

Application of Extended Technology Acceptance Model for Mobile-Banking Adoption: A Study of Banking Customers in Pakistan

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Abstract

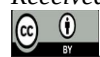
Purpose of this study: The purpose of this study is to explore relationship between Usage of Mobile banking and determine that what factors effects more and influence their decision to select a Mobile Banking to do business with the bank. **Research Questions:** This study's primary research questions was "to analyses relationship between Usage of Mobile banking and what factors effects usage mobile banking in the selection of Mobile banking and what component effects mobile banking more generally." There were five additional sub-questions used. **Methodology:** The methodology for this study was the quantitative data collection method, which is the primary data using a closed-ended questionnaire in a survey approach. The information was gathered from customers of Mobile baking using convenience sampling. The data was collected from customers of Mobile banking in Pakistan. A total of 150 customers participated in the survey. Different statistical analysis approaches; such as descriptive and regression analysis with Statistical Software SPSS and SMART PLS, were used to examine the hypotheses. **Results:** The findings of this study are satisfying regarding the main questions of the study that the relationship between usages of mobile baking are significantly positively related and also intention to M-Banking, Perceived ease of use, Perceived usefulness, Transaction convenience, Perceived risk, are supported results. Future study can use the qualitative research method and also future study can use other than method of close ended questioner and also can-do research on secondary data.

Keywords: Mobile Banking, Consumer Behavior, Theory of Planned Behavior, Consumer satisfaction.

Introduction

In the information age, it is difficult to deny the presence of many technological inventions that science has brought into our lives. Mobile banking is one of the cutting-edge technologies that has just been developed. Traditional banking is geographically decentralized, with branches dispersed throughout populated areas to provide consumers with convenient access. The Extended Technology Acceptance Model (TAM) is widely used theoretical framework for recognizing the influencing factors individual's usage and acceptance of technology. When the

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time comes to Mobile-Banking Adoption, the Extended (TAM) can be a useful tool for identifying the key factors that drive or hinder adoption.

Like other Intention to use Mobile-Banking (MB), to be able to strengthen the goal of implementing M-Banking personal and financial information must be guaranteed by the bank. Banks claim that M-Banking services must also be transaction secure and error-free. In this instance a significant to the adoption and use M-Banking is perceived. Therefore, the intention to use M-Banking services will drop if the user determines the banking security risk transaction through Mobile Banking. As a result, the likelihood that a client will use mobile banking services will decline if they believe that doing so poses a security risk. It's crucial to get clients interested in implementing a particular system yet keeping the user is more crucial than adopting. Therefore, in addition to having objects if the consumers believe that the banks ensure the security of transaction using Mobile-Banking (Sulistyowati et al., 2021a).

Similarly, Perceived Ease of Use, Convenience in connection with consumer activities based on their time and effort to receive specific services. One benefit of services that allow users to use the service at various hours is convenience in online transaction. Furthermore, if the customers find the navigation process to be challenging they will abandon the transaction. However, people will be drawn to adopt particular technologies in the future if they think they are easy to utilize and beneficial. This study places a lot of emphasis on the use technology in banking including M-Banking services. Additionally, people can use M-B features make payments for a goods or services & perform other transaction. The banks assurance that transaction made through M-B are secure simple & error-free is related to transactions convenience. According to this survey bank clients are likely to utilize the M-B application in the future whether they think it's easy to utilize & useful for executing financial transaction (Jamshaid, 2025).

A person behavior in utilizing perceive usability (PU) and perceived robustness (PR) not a system are usefulness (PEoV). This research has indicated that TAM helps to explain why people choose to adopt particular systems. The idea that using a certain system does not need much effort is related to perceived ease of use. A person's perception of the utility of a given strategy is related to their conviction that doing so will improve their performance. The significance of PU & PU to the intention to utilize particular system has been supported by prior ingestions. Within the framework of the research, it is expected that the M-B system will be simple to learn and the accessible menus will adapt to the requirements of customers bank transactions. Therefore, people's intentions to use M-B will expand as it becomes more comfortable and offers more advantages (Jamshaid, 2025).

In the case of online services the business must additionally ensures that the payments producer is quick & secure. Because of the threat posed by cybercrime these requirements are important to build customer trust. Additionally, transaction convenience in online services refers to how simple it is to complete purchase from the beginning until the producer is completed at check out the accessibility of a variety of payments choice & the simplicity of returning items. Customers are delighted with the online services become of the ease of transactions. Transaction convenience in baking is correlated given the length of time needed to finish transaction. The ease of navigations inside the M-B application when offering high-quality banking service is correlated with transaction convenience (Izhar et al., 2023) .

In addition to the anticipation of desired outcomes perceived risk also refers to the possible risk of loss uncouned by consumers. As a result, the perceived risks show how customers view the associated with using particular services. As a results customer's perceptions of the dangers associated with using particular services in this study M-B are the perceived risks. Before choosing to utilize the services customers will think about how much danger they are exposed to. In this context of this study M-B transactions do bring revenues but there are also potential(Sulistyowati et al., 2021a).

According to (Puriwat & Tripopsakul, 2017) One of the key was that banks function and transact with consumers is through mobile banking mobile banking for banks is a key component of expansion initiatives. Real-time, two-way data transfer for banking, payments, and broad access to financial services and information is provided by Mobile-Banking apps. Despite the fact that there are more mobile phones than personal computers and that the M-Banking has grown among bankers than E-banking, the usage of smartphones or tablets to conduct banking transaction or access financial data is less common than one might anticipate.

Problem Statement

In order to address this issue researcher will perform this study. The primary issues are security and privacy for Mobile Banking app users in newly combined when using these applications to conduct financial transaction through Mobile in the banking sector of Pakistan. Any country's economic M-Banking depends on its banking system. The advent of M-Banking was one the most ground-breaking technological developments in banking sector. Many banks in Pakistan have introduced mobile banking technology services, but they have not yet seen a higher percentage of user uptake (Rahim et al., n.d.).

One of the most innovative technology advancements in the national and international financial sector in the introduction of Mobile Banking. M-Baking, which gives consumers real-time, two-way data transfer of banking, payments and broad access to financial services, is a crucial part of commercial banks institutions expansion plans. The effectives and modernization of Pakistan banking sector are critical to the country overall economic infrastructure. However, the actual use of tablets and smartphones for banking transactions is less common than anticipated, even though smartphones are becoming more and more common and Mobile Phone ownership is surpassing that desktop computers.

At the local level, the systemic problem is Cleary visible. Although many commercial banks in Pakistan have aggressively introduced and marketed Mobile Banking technology services to their customers, they have not yet seen a comparably high user uptake rate. The availability of technical banking infrastructure and the local consumer bases actual adoption of these systems differ significantly.

Research Gap

The above studies attempted to investigate the adoption of M-B by customers by taking these variables Actual Usage of Mobile Banking, Intention to Use Mobile Baking, Perceived Ease, Perceived Usefulness, Transaction Convenience, and Perceived Risk as factors that determine the customer's intention to adopt the Mobile Banking.

The adoption of digital and Mobile banking has been extensively studied globally, mostly using the Technology Acceptance (TAM), according to a thorough analysis of the literature. Numbers factors that influence the adoption of technology have been effectively identified by international studies. For example studies carried out in Pakistan have emphasized the importance of perceived utility, ease of use, and demographic factors in the use of internet banking. The impact website quality, customers confidence, perceived utility, and relative prices on consumers acceptance of digital banking systems has also been highlighted empirical studies conducted in Bangladesh and Jordan. Although these international studies offer a fundamental understanding of M-banking adoption, it is challenging to extrapolate their conclusions to Pakistan because of the unique socioeconomic, infrastructural, and cultural contexts of those particular nations.

There are scholarly investigations into the adoption of digital banking in Pakistan, but they have substantial conceptual and geographical constraints. Prior studies evaluating electronic banking in Pakistan have often focused more on general online banking platforms than on particular mobile applications. Additionally, importance metropolitan centers have been the main subject of studies that have directly addressed M-Banking within the Sindh province. For instance, the majority of the samples used in earlier empirical studies examining the obstacles to Mobile Banking services were from large urban centers like Hyderabad and Karachi. As a result there is still a clear geographic study vacuum concerning the adoption trends and technological obstacles encountered by banking customers in tier-2 cities or localized districts.

Research Objectives

To investigating the relationship between Actual usage Of M-B customers intention to adopt to use Mobile Banking.

To investigate relationship between intention to use M-B & customers intention to adopt to use Mobile Banking.

To investigate relationship between Perceived Ease of M-B & customers intention to adopt to use Mobile Banking.

To investigate the relationship between Perceived Usefulness & customers intention to adopt to use Mobile Banking.

To investigate the relationship between Transaction Convenience & customers intention to adopt to use Mobile Banking

To investigate relationship between Perceived Risk & customers intention adopt to use Mobile Baking.

Research Questions

Is Actual Usage significantly related to customer's intention to use Mobile Banking?

Is Intention to Use significantly related to customer's intention to use Mobile Banking?

Is Perceived Ease significantly related to customer's intention to use Mobile Banking?

Is perceived Usefulness significantly related to customer's intention to use Mobile Banking?

Is Transaction Convenience significantly related to customer's intention to use Mobile Banking?

Is Perceived Risk significantly related to customer's intention to use Mobile Banking?

Significance

This research attempts to study the adoption factors of Mobile Banking by customers. Furthermore, Research findings will show trends of customers towards Mobile Banking in taking sample of customers of Banks.

This study is significant because it contributes to the growing body of knowledge on mobile banking adoption by applying the Extended Technology Acceptance Model (Extended TAM) in the context of Pakistan's banking industry. Understanding the elements that affect consumer's acceptance and real use of Mobile Banking has grown more crucial as financial institutions continue to invest in digital banking services. This research examines the influence of Actual Usage, Intention to Use Mobile Banking, Perceived Ease of Use, Perceived Usefulness, Transaction Convenience, and Perceived Risk on customers' adoption of mobile banking, thereby providing empirical evidence that can support both academic research and practical decision-making.

From an academic standpoint, this study expands on the Technology Acceptance Model application by adding new variables that more fully explain consumer behavior in the adoption of mobile banking. Few empirical studies have thoroughly evaluated these factors collectively within the Pakistan Banking environment, despite the fact that earlier research has examined the adoption of mobile banking in several nations. Practically speaking, the results of this investigation will assist commercial banks and other financial organizations in determining the key elements that motivate or deter customers from utilizing mobile banking apps. Understanding customers' perceptions regarding usefulness, ease of use, transaction convenience, and perceived risk will enable banks to improve their mobile banking platforms by making them more user-friendly, secure, reliable, and efficient.

Literature Review

Choudhary et al., (2025) in their article "Assessing Factors Influencing Customers: Study on Mobile Banking" examined the factors that drive customers to use Mobile Banking. The results of earlier studies on the acceptance of Mobile Banking were used to make a survey tool that like a questionnaire. The findings of the study demonstrate that important variables include customers' awareness, perceived risk, perceived benefit, and perceived usability in determining the uptake of Mobile Banking. This study achieves the desired goal; however, it has one drawback. According to the study, a finding shows that the majority of consumers accept online banking due to a number of advantages. According to the results of the analysis, the primary deciding criteria for people to embrace online banking systems are their utility, simplicity of use, knowledge of mobile banking, and hazards associated with it. These elements strongly and favorably influence customers' acceptance of the Mobile Banking system.

Conceptual Definition

Adoption

Adoption in the context of M-Banking is the capacity to accept newly introduced technology. A willing user of the services is a customer who accepts it.

Customers

Customers are those who utilize services, but in the case the term refers to people who use mobile banking services. The financial institution where the customer has an account and where per the customer's instructions auto-debit payments will be made to the client.

Mobile Banking

Customers have access to their bank account via mobile banking an electronic banking system through SMS (supported networks for telecommunication the banks website (on the internet) & mobile application. With mobile banking services including withdrawals deposits & bill payments are available.

When a consumer uses mobile devices, like cell phones or personal digital assistants (PDAs), to communicate with bank this is referred to as mobile banking.

Privacy

The right to privacy can be viewed as both a legal idea and a legal right to solitude. The term "privacy" can also refer to the appropriate institutions or individuals groups to manage when and how much information about them is shared with others (Choudhary et al., 2025)

Security

Simply put security is the defense of interest. People desirable to safeguard their personal funds. The largest issues for internet users may be security information. Users of electronic banking who most likely use the internet with dial-up modems ran a lower chance of having their machines broken into. Only businesses with dedicated internet connection, like banks run the danger of being approached but an ISP employee.

Theoretical Background

Theories provide assistance for research studies and describe the theory that identifies the elements of issue that depend on the study variables. They also assist with issues that are clearly defined and provide the foundation for all arguments. It explains the factors reliability and importance. It aids the researcher in acquiring a bigger knowledge base and a collection of concepts that can aid and benefit the investigation.

Theory of Planned Behavior

In a variety of contexts, including "physical activity to drug use "recycling travel choices, from attitude to customer conduct, the adoption of technology, and privacy protection the "Theory of planned behavior" is used to examine and explain behavior that is effectively planned in

advance,(Zong et al., 2023) define moreover the goal of the theory is to define the interest, the frame and concept in which it occur. Theory begging with a clear interpretation of the behavior of the stages involved. Each of these characters has a distinct level that is specified both generally and individually (Zong et al., 2023). A brief examination of past attempts to use behavioral measures to predict behavior following that presents a theoretical framework called the “theory of planned behavior.” Which is crucial for cognitive control over onself.we report new findings from multiple studies on serial behavioral control or self-efficacy beliefs is positioned several partial theory topics, with a focus on open questions. The “Theory of planned behavior” places the idea of perceived behavioral control also known framework of relationship between beliefs, attitudes, and intentions, conduct and behavior.

Theory of Consumer Behavior

The “Theory of consumer behavior” economic is defined as the study of intelligent consumers behavior that aims to maximize value within budgetary constraints and market price barriers (Harahap et al., 2024). Some of the magnitude of consumer’s behavior that effects market movements and people’s satisfaction is not covered in the extensive introduction. Assuming that is feasible, which is motivated by a desire to differentiate themselves from the majority of consumers who aim to maximize comfort and spent as much money as they can themselves such behavior can be characterized as foolish. However, according to economic theory it make sense because it will make consumers more useful, and the welfare graph this will result in a lower behavior rank because it enables users to enjoy a variety of amenities and comforts despite resource constraints (Harahap et al., 2024).

Theory of Internet Baking and TAM

(Patel et al., 2024) have investigate the structure online banking using an expanded version of the TAM model and the incorporation of new risk variables in the context of Pakistan, the information gathered from 339 customers via an online survey the method of using structural equation modeling the recommended framework as evaluated. The study main influencing factors included bank familiarity, individual trust propensity, and structural assurance these factors affect consumer’s early faith in Pakistan’s adoption of online banking. The researcher, according to the authors, can be used to help financial instruction’s develop strategies that will increase the uptake of internet banking.

Previous Studies

Hakizimana et al., (2023) integrated constructs to determine online banking usage in India use the TAM approach. Perceived usefulness, Perceived simplicity of use, Perceived risk, Perceived efficacy of internet use Perceived self-efficacy of internet banking & subjective norm bank among the qualities considered are initiative, support from the government, image, trainability, and attitude. The 4 demographic characteristics were split up by the augmented TAM model of education. Divide income, age, and gender into-two groups to look at a survey moderating effect form that was used to gather information from 300 participate. Primary data analysis using confirmatory factor analysis. The researcher conclusions showed that every variable supports and contributes to the suggested model. The adoption online baking usage varied by variables by 26.5% and the TAM model varied by 29.9% as explained by the predictor variables in this study.

(Hakizimana et al., 2023) examined the determinants of internet banking adoption in Jordan. The information was acquired from customers with active accounts at thirteen commercial banks. Using regression analysis, 476 customers from primary data were selected as a sample. The findings show that all factors have a considers impact on adoption, but that website quality and customers confidence are the best indicators of whether or not people will use internet banking. Nevertheless, Jordan has a relatively low rate of consumer's uptake. The actual users of this helpful technology are those with high levels of education and computer application proficiency.

(Kelly & Palaniappan, 2023) using TAM and the Diffusion of Innovation (DOI) Theory, empirical researcher on the uptake of Mobile-Banking examined the mitigating influence of demographic attributes on customer's attitudes toward the technology in India. According to data collected from a focus group with eight public sector senior managers and a poll of 367 graduate and postgraduate students, the moderator factors include age, gender, education, occupation, earning, experience, and marital status. The study's findings demonstrate that educational background has no moderating effect on user attitude. All other factors, however, continue to be important.

Empirical Analysis

(Rwezaula et al., 2022) Pakistan examined the elements that prevent its clients from utilizing mobile banking services. By using the judgment method, a study was conducted with 372 respondents primarily from (Hyderabad & Karachi) the two largest cities in Sindh province. In order to get at the results, the researcher employed a correlation study design and multiple regression from the analysis. The study used the TAM model to analyze factors like as societal impact perceived ease of use, perceived risk, and perceived utility of to determine whether they had an impact on Pakistan adoption of Mobile Banking.

(Choudhary et al., 2025) the elements influencing Bangladesh's usage of mobile banking were examined by the researchers. For this investigation a quantitative methodology was used. Customers of Brace-Bangladesh fully functional mobile banking services provides are Back limited and Dutch Bangla Bank limited , were given a self-administrated questionnaire as part of the research. There were 100 surveys distributed but only 64 complete surveys were given back, resulting in response rate of 64%. The data were evaluated using multiple regressions, and the findings indicated that the adoption of mobile banking was influenced by a number of factors, including aptitude moral character, goodness, perceived utility, perceived usability, perceived ease of use, relative costs and time benefits.

Conceptualization of the Variables

Intention to use Mobile- Banking

Like other Intention to use Mobile-Banking (MB) in order to strengthen the goal of implementing M-Banking the financial and personal data must be guaranteed by the bank. Additionally, the mobile banking services needs to because for the transaction and free of errors according banks in this instance, perceived risk is a major barrier to Mobile-Banking uptake and utilization. Therefore, if a user believes there is a security risk associated with banking, they are less likely to intend to us mobile banking transaction through Mobile-Banking. As a result, the likelihood that a client will use Mobile-Banking services will decline if they believe that doing

so poses a security risk. It's curial to get clients interested in implementing a particular system yet keeping the user is more crucial than adopting. Therefore, in addition to having objects if the consumers believe that the banks ensure the security of transaction using Mobile-Banking (Irshad, 2023).

Perceived Ease of Use

Similarly, Perceived Case of use, convenience in connection with consumer's activities based on their time and effort to receive specific services. One benefit of services that allow to use the services at various hours is convenience in online transaction. Furthermore, if the customers find the navigation process to be challenges they will abandon the transaction. However, people will be drawn to adopt particular technologies in the future if they think they are simple to use and beneficial. This is study places a lot of emphasis on the use technology in banking including Mobile-Banking services. Additionally, people can use Mobile-Banking feature make payments for a goods or services and perform other transaction. The banks assurance that transaction made through Mobile-Banking secure simple and error-free is related to transactions convenience. According, to this survey bank clients are likely to utilize the M-B applications in the future whether they think it's easy to utilize and useful for executing financial transaction (Jamshaid, 2025).

Perceived Usefulness

A person behavior in utilizing a system is determined by perceived ease of use (PU) and perceived usefulness (PEoV). This research has indicated that TAM helps to explain why people choose to adopt particular systems. The idea the using a certain system does not need much effort is related to perceived ease of use. A person's perception of the utility of a given strategy is related to their belief that it will help them perform better. The significance PU and PU to the intention to utilize particular system has been supported by prior ingestions. In the context of the study it is anticipated than the Mobile-Banking system will be simple to learn and the accessible means will adapt to the requirements if customers bank transaction. Therefore, people's intentions to use Mobile-Banking will expand as it become more comfortable and offers more advantages (Jamshaid, 2025).

Transaction Convenience

In the case of online services the business must additionally ensures the payments producer is quick & secure. Because of the threat posed by cybercrime these requirements are important to build customers trust. Additionally, transaction convenience in online services refer to how simple it is to finalize trades from the beginning until the checkout process is completethe accessibility of a variety of payments choice & the simplicity of returning items. Customers are delighted with the online services become of the ease of transactions. Transactions convenience in banking is correlated with the amount of the time required to complete transaction. The ease of navigations inside the M-B applications when offering high-quality banking services is correlated with transaction convenience (Izhar et al., 2023).

Perceived Risk

In addition to the anticipation of desired outcomes perceived risk also refers to the possible risk of loss uncounted by consumers. As a result the perceived risks show how customers view the associated with using particular services. As a results customers perceptions of the dangers in this study Mobile-Banking are the perceived risk. Before choosing to utilize the services customers will think about how much danger they are exposed to. In this context of this study Mobile-Banking transactions do bring revenues but there are also potential (Sohail, 2024).

Conceptual Framework

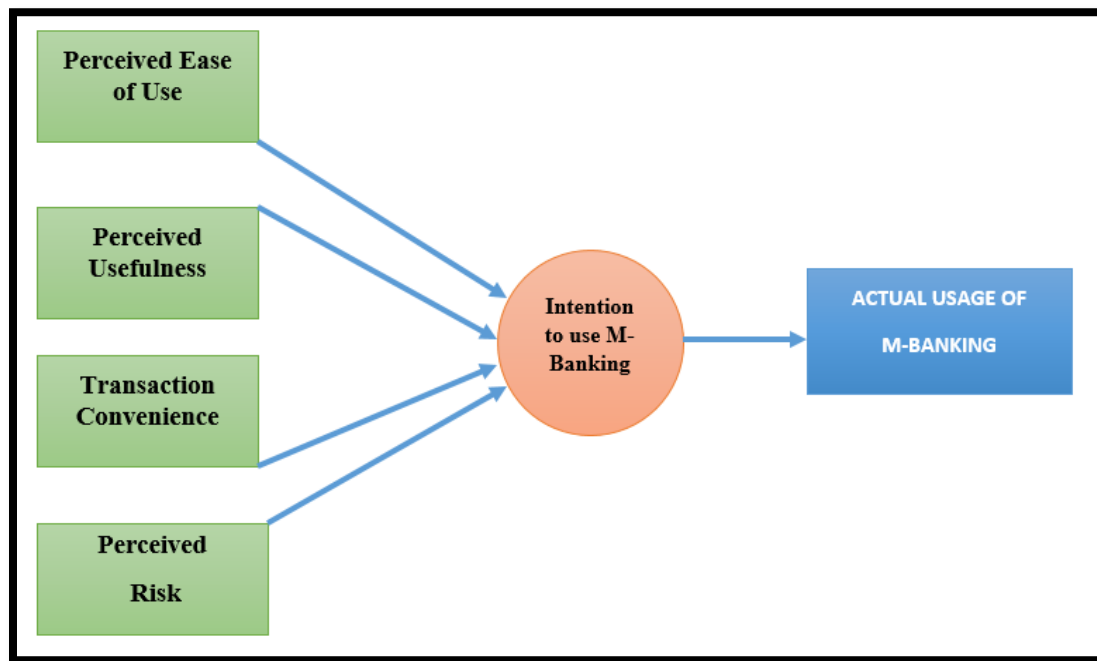


Figure 2.1 Conceptual Framework

Hypotheses

- H1:** Perceived Ease of Use is Negative correlated to Intention to use M-Banking.
- H2:** Intention to use M-Banking is positively correlated to Actual usage of M-Banking.
- H3:** Perceived Risk is Negative correlated to Intention to use M-Banking.
- H4** Perceived Usefulness is positively correlated to Intention to use M-Banking.
- H5:** Transaction Convenience is positively correlated to Intention to use M-Banking.

Research Methodology

The research strategy, methodology, and methods for gathering, evaluating and interpreting the data are covered in this chapter. The chapter outlines the research methodology that is appropriate and appropriate for this topic because the current study goal is to look into the

adoption of Mobile-Banking among banking customers. The chapter then goes over different research methodologies in general and the approach that will be utilized in the current study. Well also talk about the different kinds of research procedures and, of course, which ones work best for this particular study. Then, a through explanation of the study's data collection techniques and questionnaire formulation procedure will follow. The study's demographic and sampling procedures, data collection strategy, and study variables will next be covered.

Research Design

Research design is described as the general method you adopt to coordinate the many review components in a solid and sensible manner in order to guarantee that you will actually answers the research issue. Additionally, it creates the foundation for gathering, estimating, and analyzing information.

Additionally, research design is the idea for looking the research problem, focusing research purpose, and finding the responses to research inquires. This study encapsulates exploratory research to gain foundational knowledge about our area of interest.

Data Collection Method

Data collection is systematic process for gathering information for an exact topic. I it is very important to ensure that your data is completed through the collection stage and it must be collected in legal and ethically way. If these conditions are not applied that means your analysis will not be exact and the values can be comprehensive.

Data Collection methods under Quantitative Research

This is method is consisting of numerical data. This method is further divided in two types Primary and Secondary.

Primary data: Close-ended questionnaire or Survey

Primary data is the original and unique data that are acquired by a researcher from a source that can be survey or questionnaires etc. This data is collected for a specific research problem in hand using processes that may apply a research problem in a better way. In the primary data survey and close-ended questionnaires are main sources.

This study used primary data close ended questionnaires for data collection, further this study uses 5-point Likert scale the questionnaire types was multiple choice questions like “ Strongly disagree, disagree, neutral, agree, strongly agree”. The data is collected from bank customers through physical questionnaires and with help of goggle form.

Population and Sampling Method of the Study

Population

The researches population is acknowledged in a way that supports the creation of the sampling frame. It provides an admissible sample that can be used to gather empirical data. The team research population refers to total group of participants from which our research sample is

chosen. Determine the precise number of responders or items to use in sample selection is another factors considered in the population.

Sampling Process

The research study chooses a simple size because there are too many obstacles to investigate the full research population. The sampling procedure is explained in details in the sections that follow, along with a definition of the sampling techniques.

Sample Size

The number of individuals selected is known as the sample size for the study from the population. To determine the sample size, the population is divided into smaller units. Data is gathered from representatives of the entire population using a sample, and the results are then extracted and examined. The data was gathered using an online survey & pencil and paper questionnaires by banking customers in Pakistan city areas.

150 customers worth of data have been gathered in order to obtain the data accurately and on time, personal visits and communication with the respondents were conducted in fact, this saved time and produced accurate responses from the respondents.

Sampling Frame

A list of participants from the intended audience who are able to provide information for the study is known as a sampling frame. An extensive list of Pakistan city customers who use bank accounts would serve as the sampling frame for the current study's thesis.

Statistical Tools and Techniques For Data Analysis

Appropriate statistical tools and techniques have been employed in the data analysis process to ensure that the results are accurate, comparable, and topic-appropriate.

This study employed the SMARTPLS3 package, which is used for quantitative data analysis, for the same reason. Additionally, the program SPSS v 25 was used to perform frequency analysis, and other descriptive analyses, yielding reliable results for the study's data.

Descriptive statistics analysis through SPSS software

Measure of central tendency, such as mean and mode, & measures of dispersion, such as standard deviation, are examples of descriptive statistics. The frequency distribution of the respondent's demographic information was examined using SPSSV25.

The first section of the questionnaire, which asked about the respondent's age, gender, and qualification, yielded results from the descriptive statistics. Using SPSS V25, the descriptive statistics from each of the constructs individual items were also retrieved.

Smart PLS 3

One useful tool for measuring, creating, and validating management science models is the SMART PLS 3 packages. According to numerous articles and publications, SMART PLS 3 is considered a good analytical tool by many research scholars.

Using SMART PLS, the path model from variables was created. The constructs corresponding indicators were fastened to them. Following the models drawing, the data was run through the PLS Algorithm and PLS Bootstrapping.

Instrument and Tools Measures

A questionnaire was employed in this study as the instrument to gather data from the participants. Both paper copies and an online survey in the form of a Google Form were distributed for the questionnaire. The research created the online questionnaire and sent the sample respondents the link. Since it saves money and the time conducting an online survey in fact the most convenient and effective way to collect data.

The study's variables have been divided into independent categories, each of which includes 1) AU = Actual Usage of M-Banking, 2) ITMB = Intention to use M-Banking, 3) PU = Perceived Ease of use, 4) PU = Perceived Usefulness, 5) TC = Transaction Convenience, 6) PR = Perceived Risk,

Measures

The valid and published items were used in this study and the closed-ended questions used a 5-Point scale that includes 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree 5 = Strongly Agree

Table 3.1 Variables, Scales, and sources of variables

Section	Variables	No of items	Scale	Sources
1	Actual usage of M-Banking	3	Likert Scale	(Sulistyowati et al., 2021b)
2	Intention to use M-Banking	3	Likert Scale	(Sulistyowati et al., 2021)
3	Perceived ease of use	3	Likert Scale	(Sulistyowati et al., 2021a)
4	Perceived Usefulness	3	Likert Scale	(Sulistyowati et al., 2021a)
5	Transaction Convenience	3	Likert Scale	(Sulistyowati et al., 2021a)
6	Perceived Risk	3	Likert Scale	(Sulistyowati et al., 2021a)

Variables and Items Coding

The following lists the constructs and indicators that are used in the Questionnaire.

Table 3.2 Questionnaire items with constructs

Constructs	Labels	Indicators
Actual Usage of M-Banking	AUMB_1	I access M-Banking several times a week

Intention to Use M-Banking	AUMB_2	I use M-Banking regularly
	AUMB_3	I have weekly necessities to use M-Banking
	ITUMB_1	I have an interest in using M-banking in the future
Perceived Ease of Use	ITUMB_2	I will use M-Banking in my daily life
	ITUMB_3	I will M-Banking for bank transaction
	PEOU_1	I would argue that using M-Banking is easy to use
Perceived Usefulness	PEOU_2	I feel that learning M-Banking is simple
	PEOU_3	I think that easy to operate the menus in M-Banking
	PU_1	M-Banking helps me in doing banking transactions
Transaction Convenience	PU_2	M-Banking makes my life simpler
	PU_3	M-Banking services is very beneficial for me
	TC_1	All my banking transactions can be done quickly through M-Banking
Perceived Risk	TC_2	It does not take long to make bank transactions through M-Banking
	TC_3	I feel comfortable to keep my personal information in the M-Banking system
	PR_1	I find I not easy psychologically, using M-Banking for trade transaction
	PR_2	I feel uncomfortable using M-Banking as it relates to privacy and security information of the system
	PR_3	I believe that there is negative impact on the use M-Banking

Operationalization of Variables and Instruments

The instruments utilized in this study investigation ate listed below. These instruments were used to measure the scale of produce results.

Measures

The measurement scale that was both valid and published was used in this study. A 5 point Likert Scale was used for the study items. The measurements-related information is defined individually for each variables below. All scale, items, item coding, and adopted sources of information are noted.

Actual Usage of M-Banking

The 3-item questionnaire were developed by Sulistyowati et al., (2021) to measure the “ Actual Usage of M-Banking” was chosen for this study in order to assess then influence of others on peoples interest or attraction. The variable’s code AU counts inquires such as like AU1, AU2, and AU3.

Intention to use M-Banking

The 3-item questionnaire were developed by Sulistyowati et al., (2021) to measure the “Intention to use M-Banking” was chosen for this study in order to assess then influence others on peoples interest or attraction. The variable’s code IU counts inquires such as like IU1, IU2, and IU3,

Perceived ease of use

The 3-item questionnaire were developed by Sulistyowati et al.,(2021) to measure the “Perceived ease of use” was chosen this study in order to assess then influence others on peoples interest or attraction. The variables code PU counts inquires such as like PU1, PU2, and PU3.

Perceived Usefulness

The 3-item questionnaire were developed by Sulistyowati et al., (2021) to measure the “Perceived usefulness” was chosen this study in order to assess then influence other on peoples interest or attraction. The variables code PU counts inquires such as like PU1, PU2, and PU3.

Transaction Convenience

The 3-item questionnaire were developed by Sulistyowati et al., (2021) to measure the “Transaction Convenience” was chosen this study in order to assess then influence other on peoples interest or attraction. The variables code TC counts inquires such as like TC1, TC2, and TC3.

Perceived Risk

The 3-item questionnaire were developed by Sulistyowati et al.,(2021) to measures the “Perceived Risk” was chosen this study in order to assess then influence other on peoples interest or attraction. The variables code PR counts inquires such as like PR1, PR2, and PR3.

Results and Analysis

The goal of this study is to investigate the factors that influence the adoption of mobile banking using data from Pakistani cities. This chapter on outcomes and data analysis attempts to evaluate and interpret the collected data in order to decide whether the hypothesis is accepted or denied. Multiple regression analysis, path analysis, correlation, SMART PLS, SPSS25.0 software, and other statistical methods will be used to accomplish this.

This chapter includes comprehensive tables, understandable graphs, diagrams, and other pertinent snapshots to support the study’s findings. Additional discussion and elaboration are provided after the use of supporting materials to confirm whether or not the study goal was successful met. The questions of whether the model developed in this research study is supported by the results is also in this chapter.

Results

The outcomes in this chapter can be divided into two primary categories: inferential Statistics and descriptive. The first parts use of frequency distribution tables on the data that was gathered.

These tables provide extensive information about the sample respondent's demographics, including name, age, gender, language, qualification, and whether or not they have a bank account. The statistical analysis of the demographic feature is displayed in their tables. The frequency distribution and its implication are presented in this statistical analysis.

The second section of the results explains the degree to which the populations sample agreed or disagreed with the instruments variables items, finding out how much sample units agree or disagree will help the researchers in their work

Descriptive Statistics: Frequency of Demographics

There are two sections to this analysis section. The frequency distribution of data collected and a descriptive analysis of respondents demographic characteristics are covered in the first section. The frequency tables and descriptive statistics of the independent and dependent variables are covered in the second section.

Frequency Distribution of Gender

Table 4.1 Frequency distribution of Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender wise Distribution	Female	32	21.3	21.3	21.3
	Male	118	78.7	78.7	100.0
	Total	150	100.0	100.0	

Table 4.1 describes the sample data terms of male and female respondents. The study has a high percentage of male respondents 118, as indicated in the table. The ratio of male respondents is 78.7% while the ratio of female respondents is comparatively low at 21.3%. Due to the relatively low percentage of female involvement in banking, the number of female respondents 32 in the table is lower than that of male respondents.

Frequency Distribution of Age

Table 4.2 Frequency distribution of Age

	Frequency	Percent	Valid Percent	Cumulative Percent
16 - 20	19	12.7	12.7	94.0
21 - 25	90	60.0	60.0	81.3
25 - 29	32	21.3	21.3	21.3
25-29	8	5.3	5.3	100.0
Above	1	0.7	0.7	94.7
Total	150	100.0	100.0	

Table 4.2 shows the frequency and percentage of sampling units of the respondents regarding the age of the elements sampled from the population. The study's target audience comprises a maximum of 16-20 year old respondents; the ratio of these respondents is 94.0 % with a frequency of 32 as indicated in the table. There is frequency of 90 and a ratio of 60.0% for those aged 21 to 25; 12.7% of respondents are between the ages of 25-29 and the frequency is 32 in table. When compared to the above ratio of 5.3% and frequency of 1.

Frequency Distribution of Qualification/Educational level of respondents

Table 4.4 Frequency Distribution of Qualification/Educational level

	Frequency	Percent	Valid Percent	Cumulative Percent
Bachelor	76	50.7	50.7	50.7
Intermediate	18	12.0	12.0	88.0
Master	38	25.3	25.3	76.0
Matric	13	8.7	8.7	96.7
Other	4	2.7	2.7	99.3
PHD	1	0.7	0.7	100.0
Total	150	100.0	100.0	

The highest ratio of customers/respondents having Bachelor's degree which represent 50.7% ratio or frequencies, however 18 customers/respondents level of educations is intermediate represent 12.0% ratio and 38 respondents have Master's degrees clearly shows that most the respondents 25.3% ratio have bachelors level education and rest of them are lower ratio as Matric ratio is 8.7% which is 13 respondents. The very low ratio is PHD level education which is only 0.7% means 1 respondents, and very low ratio is other level education which is only 2.7% means 4 respondents, therefore the study main target customers are bachelor and Master level education customers as the intermediate ratio is not more because of age below 18 people cannot use the bank as PHD level education is not preferred by the community.

You have an account in ----- Bank?

Table 4.5 you have an account in ----- Bank?

	Frequency	Percent	Valid Percent	Cumulative Percent
AL Habib Bank	13	8.7	8.7	8.7
Allied Bank	13	8.7	8.7	17.3
Habib Bank Limited (HBL)	43	28.7	28.7	46.0
Khushhali Bank	4	2.7	2.7	48.7
Meezan Bank	4	2.7	2.7	51.3
Muslim Commercial Bank (MCB)	1	.7	.7	52.0
National Bank of Pakistan (NBP)	15	10.0	10.0	62.0
Other	38	25.3	25.3	87.3
Sindh Bank	13	8.7	8.7	96.0
Soneri Bank	6	4.0	4.0	100.0
Total	150	100.0	100.0	

The ratio of Al Habib Bank respondents is 8.7% ratio or frequencies 13, and ratio Allied Bank respondents is 8.7% ratio or frequencies 13, and ratio Habib Bank Limited (HBL) respondents is 28.7% ratio or frequencies 43, and ratio Khushhali Bank respondents is 2.7% ratio or frequencies 4, and ratio Meezan Bank respondents is 2.7% ratio or frequencies 4, and ratio Muslim commercial Bank (MCB) respondents 0.7% ratio or frequencies 1, and ratio National Bank of Pakistan (NBP) respondents is 10.0% ratio or frequencies 15, and ratio Sindh Bank respondents

is 8.7% ratio or frequencies 13, and ratio Soneri Bank respondents is 4.7% ratio or frequencies 6, and ratio other respondents is 25.3% ratio frequencies 38, in this table very highest respondents of Other and national Bank of Pakistan (NBP) and very lowest respondents of Muslim commercial Bank (MCB).

Descriptive Statistics of indicators of Constructs

This section describes the descriptive statistics analysis of the items of variables.

Actual usage of M-Banking

Table 4.6 Descriptive statistics of actual usage of M-Banking

Item Label	Indicator (Item description)	Mean	Std. Deviation
AUMB 1	I access M-Banking several times a week.	3.41	1.301
AUMB 2	I use M-Banking regularly.	3.34	1.209
AUMB 3	I have weekly necessities to use M-Banking.	3.19	1.178

Table 4.6 indicates the mean and standard deviation values along with frequency of responses taken on the actual usage of m-banking instrument on a five-point Likert scale. The table consist of a dependent variables response on the items of actual usage of m-banking that are 3 items. The item AU1 is highest mean which is 3.41 and have Standard deviation 1.301 that is highest the item AU1 this shows a positive sign that the customers will participate in M-Banking adoption. The item AU3 have lowest mean which is 3.19 and having standard deviation 1.178 that is lowest standard deviation where item AU3 shows normal sign that the customers will participate in m-Banking adoption. The item AU2 is Middle mean which is 3.34 and standard deviation 1.209 that is middle the item AU2 states shows an all values are almost near to the average sign that customers will participate in M-Banking adoption.

Intention to use M-Banking

Table 4.7 Descriptive statistics of Intention to use M-Banking

Item Label	Indicator (Item description)	Mean	Std. Deviation
TUMB1	I have an interest in using M-Banking in the future.	3.57	1.397
TUMB2	I will use M-Banking in my daily life.	3.27	1.198
TUMB3	I will use M-Banking for bank transactions.	3.47	1.278

Table 4.7 indicates the mean and standard deviation values with frequency of responses taken on the Intention to use M-Banking instrument on a five-point Likert scale. The table consist of an independent variable response on the items of intention to use M-Banking are 3 item.

The item TUMB1 is highest mean which 3.57 and have standard deviation 1.397 that is highest, the item TUMB1 states that “shows a positive sign that the customers will participate in M-Banking adoption. The item TUMB2 have lowest mean which is 3.27 and having standard deviation 1.198 that is lowest standard deviation where item TUMB this is normal sign that the customers will participate in M-Banking adoption. The item TUMB3 is middle mean which is 3.47and standard deviation 1.278 that is middle the item TUMB3 states this is shows an all

values are almost near to the average sign that the customers will participate in M-Banking adoption.

Perceived ease of use

Table 4.8 Descriptive statistics of Perceived ease of use

Item Label	Indicator (Item description)	Mean	Std. Deviation
PEOU1	I would argue that using M-Banking is easy to use.	3.25	1.334
PEOU2	I feel that learning M-Banking is simple.	3.32	1.287
PEOU3	I think that easy to operate the menus in M-Banking.	3.25	1.272

Table 4.8 indicates the mean and standard deviation values along with the frequency of responses taken on the perceived ease of use instruments on a five-point Likert scale. The table consist of an independent variable response on the items of perceived ease of use that are 3 items. The item PU2 is highest mean which 3.32 and have standard deviation 1.287 that is highest, the item PU2 states this shows a positive sign that the customers will participate in M-Banking adoption. The item PU3 have lowest mean which is 3.25 and having standard deviation 1.272 that is lowest standard deviation where item PU3 states this shows normal sign that the customers will participate in M-Banking adoption. The item PU1 is middle mean which is 3.25 and standard deviation 1.334 that is middle the item PU1 states this shows an all values are almost near to the average sign that the customers will participate in M-Banking adoption.

Perceived Usefulness

Table 4.9 Descriptive statistics of Perceived Usefulness

Item Label	Indicator (Item Description)	Mean	Std. Deviation
PU1	M-Banking helps me in doing banking transactions.	3.42	1.342
PU2	M-Banking makes my life simpler.	3.31	1.317
PU3	M-Banking service is very beneficial for me.	3.31	1.285

Table 4.9 indicates the mean and standard deviation values along with frequency of responses taken on the actual usage of m-banking instrument on a five-point Likert scale. The item PU1 is highest mean which is 3.42 and have standard deviation 1.342 that is highest the item PU1 states this shows a positive sign that the customers will participate in M-Banking adoption. The item PU3 have lowest mean which is 3.31 and having standard deviation 1.285 that is lowest standard deviation where item PU3 this shows normal sign that the customers will participate in M-Banking adoption. The item PU2 is middle mean which is 3.31 and standard deviation 1.317 that is middle the item PU2 this shows an all values are almost near to the average sign that the customers will participate in M-Banking adoption.

Transaction Convenience

Table 4.10 Descriptive statistics of Transaction Convenience

Item Label	Indicator (Item Description)	Mean	Std. Deviation
TC1	All my banking transactions can be done quickly through M-Banking.	3.40	1.366
TC2	It does not take long to make bank transactions through M-Banking.	3.23	1.328
TC3	I feel comfortable to keep my personal information in the M-Banking system.	3.23	1.270

Table 4.10 indicates the mean and standard deviation values along with frequency of responses taken on the Transaction Convenience instrument on a five-point Likert scale. The item TC1 is highest mean which is 3.40 and have Standard deviation 1.366 that is highest the item TC1 this item shows a positive sign that the customers will participate in M-Banking adoption. The item TC3 have lowest mean which is 3.23 and having standard deviation 1.270 that is lowest standard deviation where item TC3 this shows normal sign that the customers will participate in M-Banking adoption. The item TC2 is middle mean which is 3.23 and standard deviation 1.328 that is middle the item TC2 states this shows an all values are almost near to the average sign that the customers will participate in M-Banking adoption.

Perceived Risk

Table 4.11 Descriptive statistics of Perceived Risk

Item Label	Indicator (Item Description)	Mean	Std. Deviation
PR1	I find it not easy psychologically, using M-Banking for trade transactions.	2.48	1.235
PR2	I feel uncomfortable using M-Banking, as it relates to the privacy and security information of the system.	2.39	1.134
PR3	I believe that there is a negative impact on the use of M-Banking.	2.44	1.201

Table 4.11 indicates the mean and standard deviation values along with frequency of responses taken on the Perceived Risk of m-banking instrument on a five-point Likert scale. The item PR1 is highest mean which is 2.48 and have Standard deviation 1.235 that is highest the item PR1 states this shows a positive sign that the customers will participate in M-Banking adoption. The item PR2 have a lowest mean which is 2.39 and having standard deviation 1.1348 that is a lowest standard deviation where item PR2 states this shows normal sign that the customers will participate in M-Banking adoption. The PR3 is middle mean which is 3.44 and standard deviation 1.201 that is middle the item PR3 states this shows an all values are almost near to the average sign that the customers will participate in M-Banking adoption.

Data Analysis through Structural Equation Modeling

A set of statistical techniques known as structural equation modeling (SEM) allow for the observation of a group of relationship between one or more independent variables (IV'S), which may be consistent or disconnected and one or more dependent variables (DV'S) which may continue is discontinue. Factor variables or measures may be used for both the independent and dependent variables. Such as “confirmatory component analysis”, “path analysis”, “analysis pf covariance structures”, and “casual modeling” are frequently used to refer to simultaneous equation modeling (SEM) (Weston & Gore, 2006).

According to the researcher, SEM combines “factors analysis and path analysis.” To put in another way, “SEM is also similar to path analysis in that researcher’s test hypothesized relationships between constructs.” The goals of SEMs are similar to those of “factor analysis,” which is to give a crude overview of the interactions between variables. Factor loadings are correlations between latent variables and both indicators and order latent variables.

Structural equation modeling, or SEM, has grown in popularity as a results of the need to evaluate entire theories and notions. The capacity of SEM to assess latent variable measurement and examine the connections between latent variables is the primary factor contributing to its efficacy. Research now have the choice to employ the variance-based partial least squares technique (PLS-SEM), even if the initial application of this method used a covariance-based approach (CB-SEM).

Assessment of the Measurement Model (Outer Model)

The measurement model evolution the initial stage of the PLS analysis evaluates the theoretically define construct validity. Factor loadings, composite reliability and extracted average variance are evaluated for a measurements model. Additionally, it shows how accurately each item reflects the contribution to a particular element (Hair Jr. et al., 2017).

Construct validity

Construct validity evaluates that the test that have be intended to determine a construct is authentically measuring that construct. Factor loading and cross loadings can be helpful in evaluating the construct validity of particular construct.

The table below maintains the factor loadings of observed variables. Value of factor loading accurate when it is greater 0.60. The table indicate that all variables are having the value than 0.6 therefore the factor loadings of each variables are significant.

Table 4.12 Factor Loadings

CONSTRUCT	ITEMS	OUTER LOADINGS
Actual usage of M-Banking	AU1	0.879
	AU2	0.833
	AU3	0.833
Intention to use M-Banking	IU1	0.885
	IU2	0.891
	IU3	0.903

Perceived ease of use	PU1	0.922
	PU2	0.916
	PU3	0.887
Perceived Risk	PR1	0.891
	PR2	0.844
	PR3	0.854
Perceived Usefulness	PU1	0.922
	PU2	0.916
	PU3	0.887
Transaction Convenience	TC1	0.920
	TC2	0.937
	TC3	0.854

The table 4.12 shows the whole factor loading of six unobserved variables in the model.

Table 4.13 Cross Loadings

	Actual usage of M-Banking	Intention to use M-Banking	Perceived ease of use	Perceived Risk	Perceived Usefulness	Transaction Convenience
AU1	0.877	0.597	0.434	0.133	0.501	0.492
AU2	0.883	0.552	0.406	0.254	0.525	0.423
AU3	0.836	0.529	0.467	0.189	0.502	0.457
IU1	0.629	0.896	0.564	0.239	0.637	0.601
IU2	0.541	0.885	0.591	0.346	0.652	0.671
IU3	0.556	0.897	0.607	0.378	0.699	0.697
PU1	0.458	0.608	0.883	0.276	0.639	0.572
PU2	0.413	0.542	0.887	0.227	0.664	0.64
PU3	0.455	0.58	0.872	0.295	0.649	0.649
PR1	0.168	0.301	0.257	0.879	0.352	0.346
PR2	0.165	0.267	0.258	0.838	0.301	0.3
PR3	0.226	0.341	0.268	0.87	0.268	0.296
PU1	0.59	0.737	0.657	0.354	0.922	0.732
PU2	0.476	0.622	0.682	0.288	0.913	0.663
PU3	0.527	0.649	0.675	0.307	0.889	0.679
TC1	0.532	0.688	0.657	0.292	0.731	0.928
TC2	0.504	0.699	0.683	0.36	0.734	0.938
TC3	0.403	0.619	0.585	0.349	0.622	0.882

Table 4.13 shows that the cross loadings that are visible above. The role is to ensure that all constructs have values less than 0.50 with respect to other constructs, and that the suggested values is lower than 0.50, thereby confirming validity. Cross loading values in this table are less than the recommended value of 0.50, but constructs validity is still supported.

Convergent Validity

One kind of construct validity is convergent validity, which is evaluated when determining the validity of a construct. Convergent validity is supported when each item has composite reliability of at least 0.70 and when each construct's average variance extracted (AVE) is at least 0.50 above than there is support for convergent validity (Weston & Gore, 2006).

Table 4.14 Measurement Model (Cronbach's alpha, CR and AVE)

Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AU	0.832	0.834	0.899	0.749
IU	0.873	0.878	0.922	0.797
PU	0.856	0.857	0.912	0.776
PR	0.831	0.855	0.897	0.744
PU	0.894	0.904	0.934	0.825
TC	0.905	0.922	0.94	0.839

The results in the table 4.14 shows that there are all values of composite reliability is exceeding the suggested value 0.70, the in the table Average variance extracted (AVE) for Actual usage of M-Banking (0.749), Intention to use M-Banking (0.797), Perceived ease of use (0.776), Perceived risk (0.744), Perceived usefulness (0.825), and Transaction Convenience (0.839) all constructs have achieved the suggested value more than 0.50. In the above table Cronbach's alpha, values of AVE and Composite reliability. As approximately values of Cronbach's alpha exceed the suggested value 0.7 and as same Composite reliability all constructs values are more than suggested value 0.7. Average variance extracted (AVE) values also cross the suggested value 0.50. In the table from all accepts values are more than suggested values that means it's acceptable.

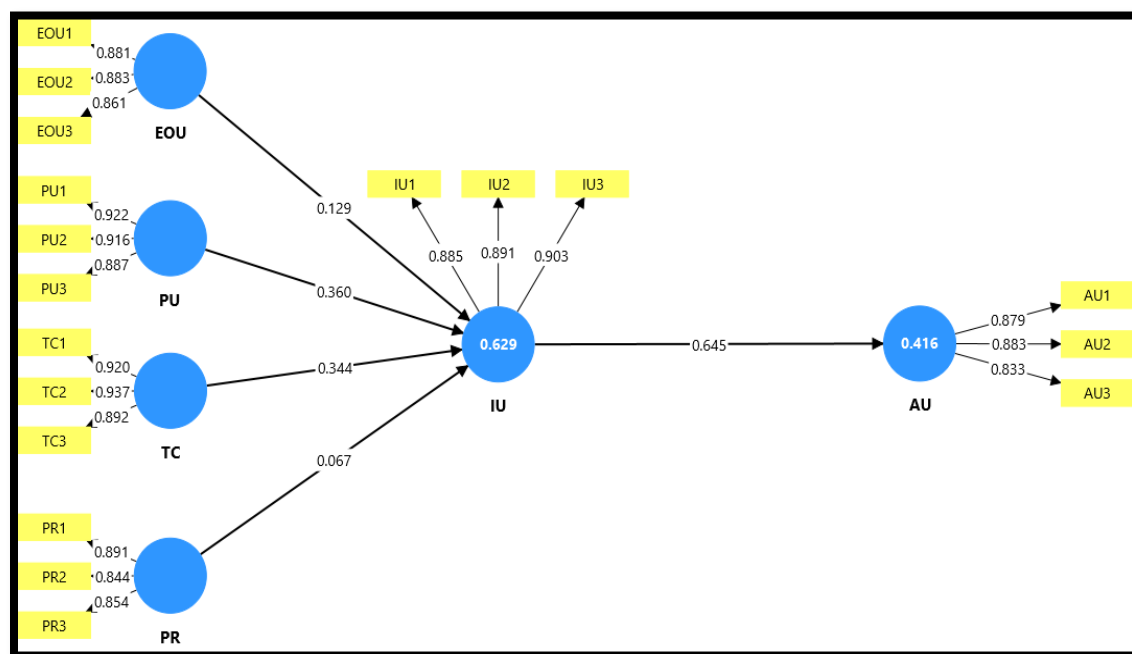


Figure 4.1 Outer Model Assessment

The measurement model in figure 4.1 shows the all six constructs Actual usage of M-Banking, Intention to use M-Banking, Perceived ease of use, Perceived Usefulness, Transaction Convenience, Perceived Risk, and Customer satification tested for their significance through t-value, outer weight and R-square

Discriminant Validity

Discriminant validity is the degree in which one item is unrelated to other item that examines multiple constructs. Discriminant validity can be measured by the correlation between measures of exacting constructs.

Discriminant validity recommended that the average variance extracted of each variables should be gather than the square correlation between constructs (Hair et al., 2014).

Table 4.15 Discriminant validity - Fornell and Larcker Criterion

	Actual usage of M-Banking	Intention to use M-Banking	Perceived ease of use	Perceived Risk	Perceived Usefulness	Transaction Convenience
Actual usage of M-Banking	0.865					
Intention to use M-Banking	0.647	0.893				
Perceived ease of use	0.503	0.656	0.881			
Perceived Risk	0.221	0.355	0.303	0.862		
Perceived Usefulness	0.589	0.741	0.738	0.351	0.908	
Transaction Convenience	0.529	0.732	0.704	0.361	0.764	0.916

Note: The values are in bold latter it represents the quire root of AVE and with bold values denotes the correlations among variables.

Table 4.15 shows that it can be determined that the square root value in the bold letters and diagonal is greater than the correlation in the other columns and rows, indicating that the measurement model has sufficient discriminate validity.

The second criterion discriminant validity is that each indicators loading should be greater than all of its cross-loading this is usually a little more liberal. The Fornell-Larcker criterion measures discriminant validity on the construct level, but cross-loadings allow this kind of evaluation on the indicator level (Henseler et al., 2009).

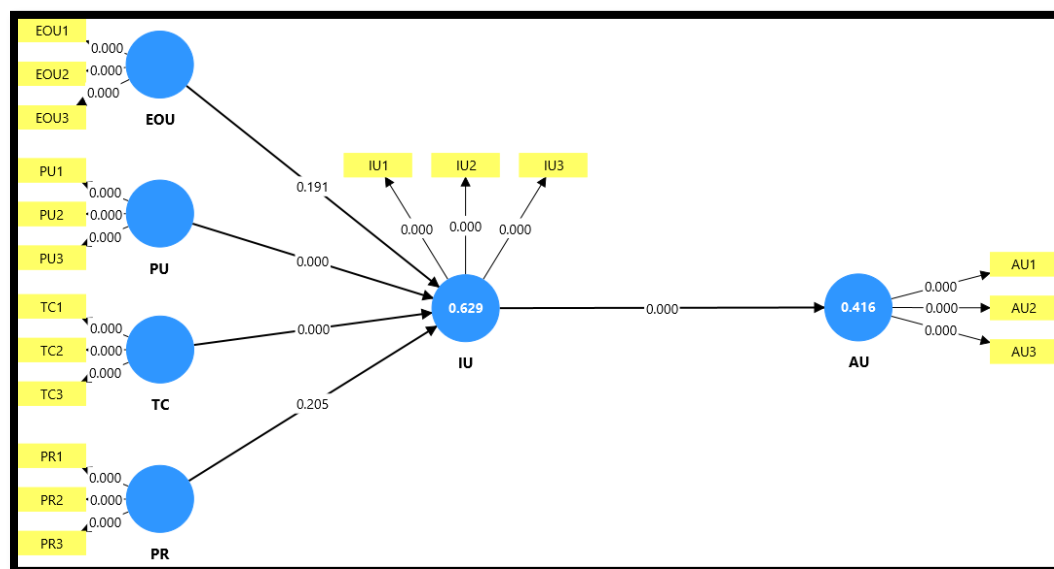
Table 4.16 Discriminant Validity – HTMT Ration

	Actual usage of M- Banking	Intention to use M-Banking	Perceived ease of use	Perceived Risk	Perceived Usefulness	Transaction Convenience
Actual usage of M- Banking						
Intention to use M- Banking	0.755					
Perceived ease of use	0.595	0.759				
Perceived Risk	0.261	0.416	0.357			
Perceived Usefulness	0.678	0.835	0.845	0.409		
Transaction Convenience	0.602	0.824	0.796	0.421	0.841	

Table 4.16 values are below the suggested value of 0.85, so the discriminant validity cannot be challenged.

Assessment of the Structural Model (Inner Model)

In the second step of SEM through PLS, the measurement model assessment is followed by the evaluation of the structural model, also referred to as the inner model. Using the structural assessment model, the suggested relationship between the latent constructs are investigated and analyzed. Initially, the structural model was examined in this study by testing the t-values of the path coefficients of the relationships using the bootstrapping method.


Figure 4.2 Structural Model (The inner Model)

Coefficient of determination (R²)

Table 4.17 Coefficient determination R²

	R-square	R-square adjusted
AU	0.416	0.412
IU	0.629	0.619

Hypotheses testing

The purpose of this study is to investigate the connections between the variables shown in six hypotheses. The P-value for three of the five hypotheses is significant with less than 0.05, and the other two hypotheses have more than suggested value. However, based on the structural model assessment. Only three of five hypotheses have t-values greater than 1.96 while the other two have less than suggested values.

Table 4. 18 Structural Assessment Model and decisions on Hypotheses

Hypotheses	Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Findings
H1	EOU->IU	0.129	0.135	0.099	1.306	0.191	Rejected
H2	IU -> AU	0.645	0.644	0.063	10.286	0.000	Accepted
H3	PR -> IU	0.067	0.065	0.053	1.266	0.205	Rejected
H4	PU -> IU	0.360	0.360	0.083	4.323	0.000	Accepted
H5	TC -> IU	0.344	0.339	0.083	4.142	0.000	Accepted

H1: Perceived Ease of Use is Negative correlated to Intention to use M-Banking:

The table 4.18 with the model of the SMART PLS4 applications, the results of the assessment model and decisions on hypotheses are displayed. The coefficient for EOU->IU is beta = 0.129 and the value of P = 0.191.

H2: Intention to use M-Banking is positively correlated to Actual usage of M-Banking:

The table 4.18 Shows the results which is created with the help of SMART PLS 4 application, the coefficient for IU -> AU is beta = 0.645 and the P-value = 0.000.

H3: Perceived Risk is Negative correlated to Intention to use M-Banking:

The table 4.18 Shows the results which is created with the help of SMART PLS 4 application, the coefficient for PR -> IU is beta = 0.067 and the P-value = 0.205.

H4: Perceived Usefulness is positively correlated to Intention to use M-Banking:

The table 4.18 Shows the results which is created with the help of SMART PLS 4 application, the coefficient for PU -> IU is beta = 0.360 and the P-value = 0.000.

H5: Transaction Convenience is positively correlated to Intention to use M-Banking:

The table 4.18 Shows the results which is created with the help of SMART PLS 4 application, the coefficient for TC -> IU is $\beta = 0.344$ and the P-value = 0.000.

Discussion

The purpose or objectives of the study includes to investigate the influence of customer satisfaction towards M-Banking adoption, by applying dependent role of Actual usage of M-Banking and also the aim of this research is to elaborate that how much client contentment is influenced by the Intention to use M-Banking and what factors effect more in favors of customer satisfaction towards M-Banking such as, Actual usage of M-Banking, Intention to use M-Banking, Perceived ease of use, Perceived risk, Perceived usefulness and Transaction Convenience . The target of this study was some selected M-Banking adoption customers and the sample was selected from M-Banking in Sindh province.

The planned behavior theory has used to examine the behavior effectively in the study in the field of consumer behavior. However, the mediator used in this study was selected from theory of planned behavior, further this study used they are important factors of theory of Planned behavior. Moreover, the theory of planned behavior helps this study to examine the behavior effectively.

This study main goal was to methodically look at the underlying variables that influence consumer's acceptance of Mobile Banking with a focus on the disparity in user uptake seen in user Sindh province area. Institutional metrics have "not yet seen higher percentage of user uptake," despite the fact that "many banks in Sindh have started offering M-Banking servies" To understand this phenomenon, the research aimed to evaluate the direct relationships between an individual's Intention to use M-Banking, Perceived ease of use, Perceived usefulness, Transaction Convenience, and Perceived Risk, against their Actual Usage of M-Banking.

This study was based on well-established theoretical framework, primarily including the "Theory of planned behavior" and the "Extended Technology Acceptance Model (TAM)" to analyze consumer behavior. As the primary analytical tool "for identifying the key factors that drive or hinder adoption," the Extended (TAM) focused on how users view of system usefulness and simplicity affects their behavior. Simultaneously, the Theory of Planned Behavior was utilized because it provides a crucial "framework of connection between belief attitudes, and intentions, conduct and behavior," allowing the research to "examine and explain behavior that is effectively planned in advance".

A critical component of this discussion is contextualizing the demographic realities of the sampled population in Thatta, which significantly informs the adoption variables. The empirical data revealed a highly specific consumer profile: a vast majority of the respondents were exceptionally young, with 94.0% falling between the ages of 16 and 25, and highly educated, with 76.0% possessing either a Bachelor's or Master's degree. Furthermore, the predominant language among the sampled bank customers was Sindhi, accounting for 83.3% of the respondents. This demographic context is vital when interpreting the technological demands of the users, as highly educated youths are typically more sensitive to digital functionality.

The study measured particular user perceptions in this setting. For example Perceived Usefulness was assessed based on the idea that "A person's perception of the utility of a given strategy is

related to their conviction that doing so will improve their performance”. And simplify their lives. The idea “that using a certain system does not need much effort.” on the other hand was the emphasis of Perceived Ease of Use, which stated that “people will be drawn to adopt particular technologies in the future if they think they are simple to use”.

Importantly, the study also looked at adoption’s structural obstacles. Since “the intention to use M-Banking services will drop if the user determines the banking security risk transaction”, perceived risk was found to be a significant potential barriers. Customers' "uneasy utilizing M-Banking because of the systems security and privacy information” was the exact focus of the data collecting. Additionally, "Customers are delighted with the online services become of the ease of transactions" was acknowledged when evaluating Transaction Convenience based on the quickness and security of online payments.

In the conclusion, a structured path model was effectively tested in this study to ascertain the interactions between these independent factors. This study offers a concentrated, localized empirical investigation of the precise technological and psychological aspects influencing the "Actual usage of M-Banking" in substituting the concrete metrics of the Extended TAM for erroneous abstractions like broad "customer satisfaction."

Conclusion, Implications and Future Recommendations

This chapter discusses first the summary of the study that expresses all pervious chapter in several paragraphs, after that, the chapter explains the contribution and implication of the study that what practical implications are, and contribution of this study. Afterward, the chapter expresses the limitation of this study and future studies recommendation which explains the suggestions for future researchers can research again on this.

Conclusion

The current study explores and examines the customer’s perspective on how people choose to transact with “M-Banking”. The study went on to say that when a customer’s chooses a bank to conduct business with, they do so with great reason. However, when a customers use M-Bank, they are more likely to choose an “M-Banking” because of their fundamental beliefs in bank.

The M-Banking is continuously achieving success but, some product of M-bank received little success, however, customers is using M-bank services and products to reduce risk of failure they further state that M-banks should appreciate and include the suggestions of market experts in advertising strategies. The study **Gait & Worthington, (2008)** examined that most important factors for selections of “M-Banking” is pricing aspects, bank reputation and, services and Quality. Further, the study said M-Bank should create an innovative and strong marketing plan therefore clients should aware about coming of new services and products.

This study’s research hypothesis is based on research five research variables independent variables intention to use M-Banking, perceived ease of use, perceived risk, perceived usefulness, transaction convenience and depended variable actual usage of M-Banking. Perceived usefulness, as opposed to perceived ease of use, has the greatest impact on actual usage of M-Banking. According to the finding of the framework mentioned above. Regarding intention to use M-Banking, Perceived ease of use, perceived risk, perceived usefulness, and

transactions convenience has the strongest direct impact actual usage of M-Banking. The purpose of the study is determine what factors, in comparison to those of competitions, influence consumers to select an M-Banking application (**Ramli & Rahmawati, 2020**).

With a particular focus on the consumer demographic in the current study effectively investigated and studied the customer's perspective about the use of mobile banking (M-Banking) services. Finding the underlying causes of a consumer's decision to embrace and consistently use digital banking apps over conventional banking techniques was the main goal. The study's empirical results showed that consumers' decisions about which financial institution to do business with are influenced by both their basic trust in the bank's abilities and a carefully considered evaluation of the system's usefulness.

The predominance of practical utility is a crucial finding of this paradigm. Perceived usefulness and the direct intention to use M-Banking have the most substantial and favorable direct impact on the actual usage of M-Banking, according to the structural equation modeling. This is in good agreement with the conclusions of reputable academic literature; as noted **by (Jamshaid, 2025)**. "bank clients are likely to utilize the M-B application in the future if they believe it to be user-friendly & useful for executing financial transaction" Furthermore,

(Choudhary et al., 2025) supports this conclusion, stating that "the primary deciding criteria for people to embrace online banking systems are their utility, simplicity of use knowledge of mobile banking, and hazards associated with it". The concrete advantages and performance improvements provided by M-Banking greatly influenced real usage in the context of largely youthful and educated population.

Long-term market success depends on the banking institution's reputation and structural guarantees, even though technology utility was vital for initial adoption. As established by(Gait & Worthington, 2008), the "most important factors for selections of 'M-Banking' is pricing aspects, bank reputation and, services and Quality". Although there was no statistically significant direct impact of Perceived Risk and Transaction Convenience on actual usage in this particular sample model, researchers stress that banking professionals cannot overlook these factors. According to (Sulistyowati et al., 2021b), "Perceived risk is a major barrier to M-Banking uptake and utilization," which means that overall user intention will unavoidably decline if personal and financial information is not secured. As (Irshad, 2023), cleverly notes that "keeping the user is more crucial than adopting," which depends only on whether "the consumers believe that the banks ensure the security of transaction."

Commercial bankers need to understand that mobile banking is a "key component of expansion initiatives" in order to close the gap between initial product launches and long-term consumer uptake (Puriwat & Tripopsakul, 2017). According to the study's findings, financial institutions need to go beyond just providing digital services; instead, they need to actively show customers how simple and helpful the platform is. Furthermore, In order to create powerful, creative marketing programs, M-banks should also include market experts' views into their advertising efforts. Banking organizations may successfully increase their digital uptake and ensure long-term customer loyalty by making sure that customers are fully informed of new offerings and instinctively trust the bank's reputation for quality and security.

Contribution and Implication

This study will help to make policies and ensure the M-Banking system among the customers in the perspective of banking rules and regulation. This study will also help the financial institutions and finance service offering bodies to take the effective arrangements and awareness sessions as the people of city may be able to convert the local and interest base banks to the M-Banking. This study clarifies the intention of people act according to the rules and regulations as defined in the M-Banking and now most of banks are offering M-Banking base services so many customers are attracting.

Limitations

This study uses the convince sampling method in other study researcher can use other sampling method. This study used 150 individual respondents; results may differ when the number of respondents increase. This study uses Likert 5-point scale. This study got respondents from the “Pakistan” city. This study used quantitative research method. This study used close ended questioner method.

Futures Studies Recommendations

This study shows the behavior of customers and future study can use the perspective of banker when they are offering M-Banking services to their customer and awareness. Future study can use the qualitative research method and also future study can use other than method of close ended questioner and also can-do research on secondary data.

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