intention (Venkatesh *et al.*, 2012; Baptista and Oliveira, 2015). HBT was found to be important factor which intends consumers to adopt virtual banking technology. (Lichtenstein and Williamson 2006). Furthermore, Shahriari (2014), Yee and Faziharudean (2010) says HBT is the key component which leads to loyalty towards adoption of virtual banking. HBT was found to have a strong positive significant impact on MBAD among Portugal bank users (Baptista and Oliveira, 2015). So, we set our hypothesis as:

- H_8: HBT will have positive influence on MBAD intention through smartphone app

Trust (TRT): Trust (TRT) is defined as whether users are willing to become vulnerable to the m-commerce providers after considering their characteristics (security, brand name). Gefen *et al.* (2003) defined TRT as a subjective belief that a party shall fulfil their obligation. TRT plays very important role in adoption of virtual technologies (Zhou, 2012a, b). Chaeng *et al.* (2014) reviewed all smartphones and stated that TRT on the device was a most significant factor in its adoption and usage. TRT is the most important component that drives consumers to adopt MB (Yoon and Occena, 2014; Susanto *et al.*, 2016). TRT has significant positive impact on MBAD (Gu *et al.*, 2009; Hanafizadeh *et al.*, 2014; Kim and Kang, 2012; Zhou, 2012; Alalwan *et al.*, 2016) and continuous intention (Thakur and Srivastava, 2014). Therefore, we set hypothesis as:

- H_9: TRT will have a significant positive influence on MBAD intention through smartphone app

Perceived Risk (PRISK): Perceived Risk (PRISK) has been examined in consumer behaviour studies since 1960's. PRISK refers to "certain types of Finanancial, product performance, social, psychological, physical or time risks when consumers make transactions online" (Forsythe and Shi, 2003). PRISK is very important construct that drives MBAD among youth (Akturan and Tezcan, 2012; Tan *et al.*, 2016). PRISK found to have a negative impact on behavioural intention to adopt internet banking (Kesharwani and Bisht, 2012) and MBAD (Kishore and Sequeira, 2016) among Indian bank clients. PRISK was found to be major barrier to adopt mobile financial related services. PRISK was found to have a strong negative significant impact on MBAD (Chitungo and Munongo, 2013; Kim and Kang, 2012; Amin *et al.*, 2006; Thakur and Srivastava, 2013; Alalwan *et al.*, 2015, 2016; Jabri, 2015; Tan *et al*, 2016; Alsheikh and Bojei, 2014). Reduced risk perception towards adoption of MBAD has a strong positive indirect effect on continuous usage (Shaikh and Karjaluoto, 2016). Therefore, we set hypothesis as:

- H_{10}: PRISK will have a significant negative impact on MBAD intention through smartphone app

Mobile application Self-Efficacy (SEF): Mobile application Self Efficacy (SEF) "an individual's feeling of self-efficacy relative to a specific mobile Software package" (Yu, 2014). SEF is "the belief in one's ability to use a technology to accomplish a task". Self efficacy theory states that "behaviour is cognitively mediated by the strength of a person's self-efficacy beliefs". Venkatesh (2000) states that control behaviour is divided into two such interpersonal (SEF) and external (FCON). SEF is very important and was found to have no significant impact (Koksal, 2016), positive significant impact (Amin *et al.*, 2006; Gu *et al.*, 2009) and continuous intention on MBAD. Therefore we set hypothesis as:

- H_{11}: SEF will have a positive significant influence on MBAD intention through smartphone app

Personal Innovativeness (PINV): Personal Innovativeness (PINV) in Information Technology (PINV) refers to the "willingness of an individual to try out any new information technology" (Agarwal and Prasad, 1998). PINV plays a very significant role in technology adoption studies (Agarwal and Prasad, 1998; Kim *et al.*, 2009). PINV was found to have a positive impact on MBAD (Chitungo

and Munongo, 2013). There is a need for more investigation of personality traits in m-Commerce technology adoption among Indians (Thakur and Srivastava, 2013). Hence, we set hypothesis as:

- H_{12}: PINV will have significant positive influence on MBAD intention through smartphone app

Trialability (TRY): Trialability (TRY) refers "to whether users given free trials are more likely to accept a new technology". According to Hong *et al.* (2006) to predict initial adoption of any technology verifying the impact of TRY will be highly useful. TRY was found to be the strongest predictor of technology adoption. TRY was found to have a positive impact on MBAD (Chemingui and Lallouna, 2013; Odumeru, 2013; Koksal, 2016; Dash *et al.*, 2015). Therefore, we set our hypothesis as:

- H_{13}: TRY will have significant positive influence on MBAD intention through smartphone app

Compatibility (COM): Compatibility (COM) is "the degree to which the innovation is perceived to be consistent with the potential user's existing values, previous experiences and needs". Tornatzky and Klein (1982)'s in their meta analysis states that COM was found to be the most important factor in consumer studies. COM is the most significant predictor for MBAD (Shaikh and Karjaluoto, 2015). COM was found to have a strong positive impact on MBAD among Iranian banking clients (Hanafizadeh *et al.*, 2014), Lebanese bank clients (Odumeru, 2013), Indian (Dash *et al.*, 2015) and US clients (Engwanda, 2014). COM was found to have a strong positive significant impact on MBAD (Chemingui and Lallouna, 2013; Chitungo and Munongo, 2013; Jabri, 2015; Koksal, 2016). Therefore, we set hypothesis as:

- H_{14}: COM will have significant positive impact on MBAD intention through smartphone app

Perceived Financial Cost (PCOST): Perceived financial Cost (PCOST) is defined as "the extent to which a person believes that he or she has the financial resources needed to use a system". Maintaining and conducting a transaction through mobile banking app costs money (such as charges of 2G, 3G, 4G, LTE) connections needs to be paid regularly. Singh *et al.* (2010) conceptualized PCOST as an important predictor for MBAD. Tran and Corner (2016) found PCOST to have a negative impact on MBAD among New Zealand bank users. PCOST was found to have no significant impact on MBAD among
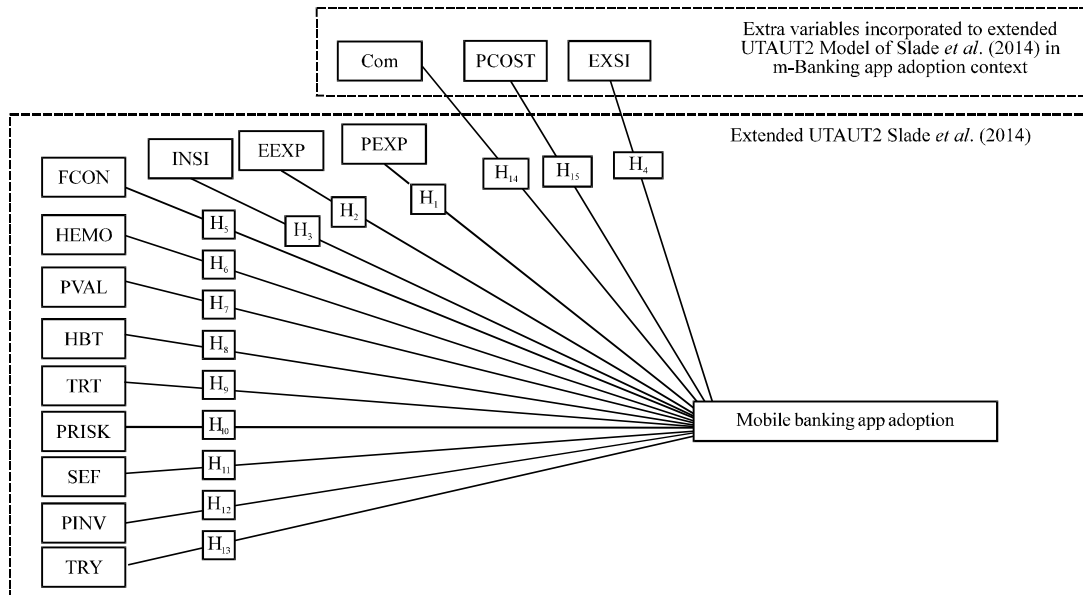
Fig. 1: Moderating variables such as age, gender, experience and income were not considered in the proposed framework

Lebanese students (Koksal, 2016) and Saudi Arabian bank clients (Alsheikh and Bojei, 2014). Therefore, we set our hypothesis as:

- H_{15}: PCOST will have a significant negative influence on MBAD intention through smartphone app

Summary of literature review and need for research: From the literature review we can summarize that factors such as PEXP/PUSE, EEXP/PEASE, SEC, TRT, SI, PINV, PRISK, HEMO, PVAL, TRY COM, SEF and PCOST were found as important elements that affect MBAD. In the current scenario, the sales of smartphones in India are surging at a high rate which brings marketer's attention towards this to understand on what drives Indians consumers to use m-Banking. After an extensive literature review on m-Banking, Musa *et al.* (2015) recommends to research more on smart mobile banking service adoption that will lead to a greater contribution towards academic and practical discourse. The banking sector will have a big technology edge to manage its customers by conducting banking transactions through use of smartphone apps. State bank of India is the largest public sector bank in India which provides its own m-Banking apps in all android, symbian and IOS platforms of the smartphone and likewise many other public and private sector banks in India have their own smartphone app's that are listed in Appendix 1. There is a need for such study in a developing country like India which has the second largest smartphone penetration in Asia pacific

region after China (e-Marketer, 2015). Kim (2010), Tran and Croner (2016) recommended to investigate the effect of EXSI on MBAD. Shaikh and Karjaluoto (2015) in their meta analysis they found that there were no studies conducted on the behaviour of smartphone/tablet users in relation to MBAD. Alsheikh and Bojei (2016) recommended to research more about specific type of mobile banking service in future.

Proposed framework: Shaikh and Karjaluoto (2016) states that there is a need for more research on new m-Banking technologies (such as smartphone banking applications) apart from traditional SMS banking. In order to fill this gap the current research focuses on examining the factors that affect MBAD through smartphone app by applying extended UTAUT2 Model of Slade *et al.* (2014). This research will also validate and extend the extended UTAUT2 Model of Slade *et al.* (2014) empirically in MBAD context and with Indian samples. Based on above literature a new model was proposed shown in Fig. 1.

MTERIALS AND METHODS

Participants for quantitative study: A self-administered likert scale questionnaire was distributed through online survey using qualtrics to under graduate and post graduate students of a private university in south India. The questionnaire was distributed, only to those who have smartphone and had used an m-Banking app at least once. The data of about 286 were collected. The data were

Table 3: Descriptive statistics of respondents

Descriptive statistics	Frequency	Percent
Gender		
Male	183	64.0
Female	103	36.0
Qualification		
Under graduate	180	62.9
Post graduate	106	37.1
Using smartphone since (Years)?		
<1	73	25.5
1-2	112	39.2
>3	101	35.3
Usage of smartphone per day (h)		
<8	49	17.1
8-12	127	44.4
>12	110	38.5
Money spent for mobile internet per month (Rs.)		
100-200	12	4.2
201-300	168	58.7
301-400	106	37.1
Which mobile internet technology do you use?		
2G	80	28.0
3G	181	63.3
4G	25	8.7
You are using banking app since (h)?		
>1	162	56.6
1-2	124	43.4
Total	286	100.0

Table 4: Sources of measuring instruments

Number of items	Adapted and modified from the studies of
The 4 items of PEXP, EEXP, FCON	Venkatesh *et al.* (2012), Baptista and Oliverira (2015)
The 3 items of INSI, HEMO, PVAL, HBT	Venkatesh *et al.* (2012), Baptista and Oliverira (2015)
The 4 items of PRISK	Wu and Wang (2005)
The 4 items of EXSI	Hsu and Chiu (2004) and Kim (2010)
The 4 items of PINV	Agrawal *et al.* (2000)
The 4 items of SEF	Agrawal *et al.* (2000) and Yu (2014)
The 3 items of COM	Wu and Wang (2005)
The 3 items of TRY	Venkatesh and Bala (2008)
The 5 items of PCOST	Chong
The 6 items of TRT	Chong

collected from the time period of January 2016 to April 2016. All respondents were requested to answer honestly to have good and bias free output as per suggestions of Podsakoff *et al.* (2003). Descriptive statistics are shown in Table 3.

Measuring instrument: Table 4 shows sources of measuring instrument. All the 53 items were adapted and slightly modified to suit the context of research from existing studies. The 5 points Likert type scales was used for all items ranging from "1 as strongly disagree" to "5 as strongly agree". The developed instrument was tested with fifty undergraduate and fifty postgraduate students as a pilot study to rectify any errors in understanding the statements. The results of the Composite Reliability Value (CRV), the Average Variance Extracted (AVE) and factor

loadings were found to besurpassing all the recommended values as suggested by (Hair *et al.*, 1998; Nunnally, 1978a, b; Fornell and Larcker, 1981; Chin, 1998).

RESULTS AND DISCUSSION

Structural Equation Model (SEM) was performed using partial least square estimation using smart PLS 2.0. To explain endogenous construct we adopted variance based methodology like Smart PLS 2.0 for analysis. Variance based Partial Least Square (PLS) is suitable for complex models with more of constructs, more number of paths, less sample size and distribution free (Chin, 1998; Hair *et al.*, 2010). Our data analysis is divided into 2 stages first, we analysed reliability and validity test of measurement model and second we evaluated the structural Model SEM by testing the significance of the relationship between the constructs as per suggestions of (Anderson and Gerbing, 1988; Chin, 2010). This is done to draw effective conclusions of the relationships framed. Bootstrapping technique was used to calculate t-values (Hair *et al.*, 2013).

Stage 1 (tests for reliability and validity of measurement Model): The reliability and validity of measurement model should be assessed before structural model evaluation (Anderson and Gerbing, 1988; Hair *et al.*, 2013). Cronbach's Alpha (CA) and Composite Reliability (CR) values of constructs >0.7 Nunnally (1978a, b), Fornell and Larcker (1981) is said to be reliable. Our study CA values are ranging from (0.821-0.913) and CR values ranging from (0.894-0.935), thus the constructs used in this study are reliable. The loadings of each individual item/indicator should be more than 0.7 in order to have good indicator reliability. The cross loading values of items in this study vary from (0.753-0.927) thus the indicator reliability is confirmed.

The Average Variance Extracted (AVE) is recommended to be >0.50 (i.e., more than 50 % of the variance of indicators should be considered) (Fornell and Bookstein, 1982; Fornell and Larcker 1981; Hair *et al.*, 2013). As we can see Table 4 all the values of AVE are above 0.50 thus they construct are said to have good convergence validity (Hair *et al.*, 1998). Table 5 for cross loadings, AVE, CR and CA values. There are two methods to analyse Discriminant Validity (DVAL), Fornell and Larcker (1981) and cross loadings method. In this study, DVAL is tested by Fornell and Larcker (1981) method who states that "the square root AVE values that should be greater than variance shared between and other latent

Table 5: Cross loadings, Average Variance Extracted (AVE), Composite Reliability (CR), Cronbach Alpha (CA) and variance (R^2) values

Constructs/Items	CL	AVE	CR	CA	R^2
PEXP					
PEXP 1	0.909	0.759	0.904	0.847	0.781
PEXP 2	0.809	-	-	-	-
PEXP 3	0.892	-	-	-	-
EEXP					
EEXP 1	0.889	0.777	0.933	0.904	-
EEXP 2	0.812	-	-	-	-
EEXP 3	0.913	-	-	-	-
EEXP 4	0.909	-	-	-	-
INSI					
INSI 1	0.902	0.781	0.914	0.859	-
INSI 2	0.89	-	-	-	-
INSI 3	0.858	-	-	-	-
EXSI					
EXSI 1	0.842	0.693	0.9	0.853	-
EXSI 2	0.82	-	-	-	-
EXSI 3	0.844	-	-	-	-
EXSI 4	0.822	-	-	-	-
FCON					
FCON 1	0.865	0.778	0.933	0.905	-
FCON 2	0.909	-	-	-	-
FCON 3	0.883	-	-	-	-
FCON 4	0.871	-	-	-	-
HEMO					
HEMO 1	0.9	0.776	0.912	0.856	-
HEMO 2	0.864	-	-	-	-
HEMO 3	0.88	-	-	-	-
PVAL					
PVAL 1	0.891	0.771	0.91	0.852	-
PVAL 2	0.882	-	-	-	-
PVAL 3	0.861	-	-	-	-
HBT					
HBT 1	0.839	0.738	0.894	0.821	-
HBT 2	0.927	-	-	-	-
HBT 3	0.805	-	-	-	-
TRT					
TRT 1	0.827	0.695	0.932	0.913	-
TRT 2	0.881	-	-	-	-
TRT 3	0.824	-	-	-	-
TRT 4	0.835	-	-	-	-
TRT 5	0.777	-	-	-	-
TRT 6	0.856	-	-	-	-
PRISK					
PRISK 1	0.832	0.704	0.905	0.86	-
PRISK 2	0.841	-	-	-	-
PRISK 3	0.829	-	-	-	-
PRISK 4	0.852	-	-	-	-
SEF					
SEF 1	0.869	0.783	0.935	0.909	-
SEF 2	0.877	-	-	-	-
SEF 3	0.937	-	-	-	-
SEF 4	0.854	-	-	-	-
PINV					
PINV 1	0.904	0.778	0.933	0.905	-
PINV 2	0.895	-	-	-	-
PINV 3	0.886	-	-	-	-
PINV 4	0.841	-	-	-	-
TRY					
TRY 1	0.904	0.782	0.915	0.864	-
TRY 2	0.901	-	-	-	-
TRY 3	0.847	-	-	-	-
COM					
COM 1	0.863	0.753	0.902	0.836	-
COM 2	0.845	-	-	-	-
COM 3	0.896	-	-	-	-

Table 5: Continue

Constructs/Items	CL	AVE	CR	CA	R^2
PCOST					
PCOST 1	0.865	0.662	0.907	0.871	-
PCOST 2	0.817	-	-	-	-
PCOST 3	0.882	-	-	-	-
PCOST 4	0.831	-	-	-	-
PCOST 5	0.753	-	-	-	-

construct in the model" (Fornell and Larcker 1981; Table 5). From Table 5 we can observe that the square root of AVE values are greater than variance shared between constructs and other latent constructs of the model. Thus, the DVAL is confirmed. All the diagonal square root of AVE values were greater than corresponding inter-construct correlation, thus discriminant validity is satisfied.

Stage 2 (Structural model evaluation of testing significance of relationship between the constructs): The hypothesis testing was done using boot strapping techniques with 500 sub samples through which statistical significance of beta coefficients will be known. The structural model results are shown in Fig. 2. Table 6 shows that except H_5 (FCON) and H_6 (TRY) rest all of the hypothesis are at significant levels. The R-square value should be above 0.10 to have good predictive power for endogenous constructs (Hair *et al.*, 2013). R^2 acceptable level depends on the context of the research (Hair *et al.*, 2010).

"In general, R^2 values of 0.25, 0.50 and 0.75 for target constructs are considered as weak, medium and substantial, respectively" (Hair *et al.*, 2013). In this research we obtained R^2 value = 0.781 which is substantial.

Figure 2 shows the overall structure model output obtained from Smart PLS 2.0 M3 which explains about 78.1% of variance (Table 5) thus the proposed extended UTAUT2 Model has good explanatory power which satisfies the argument of Venkatesh *et al.* (2012) and Slade *et al.* (2014). Hair *et al.* (2010) says there is no limited criteria for R^2 value, it depends on the context of the research study. Except hypothesis H_5 and H_{13} all other hypothesis from H_{1-15} are accepted. Our results support the UTAUT2 and extended UTAUT2 constructs relationships proposed by Venkatesh *et al.* (2012) and Slade *et al.* (2014), respectively.

The structural model output in the Fig. 2 shows that impact of PEXP, EEXP, INSI, EXSI, PVAL, HBT, PINV, HEMO, PRISK, TRT, TRY, PCOST, FCON, COM and SEF on m-Banking app adoption. The variables such as PEXP, EEXP, INSI, EXSI, PVAL, PINV, HEMO, TRT, TRY, FCON, COM and SEF had a positive significant effect on MBAD through the app (H_1, H_2, H_3, H_4, H_6, H_7, H_9, H_{11}, H_{12}, H_{14})
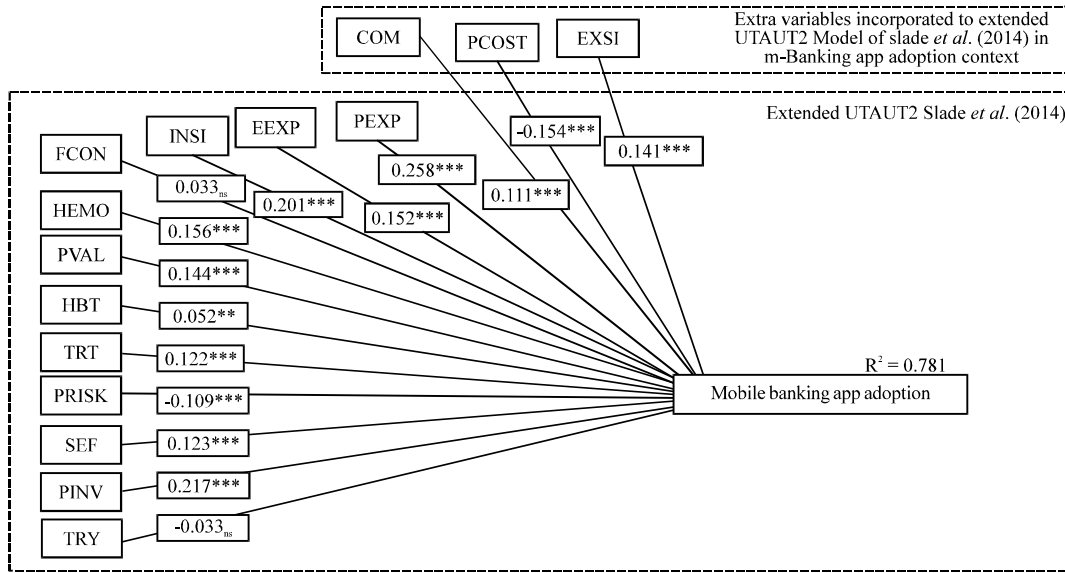
Fig. 2: Path analysis results of proposed extended UTAUT2 Model of Slade *et al.* (2014)

Table 6: Discriminant validity (Fornell and Larcker, 1981)

Variables	BI	COM	EEXP	EXSI	FCON	HBT	HEMO	INSI	SEF	PEEXP	PCOST	PINV	PRISK	PVAL	TRY	TRT
BI	0.900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COM	0.300	0.868	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EEXP	0.411	-0.070	0.882	-	-	-	-	-	-	-	-	-	-	-	-	-
EXSI	0.416	0.102	0.285	0.832	-	-	-	-	-	-	-	-	-	-	-	-
FCON	0.468	0.277	0.306	0.171	0.882	-	-	-	-	-	-	-	-	-	-	-
HBT	0.259	0.066	0.052	0.196	0.177	0.859	-	-	-	-	-	-	-	-	-	-
HEMO	0.429	0.154	0.154	0.119	0.325	0.196	0.881	-	-	-	-	-	-	-	-	-
INSI	0.463	0.091	0.117	0.120	0.359	0.190	0.231	0.884	-	-	-	-	-	-	-	-
SEF	0.397	0.125	0.252	0.084	0.100	0.010	0.219	0.157	0.885	-	-	-	-	-	-	-
PEEXP	0.634	0.250	0.164	0.160	0.372	0.249	0.348	0.327	0.683	0.871	-	-	-	-	-	-
PCOST	0.225	0.189	0.131	0.086	0.311	0.179	0.381	0.231	0.119	0.405	0.814	-	-	-	-	-
PINV	0.516	0.168	0.212	0.181	0.294	0.076	0.109	0.219	0.013	0.427	0.157	0.882	-	-	-	-
PRISK	-0.515	-0.155	-0.261	-0.281	-0.233	-0.102	-0.254	-0.247	-0.244	-0.451	-0.183	-0.229	0.893	-	-	-
PVAL	0.372	0.154	0.085	0.236	0.095	0.100	0.552	0.125	0.304	0.121	0.180	0.177	-0.092	0.878	-	-
TRY	0.238	0.204	0.023	0.175	0.155	0.283	0.267	0.195	0.028	0.302	0.259	0.134	-0.216	0.028	0.884	-
TRT	0.371	0.085	0.222	0.205	0.345	0.151	0.118	0.038	0.103	0.263	0.063	0.114	-0.265	0.074	0.108	0.834

In the above table square root of AVE values are presented in bold letter

Table 7: Path coefficients

Paths	Beta	t-statistics	Hypothesis	p-values	Supported
PEXP->BI	0.258	5.802***	H_1	<0.001	Supported
EEXP->BI	0.152	4.432***	H_2	<0.001	Supported
INSI->BI	0.201	5.664***	H_3	<0.001	Supported
EXSI->BI	0.141	4.404***	H_4	<0.001	Supported
FCON->BI	0.033	0.998ns	H_5	>0.050	Not supported
HEMO->BI	0.156	4.874***	H_6	<0.001	Supported
PVAL->BI	0.144	4.179***	H_7	<0.001	Supported
HBT->BI	0.052	2.102**	H_8	<0.010	Supported
TRT->BI	0.122	3.533***	H_9	<0.001	Supported
PRISK->BI	-0.109	3.071***	H_{10}	<0.001	Supported
SEF->BI	0.123	4.066***	H_{11}	<0.001	Supported
PINV->BI	0.217	5.363***	H_{12}	<0.001	Supported
TRY->BI	-0.033	1.014ns	H_{13}	>0.05	Not supported
COM->BI	0.111	3.540***	H_{14}	<0.001	Supported
PCOST->BI	-0.152	4.503***	H_{15}	<0.001	Supported

$*p<0.05$, $**p<0.01$ and $***p<0.001$, NS = Not Significant

and was significant at $p<0.001$ levels, H_8 was significant at $p<0.01$ level. The ariables PRISK (H_{10}) and PCOST (H_{15}) had a negative impact on MBAD through the app

(Table 7 and 8). The variables FCON (H_5) and TRY (H_{13}) were found to have no significant effect on MBAD through the app.

Table 8: Hypothesis supported studies

Hyp.	Supported studies	Contradicted studies	Accepted/Rejected
H_1	Gu *et al.* (2009), Deb and Lomo-David (2014), Yoon and Occena (2014), Kishore and Sequeira (2016), Tan *et al.* (2016), Alsheikh and Bojei (2014), Alalwan *et al.* (2016), Baptista and Oliveira (2015)	Akturan and Tezcan (2012), Afshan and Sharif (2016)	Accepted
H_2	Gu *et al.* (2009), Deb and Lomo (2014), Kishore and Sequeira (2016) Tan *et al.* (2016), Alsheikh and Bojei (2014) and Alalwan *et al.* (2014)	Amin *et al.* (2006), Afshan and Sharif (2016) Jabri (2015), Baptista and Oliveira (2015)	Accepted
H_3	Chitungo and Munongo (2013), Yu (2012), Deb and Lomo (2014), Govender and Sihlali (2014), Kim (2010), Alalwan *et al.* (2016), Tan *et al.*(2016), Aboelmaged and Gebba (2013), Kishore and Sequeira (2016)	Shaikh *et al.* (2015), Afshan and Sharif (2016), Baptista and Oliveira (2015)	Accepted
H_4	Kim (2008)	Hsu and Chiu, (2004), Yul (2014), Tran and Corner (2016)	Accepted
H_5	Alalwan *et al.* (2016), Aboelmaged and Gebba (2013), Baptista and Oliveira (2015)	Crabbe *et al.* (2009), Afshan and Sharif (2016)	Accepted
H_6	Chemingui and Lallouna (2013), Amin *et al.* (2006), Alalwan *et al.* (2015), Baptista and Oliveira (2015)		Accepted
H_7	Govender and Sihlali (2014), Baptista and Oliveira (2015)	Chitungo and Munongo (2013)	Accepted
H_8	Yee and Faziharudean (2010), Shahriari (2014), Baptista and Oliveira (2015)		Accepted
H_9	Gu *et al.* (2009), Hanafizadeh *et al.* (2014), Kim and Kang (2012), Zhou (2012), Alalwan *et al.*(2015), Afshan and Sharif (2016)		Accepted
H_{10}	Chitungo and Munongo (2013), Kim and Kang (2012), Amin *et al.* (2006), Thakur and Srivastava (2013), Alalwan *et al.* (2015, 2016), Jabri (2015), Tan *et al.* (2016), Alsheikh and Bojei, 2014 and Sequeira (2016), Tan *et al.* (2016)		Accepted
H_{11}	Agrawal *et al.* (2000), Amin *et al.* (2006), Gu *et al.* (2009) Susanto *et al.* (2016)	Koksal (2016)	Accepted
H_{12}	Chitungo and Munongo (2013)		Accepted
H_{13}	Chemingui and Lallouna (2013), Audi (2016), Koksal (2016) and Dash *et al.* (2015)		Rejected
H_{14}	Chemingui and Lallouna (2013), Chitungo and Munongo (2013), Hanafizadeh *et al.* (2014), Engwanda (2014) Jabri (2015) and Koksal (2016)		Accepted
H_{15}	Tran and Corner (2016)	Koksal (2016), Alsheikh and Bojei (2014)	Accepted

Hyp. = Hypothesis

Theoretical contributions: This research has explored factors affecting MBAD through smartphone app among young Indian consumers. The results of this study have contributed to the studies of Venkatesh *et al.* (2012) who developed UTAUT2 Model and recommended to test it with different countries with different technologies and also to extend it with other relevant factors in a consumer context. Similarly, Slade *et al.* (2014) who expanded the UTAUT2 Model with TRT and PRISK construct in mobile health care apps context and recommended to empirically test it with different m-technologies. Slade *et al.* (2014) further expanded the UTAUT2 Model with three more variables such as TRY, PINV and SEF in M-Payment context and recommended to empirically validate with different mobile technologies and also to extend their model with other relevant constructs. This research fills this gap by expanding UTAUT2 other relevant constructs in MBAD context. The results of this study proved that UTAUT2 showed substantial improvements in the variance explained in behavioural intention (Venkatesh *et al.*, 2012). We have supported Slade *et al.* (2014) model with an empirical data and we have also contributed one more extra construct such as EXSI and PCOST to an existing extended UTAUT2 Model of Slade *et al.* (2014) in m-Banking app adoption context.

CONCLUSION

The objective of our study was to explore factors that drive young Indian college students to adopt m-Banking through smartphone app. This study results shows that factors such as PEXP, EEXP, INSI, EXSI, HEMO, PVAL, TRT, SEF, PINV, HBT and COM has positive and PCOST and PRISK has negative significant impact on MBAD through the app. The HBT path coefficient value of HBT towards MBAD was found to be low but significant. Factors such as FCON and TRY was found to have no significant relationship with MBAD. Our proposed model relies on an extension of the extended UTAUT2 Model framed by Slade *et al.* (2014) for which we added an extra variable such as EXSI and PCOST after a thorough literature review on MBAD studies. Both EXSI and PCOST were found to have significant impact on MBAD through the app.

In the current study the variable which had the highest impact on MBAD through the app among young Indian consumers was PEXP. Productivity of performance was found to have a major impact on intention. So m-Banking firms must keep on focusing to deliver more prolific features to keep m-Banking app users intact.

PINV was found to have the second strongest impact on MBAD through the app. This shows that young Indian college students like to adopt more new and innovative technologies without any hesitation. So m-Banking firms must keep focusing on providing more innovative banking process through mobile apps.

INSI was found to have the third largest impact on MBAD through the app. This shows that the young Indians get more influenced through friends, colleagues and family. So, m-Banking firms must focus on providing a proper banking experience through app which will lead to positive word of mouth. At least for this sample PCOST and PRISK was found to have a negative impact on MBAD through app which is a good sign to m-Banking service providers that cost is not an issue to young Indian college students. HBT was found to have the least impact on MBAD. This might be due to the early stage of smartphone m-Banking in India. Future studies must investigate more on the effect of HBT in MBAD context. The lifestyle of a young generation of India has changed they are becoming more and more compatible towards new technology so m-Banking firms must look into how could they get more connected with user lifestyle to provide more valuable service through mobile apps.

LIMITATIONS

Since the samples of this study are students, so the results cannot be generalized and future research needs to include non-students samples (Tam and Oliveira, 2016; Afshan and Sharif, 2016). This study has not considered the effect of moderating variables such as (age, gender, experience and income). The m-Banking app is very new to Indian consumers and its adoption may vary over time, so there is also a need of longitudinal studies for better understanding on m-Banking app usage. The effect of moderating variables such as age, gender, experience, income and religion (Baptista and Oliveira, 2015) should be investigated in the future. Our conceptualized model can be further tested with other different technology adoption studies and can be extended with other relevant variables in future. In our study, habit construct was found to be negative but authors such as (Shahriari, 2014; Yee and Faziharudean, 2010; Baptista and Oliveira, 2015) states that HBT is an important factor which positively affects loyal usage of m-Banking technology. So there is a need for more investigation on HBT as a determinant for MBAD in future studies.

The effect of service quality (Baptista and Oliveira, 2015) and brand image (Chen, 2013) needs to be investigated in the future. Afshan and Sharif (2016) recommended to conduct a comparative study between urban and rural consumer behaviour towards m-Banking technology adoption in future. Structural assurance and Task Technology Fit (TTF) also affect m-Banking adoption (Afshan and Sharif, 2016; Tam and Oliveira, 2016) so future research can investigate the effect of such factors. Design aesthetics of mobile app have a strong positive impact on performance expectancy which in turn leads to loyalty so future research should investigate more on the effect of the aesthetic design of m-Banking app and the factors that affect continuous adoption behaviour (Susanto *et al.*, 2016) on m-Banking context.

APPENDIX

Table 1: The information about bank's name and its Andriod Apps

Name of the bank	Android Apps
Allahabad bank	√
Andhra bank	√
Andhra Pragathi Grameena Bank	√
Axis Bank Ltd.	√
Bank of Baroda	√
Bank of India	√
Bank of Maharashtra	√
Bassein Catholic Co-op. Bank Ltd.	√
BNP Paribas	√
Canara Bank	√
Catholic Syrian Bank Ltd.	√
Central Bank of India	√
Citi Bank N.A	√
City Union Bank Ltd.	√
Corporation Bank	√
Dena Bank	√
Deutsche Bank AG	√
DCB Bank Ltd.	√
Gopinath Patil Parsik Sahakari Bank Ltd.	√
HDFC Bank Ltd.	√
ICICI Bank Ltd.	√
IDBI Bank Ltd.	√
Indian Bank	√
Indian Overseas Bank	√
IndusInd Bank Ltd.	√
ING Vysya Bank Ltd.	√
Jammu and Kashmir Bank Ltd.	√
Janaseva Sahakari Bank Ltd.	√
Janata Sahakari Bank Ltd.	√
Kallappanna Awade Ichalkaranji Janata Sahakari Bank Ltd.	√
Karnataka Bank Ltd.	√
Karur Vysya Bank Ltd.	√
Kerala Gramin Bank@	√
Kotak Mahindra Bank Ltd.	√
NKGSB Co-operative Bank Ltd.	√
Oriental Bank of Commerce	√
Pragathi Krishna Gramin Bank*	√
Punjab National Bank	√
Punjab and Sind Bank	√
South Indian Bank Ltd.	√
Standard Chartered Bank	√
State Bank of Bikaner and Jaipur	√
State Bank of Hyderabad	√
State Bank of India	√
State Bank of Mysore	√
State Bank of Patiala	√
State Bank of Travancore	√
Syndicate Bank	√
Tamilnad Mercantile Bank Ltd.	√

Table 1: Continue

6Name of the bank	Android Apps
The Cosmos Co-operative Bank Ltd.	\
The Development Bank of Singapore Ltd. (DBS Bank Ltd.)	\
The Dhanlaxmi Bank Ltd.	\
The Federal Bank Ltd.	\
The Greater Bombay Co-operative Bank Ltd.	\
The Greater Bombay Co-operative Bank Ltd.	\
The Kalupur Commercial Cooperative Bank Ltd.	\
The Ratnakar Bank Ltd.	\
The Royal Bank of Scotland N.V	\
The Saraswat Co-operative Bank Ltd.	\
UCO Bank	\
Union Bank of India	\
United Bank of India	\
Vijaya Bank	\
Yes Bank Ltd.	\

Google Play Store

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