

CHAPTER III

METHODOLOGY

Methodology is the overall approach which underpins the research process (Blaxter et al., 2006). Research methodology can be defined as a method or way to systematically solve the research problem. The purpose of this is to understand and state the methods used for this research work in order to fulfill the research aim and objectives.

The methodology adopted for the current study on “Adoption and Usage of Innovative Techniques: A Study on Mobile Banking in Coimbatore City” is discussed in this chapter, under the following heads.

- 3.1 Selection of the problem
- 1.2. Selection of sample units
- 1.3. Coimbatore city- profile
- 1.4. Collection of data
- 1.5. Period of study
- 1.6. Quantitative techniques
- 1.7. Theoretical frame work
- 1.8. Limitations

3.1. Selection of the problem

The traditional branch based banking has been passed by more technological service access methods like ATM, mobile and wireless technology. The first applications of mobile banking were introduced in Finland by Merita Norbanken currently Nordea (Laukkanen, 2006), to make payments and request account balances via mobile phones as SMS. Since 2000, there has been tremendous growth in mobile penetration across the globe. The number of mobile subscription across the globe rose from 1 billion in 2000 to 6 billion in 2012. In India also the number of people with mobile phones has increased from about 1.88 millions in 2000 to 886.3

million in 2013 (<http://trak.in/tags/business/2014/02/17/india-mobile-subscription-stats-dec-2013/>, <http://www.funtooz.com/blog/>). But, despite the large mobile subscriber base, mobile payments have not lived up to expectations in India. According to the Reserve Bank of India Report (2013), only 53 million people across 78 banks used m-banking services. Reasons attributed to non popularity of mobile banking among the customers could be various issues involved in mobile banking services such as lack of mobile banking technology standards, security of financial transaction, customer illiteracy, technical illiteracy, problems in revenue sharing agreements between mobile service providers and financial institutions. Mobile banking users are affected by these issues directly or indirectly (Bamoria, 2011). Hence the present research problem was taken to find out the views of the respondents who use mobile banking on the problems they face in the usage of mobile banking, their views in the adoption of mobile banking and the risks they face.

3.2. Selection of sample units

The sample units were selected through three stage sampling technique

First stage: Selection of city

Coimbatore known as the “Manchester of South India” is one of the more affluent and industrially advanced districts of the state of Tamil Nadu, in India. It is the second largest city and urban agglomeration in the Indian state of Tamil Nadu after Chennai and the fourth largest metropolis in South India and the sixteenth largest urban agglomeration of India.

With more than 25,000 small, medium and large industries, the city's primary industries are engineering and textiles. Coimbatore is called the "Manchester of South India" due to its extensive textile industry, fed by the surrounding cotton fields. The district also houses the country's largest amount of hosiery and poultry industries. The city has two special economic zones (SEZ), the Coimbatore Hi-Tech Infrastructure (CHIL) SEZ at Saravanampatti and the TIDEL Park near Peelamedu, and at least five more SEZs are in the pipeline. As of 2005, when Tirupur was a part of Coimbatore district, Coimbatore was the highest revenue

earning district in Tamil Nadu. In 2010, Coimbatore ranked 15th in the list of most competitive (by business environment) Indian cities. Coimbatore is the largest non-metro city for e-commerce in South India, due to growing online shopping, e-ticketing and e-billing adaptation in the city.

Coimbatore Telecommunication is among the most well established in the state with BSNL, Vodafone, Reliance, Airtel, Aircel, Tata, Idea, MTS, and Virgin having presence. Broadband internet services are available throughout Coimbatore district. Survey organizations of international repute have also projected information technology to be an area of potential growth for Coimbatore. This place has the capability of competing both nationally and globally in areas of IT investments. In fact, software industry is a thrust area for economic development of Coimbatore. The city is the second largest software producer in Tamil Nadu, next only to Chennai. IT and BPO industry in the city has grown greatly with the launch of TIDEL Park and other planned IT parks in and around the city. It is ranked at 17th among the global outsourcing cities. (www.wikipedia.org) Huge Companies like Aditi Technologies, Cognizant Technology Solutions, Wipro, Infosys, Robert Bosch GmbH, IBM, Tata Consultancy Services, Tata Elxsi, Dell, CSS Corp and KGISL operate in the city. Software exports stood at ₹ 4000 Crores for the financial year 2013 (<http://article.com/view/2014/coimbatore>). Apart from this, there are also lots of healthcare BPOs (Medical Transcription, Coding and Billing) in and around Coimbatore serving the US Healthcare industry

With this background, the researcher selected Coimbatore city to carry out her research study, in the first stage.

Second stage: Selection of banks

In the second stage, it was decided to approach public sector banks. As on march 2013, there were 26 public sector banks¹ operating in Coimbatore city.

¹ . Allahabad Bank, Andhra Bank, Bank of Baroda, Bank of India, Bank of Maharashtra, Canara Bank, Central Bank of India, Corporation Bank, Dena Bank, Indian Bank, Indian Overseas Bank, Oriental Bank of Commerce, Punjab National Bank, Punjab & Sindh Bank, Syndicate Bank, Union Bank of India, United Bank of India, UCO Bank, Vijaya Bank, IDBI Bank, State Bank of India, State Bank of Bikaner & Jaipur, State Bank of Patiala, State Bank of Hyderabad, State Bank of Mysore, State Bank of Travancore.

Through lottery method 5 public sector banks were selected. The selected public sector banks were State Bank of India, Indian Overseas Bank, Indian Bank, Syndicate Bank and Punjab National Bank. These banks, with its branch offices, operate in Coimbatore city. Among these, using convenience sampling technique, those banks which are nearer to the Institution in which the researcher pursues her study were selected. The selected banks were located in the area specified in Table-4. Similar procedure was followed in selecting the private sector banks. As on march 2013, there were 22 private sector banks² operating with various branch offices in Coimbatore city. Through lottery method, six private sector banks, viz., ICICI Bank, HDFC Bank, Karur Vaisya Bank (KVB), City Union Bank (CUB), Lakshmi Vilas Bank (LVB) and Axis Bank were selected. Using convenience sampling technique, the branches which were situated nearer to the Institution in which the researcher does her work were selected. The details are presented in Table-4

TABLE-4
SELECTION OF BANKS

S.No	Name	Place Situated	S. No	Name	Place Situated
1	SBI	Railway station	1	ICICI Bank	Trichy road
2	IOB	Gandhipuram	2	HDFC Bank	Trichy road
3	IB	ADU branch	3	KVB	Sivananda colony
4	SB	Tatabad	4	CUB	Peelamedu
5	PNB	Gandhi puram	5	LVB	Trichy road
			6	Axis Bank	P.N Palayam

Source: Field survey, 2013 SBI- State Bank of India, IOB-Indian Overseas Bank, IB- Indian Bank, SB - Syndicate Bank, PNB-Punjab National Bank, KVB-Karur Vaisya Bank, CUB-City Union Bank, LVB- Lakshmi Vilas Bank.

² Catholic Syrian Bank Ltd, City Union Bank Ltd, Dhanalakshmi Bank Ltd, Federal Bank Ltd, ING Vysya Bank Ltd, Jammu & Kashmir Bank Ltd, Karnataka Bank Ltd, Karur Vysya Bank Ltd, Lakshmi Vilas Bank Ltd, Nainital Bank Ltd, Ratnakar Bank Ltd, South Indian Bank Ltd, Tamilnadu Mercantile Bank Ltd, Axis Bank, Development Credit Bank Ltd, HDFC Bank Ltd, ICICI Bank Ltd, Indusland Bank Ltd, Kotak Mahindra Bank Ltd, Yes Bank Ltd, City Bank, HSBC Bank

Third stage: selection of sample respondents

In the third stage the respondents of the current study were selected. The researcher spent 10 days in each bank and approached the customers in the bank premises who use mobile banking. The number of respondents who were willing to provide data became the subject units of the study. The number of customers interviewed from each bank is given in Table-5

TABLE-5
RESPONDENTS INTERVIEWED AND SELECTED

Public Sector Banks				Private Sector Banks			
S.No	Banks	Interviewed	Selected	S.No	Banks	Interviewed	select ed
1	SBI	183	178	1	ICICI	76	72
2	IOB	20	15	2	HDFC	48	45
3	IB	10	7	3	KVB	44	42
4	SB	12	10	4	CUB	17	16
5	PNB	2	2	5	LVB	10	9
				6	AXIS	5	4
Total		227	212	Total		200	188

Source: Field survey, 2013 SBI- State Bank of India, IOB-Indian Overseas Bank, IB- Indian Bank, SB - Syndicate Bank, PNB-Punjab National Bank, KVB-Karur Vaisya Bank, CUB-City Union Bank, LVB- Lakshmi Vilas Bank

The total number of respondents interviewed for the study was 427; with 227 (53%) sample units from the chosen public sector banks and 200 (47%) from private sector banks. Among those interviewed about 27 respondents had not answered all the questions in the schedule. Hence omitting these, the total number of respondents selected for the study became 400 with 212 customers from public sector banks and 188 from private sector banks. The schematic representation of the selection of the sample units are given in Figure-7.

SELECTION OF THE SAMPLE UNITS

STAGE I: Selection of city

Coimbatore city

STAGE II: Selection of banks

Selection of public Sector banks

Selection of private sector

Selected Public sector banks
 1. SBI
 2. IOB
 3. IB
 4. SB
 5. PNB

Selected private sector banks
 1. ICICI
 2. HDFC
 3. KVB
 4. CUB
 5. LVB
 6. AXIS

STAGE III: Selection of sample respondents

Selection of the sample respondents

Public sector banks	Number	
	interviewed	selected
SBI	183	178
IOB	20	15
IB	10	7
SB	12	10
PNB	2	2
Total	227	212

Private sector banks	Number	
	interviewed	selected
ICICI	76	72
HDFC	48	45
KVB	44	42
CUB	17	16
LVB	10	9
AXIS	5	4
Total	200	188

Total respondents 400

Fig-7

3.3. Coimbatore city- profile

Coimbatore is one of the industrially advanced districts of the state of Tamil Nadu. The head Quarters of the district is Coimbatore City. Coimbatore is also known as Kovai. Coimbatore is situated in the west of Tamil Nadu, bordering Palakkad district of the state of Kerala. It is surrounded by the Western Ghats mountain range to the West and the North, with reserve forests and the Nilgiri Biosphere Reserve on the northern side. The city is located on the banks of the Noyyal River surrounded by the Western Ghats and is administered by the Coimbatore Municipal Corporation. Coimbatore serves as an entry and exit point to neighboring Kerala and the very popular hill station of Udhagamandalam (Ooty) is 70 kms from Coimbatore. It is the disembarking point for those who want to take the Mountain train that runs from Mettupalayam just 35 kms away from Coimbatore, Regular bus services are also available daily from Coimbatore to Ooty and other districts, towns and major cities. It is one of the fastest growing tier-II cities in India and a major textile, industrial, commercial, educational, information technology, healthcare and manufacturing hub of Tamil Nadu.

Coimbatore has a pleasant, salubrious climate due to its proximity to thickly forested mountain ranges and the cool breeze blowing through the Palghat gap which makes the consistently hot temperatures pleasant. Under the Koppen climate classification, the city has a tropical wet and dry climate, with the wet season being from October to December due to the northeast monsoon. Coimbatore is located at an elevation of about 411 meters. The mean maximum and minimum temperature varies between 35 °C (95 °F) and 18 °C (64 °F). Highest temperature ever recorded is 41 °C (106 °F) and lowest is 8 °C (46 °F).

Firmly established as the 'Textile Capital' of India, Coimbatore (Kovai), at the foot of Nilgiri Hills, is going through a transitional phase to become one of the most important business city and a prime metropolis. While entertainment opportunities have expanded, a multi-ethnic population is beginning to change the complexion of the city in terms of lifestyles and tastes. The city has expanded beyond its traditional borders with self-contained spacious environment. It is the city of the future. The boom is due to an immense rise in business, increase in trade travel and rise in the flight frequency between the city and other Indian cities. Moreover, it is also attracting massive

investment in automobile, retail, pump & foundry and realty sectors. Coimbatore has been ranked 4th among Indian cities in investment climate by the CII and ranked 17th among the top global outsourcing cities by Tholons. (www.coimbatore.com)

As per the 2011 census, the population density in the city was 10,052 per km² (26,035 per mi²). As per provisional reports of Census India, population of Coimbatore city in 2011 is 1,061,447; of which male and female are 531,017 and 530,430 respectively. Although Coimbatore city has population of 10,61,447; its urban / metropolitan population is 21,51,466 of which 10,77,812 are males and 10,73,654 are females. In education section, total literates in Coimbatore city is 885,471 of which 457,982 are males while 427,489 are females. Average literacy rate of Coimbatore city is 91.74 percent of which male and female literacy was 95.02 and 88.47 percent respectively. There were a total of 425,115 workers, comprising 1,539 cultivators, 2,908 main agricultural labourers, 11,789 in house hold industries, 385,802 other workers, 23,077 marginal workers, 531 marginal cultivators, 500 marginal agricultural labourers, 1,169 marginal workers in household industries and 20,877 other marginal workers.

Coimbatore is an educational hub of south India. As of 2014, the Coimbatore district is home to 6 universities, 75 engineering colleges, 3 medical colleges, 26 polytechnics Colleges and more than 59 Arts and Science Colleges and 88 matriculation schools, 15 state board schools and 6 CBSE schools. (www.coimbatore.com)

MAP OF COIMBATORE CITY

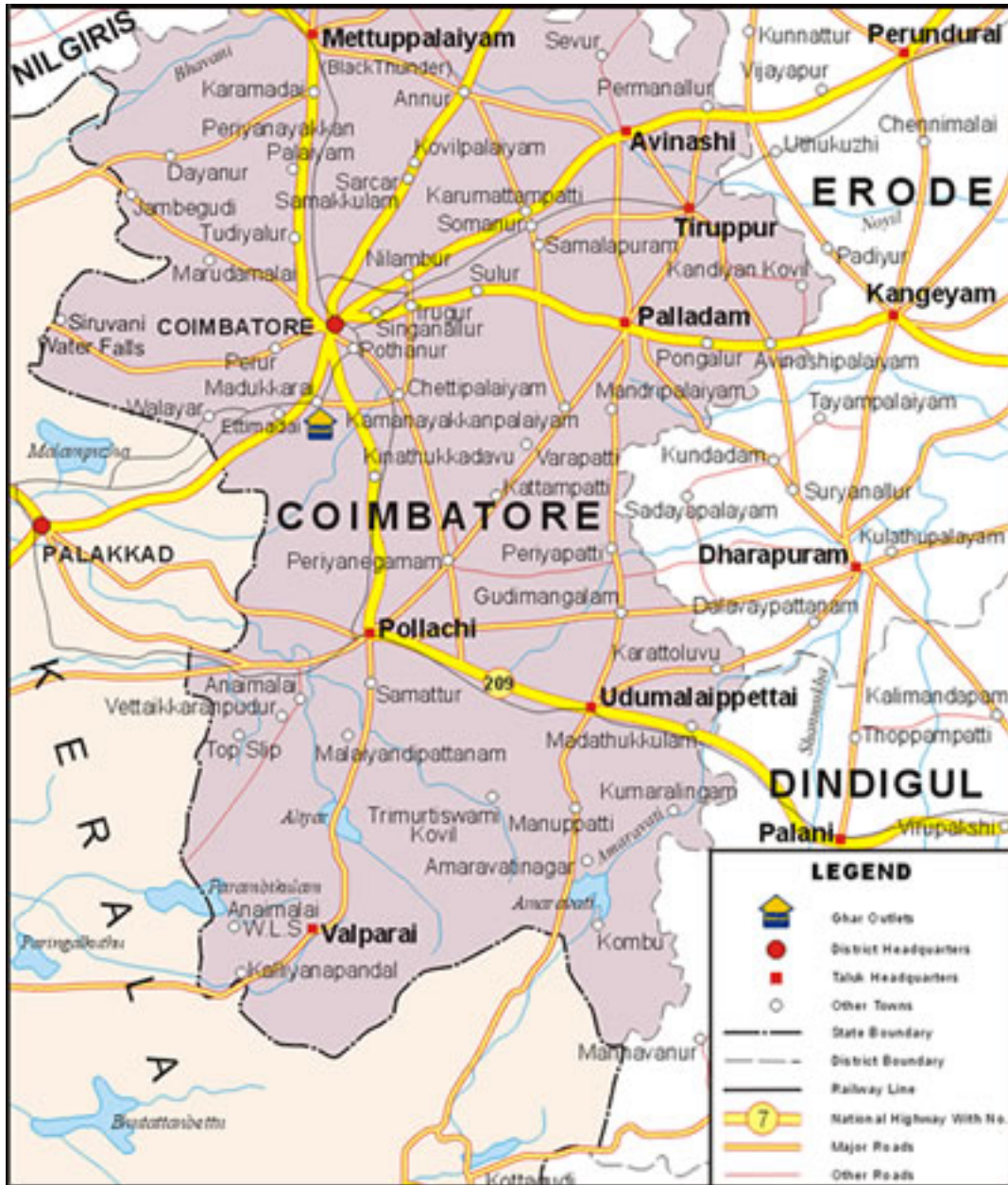


Fig-8

3.4 Collection of data

The data for the current study were collected through personal interview method. Questions pertaining to the study were framed in a questionnaire and a pilot survey was conducted among 25 customers who use mobile banking technology. Based on the problems that the investigator faced in getting data, questionnaire was modified (Annexure 1) and the modified questionnaire was administered to the sample units.

3.5 Period of study

The required data for the study were obtained by administering the prepared questionnaire to the sample respondents during April to July 2013.

3.6 Quantitative techniques

The data collected from the sample units were checked for completeness and were analysed using the following quantitative tools.

- 3.6.1. Chi square test
- 3.6.2. Factor analysis
- 3.6.3. KMO Bartlette's test of sphericity
- 3.6.4. Rating scale
- 3.6.5. Regression analysis
- 3.6.6. Kolmogorov-Smirnov test
- 3.6.7. ANOVA test
- 3.6.8. Garrett's score and
- 3.6.9. Percentages, averages and graphs

3.6.1. Chi square test

To find out whether frequency of usage of mobile banking is dependent on selected factors, and on the purpose of using mobile phones, Chi-square test was applied.

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

O- Observed frequency E- Expected frequency

3.6.2. Factor analysis

Factor analysis is defined as a class of procedures that are primarily used for data reduction and summarization (Malhotra & Birks, 2007). The goal of this procedure is to reduce a large amount of variables into a manageable number and explain the maximum amount of variance in the data. This is feasible by grouping the variables into specific factors, as the underlying dimensions that explain the correlations among a set of variables are named (Malhotra & Birks, 2007).

Factor analysis technique was applied in the study when analysing (i) the expectation of the sample units on the usage of mobile banking; (ii) the views of the respondents in the adoption of mobile banking.

To extract factors, varimax rotation method was applied.

3.6.3 KMO and Bartlett's test of Sphericity

Kaiser-Meyer-Olkin measure of sampling adequacy is a statistic that indicates the proportion of variance in the variables that might be caused by the underlying factors. If the value is closer to one; it generally indicates that factor analysis is useful with the data and a value less than 0.50 implies that factor analysis would not be useful. Bartlett's test of Sphericity explains whether the chosen variables are not related with each other so that they are unsuitable for structure detection. Small values (less than 0.5) of the significance level indicate that a factor analysis is useful with the data.

In the given study, KMO and Bartlett's test of Sphericity were employed while deriving factors (i) on the opinion of the sample units in their expectations on mobile banking and (ii) in analysing the intention of the customers to adopt mobile banking.

3.6.4 Rating Scale

Likert rating scale was used in the study for the respondents to express their opinion on various statements pertaining to the work under study in a five point rating scale as (i) strongly agree, (ii) agree, (iii) neutral, (iv) disagree and (v) strongly disagree. At one extreme of the scale there is 'strongly agree' with the given statement and at the other, 'strongly disagree' and between these two points lie intermediate points. Each point on the scale carries a score either as '+2', '+1', '0', '-1' and '-2' or '5', '4', '3', '2' and '1' respectively starting from 'strongly agree', 'agree', 'neutral', 'disagree' to 'strongly disagree'.

3.6.5 Regression analysis

Multiple regression equations were estimated using the ordinary least squares method to find out the extent of relationship existing among the chosen variables in the frequency of usage of mobile banking. The null hypothesis tested was

Ho: Frequency of usage of mobile banking is independent of perceived usefulness/

perceived ease of use/trust/privacy/compatibility/social influence/perceived relative advantage and perceived financial cost.

Ha: Frequency of usage of mobile banking is dependent of perceived usefulness/ perceived ease of use/trust/privacy/compatibility/social influence/perceived relative advantage and perceived financial cost.

Based on the significance level the null hypotheses were either rejected or not rejected.

3.6.6 Kolmogorov-Smirnov D test

Kolmogorov-Smirnov D test is a test of normality for large samples. This test is similar to the chi-square test for goodness-of-fit, if the observed data fits a normal distribution. If the results are significant, then the null hypothesis of no difference between the observed data distribution and a normal distribution is rejected. Mean value less than 0.05 indicates that the data are non-normal.

3.6.7 ANOVA Test

One-way analysis of variance (one-way ANOVA) is a technique used to compare means of two or more samples (using the F distribution). One-way ANOVA test was used to find out whether intention to adopt mobile banking was dependent on risks such as performance risk/financial risk/ social risk/time risk/security risk and perceived risk. The null hypotheses tested was

Ho: Intention to adopt mobile banking is independent of performance risk/financial risk/ social risk/time risk/security risk and perceived risk.

Ha: Intention to adopt mobile banking is dependent on the stated risks.

If the calculated F value exceeds the theoretical F value for a given degrees of freedom, Ho is rejected; otherwise not rejected.

SPSS 16 version was used in the application of the quantitative techniques stated from 3.6.1 to 3.6.7

3.6.8 Garrett's score

This technique was used to obtain the views of the customers on what should be the role of banks in promoting mobile banking among its customers. To get Garrett score first the percent position was obtained using the formula

$$\text{Percentage Position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

where R_i = Rank given for i^{th} variable, N_j = Number of variables ranked by the respondents.

Garrett scores were obtained from Garrett Ranking Conversion Table.

3.6.9 Percentages, averages and graphs

Using SPSS 16 version, percentages and averages were calculated. Graphs were also drawn.

3.7 Theoretical framework

As discussed in Chapter I; there are various models on adoption of information technology, viz., Theory of Reasoned Action, Technology Acceptance Model, Extended Technology Acceptance Model, Theory of Planned Behaviour, Innovation Diffusion Theory, Unified Theory of Acceptance and Use of Technology. This section gives the theoretical framework of the model adopted in the current research work. The components of the Technology Acceptance Model, Theory of Reasoned Action and Innovation Diffusion Theory were incorporated along with 'Trust' in the study to find out the factors which determine the intention to adopt mobile banking.

Making a banking transaction on mobile banking is a form of trusting behaviour, since a consumer makes him/herself vulnerable to the actions of the mobile banking. The consumer is willing to be dependent upon the mobile banking, based on the expectation that 'mobile banking' will perform what the consumer expects it to do with confidentiality. Trust refers to the feeling of safety and inclination to depend on someone or something (Lee and Kwon, 2008). When people are facing risks, they have good expectations of other people's motivation. With the increasing proliferation of internet and e-commerce, an increasing interest in trust discussion has developed

(Sillence *et al.*, 2006). Trust has a key role in any transaction (Wu and Chang, 2006). As a result, studies have assumed that trust plays a key role in e-commerce adoption (Yang *et al.*, 2008; Casaló *et al.*, 2011; Samadi and Nejadi, 2009; Ko *et al.*, 2004; Marcus and Gould, 2000; Fogg, 2002). Trust is automatically reduced if consumers expect to face risks while dealing with businesses online (Ayyash *et al.*, 2013).

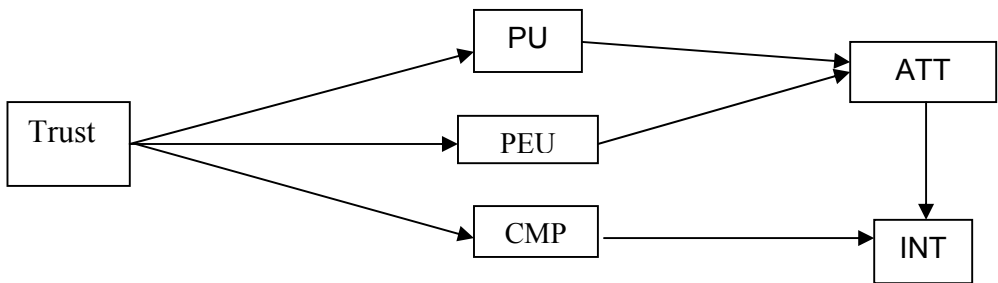
The Theory of Reasoned Action (TRA) hypothesizes that an individuals' behavioural intention to perform behaviour is jointly determined by the individuals' 'attitude' towards performing the behaviour and 'subjective norm' which is the overall perception of what relevant others think the individual should or should not do. In a Meta analysis of research on the TRA, Sheppard *et al.*, (1988) concluded that the predictive utility of the TRA was strong across conditions.

The Technology Acceptance Model (TAM) is the most influential and widely tested model to explain the acceptance of information technology. TAM posits that perceived usefulness (PU) and perceived ease of use (PEOU) and attitude share a causal relationship with the intention and usage behaviour. TAM is known as the robust and parsimonious model to predict user's acceptance of technology (V.Venkatesh; 2000).

The Innovation Diffusion Theory is concerned with how innovations spread and consists of two closely related processes, viz., diffusion process and adoption process (Roger, 1995). Diffusion is a macro process concerned with the spread of an innovation from its source to the public whereas the adoption process is a micro process that is focused on the stages individuals go through when deciding to accept or reject an innovation. Key elements in the entire process are the innovations perceived characteristics, the individuals attitude and beliefs and the communications received by the individuals from their social environment. Factors such as relative advantage, complexity, trialability, observability and compatibility were considered important in influencing individuals' acceptance of the innovation (Roger, 1995).

Combining the components of TAM, TRA and IDT along with 'Trust', the estimated model was as given below.

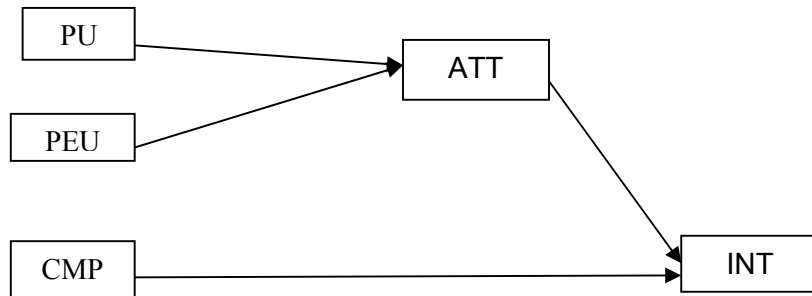
Theoretical model with 'trust' factor



PU-perceived usefulness, PEU-perceived ease of use, CMP-compatibility, Atti-attitude, INT-intention to adopt mobile banking

Fig-9

Theoretical model without ‘trust’ factor



PU-perceived usefulness, PEU-perceived ease of use, CMP-compatibility, Atti-attitude, INT-intention to adopt mobile banking

Fig-10

Another structural equation model, omitting ‘trust’ factor was also estimated.

The VPLS software was used in the estimation of the model.

3.8 Limitations of the study

Several challenges that the researcher faces during the research work are given below

- The investigator first approached the banks to get details on their customers using mobile banking. But due to security reasons, the required informations could not be obtained. Hence, the investigator has to visit the banks and

approached the customers directly in the bank premises after getting prior permission from the banks, to elicit the required data.

- The data were collected by administering the interview schedule to the respondents of the current study. The limitations of primary data collections are applicable in the study also. With much persuasion only the researcher could get the required data from the respondents.
- The study being 'micro' in nature with responses being collected from 400 sample units, the findings of the study cannot be generalised at the macro level.