



Evaluating the Impact of Financial Literacy and Cyber Security Perceptions on Customer Satisfaction with Online Banking Services in Pakistan

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ABSTRACT

Online banking is a source of executing all banking operations on a virtual basis; that means there is no need to visit the bank physically for any transaction or payment against utilities. This research has explored the scope of online banking in Pakistan, focusing on how depositors' behaviors influence their adoption of online banking services. The present study, therefore, has attempted to give an idea about the factors responsible for the engagement of users and their satisfaction in digital banking platforms in this context. The data used in this paper is primary in nature and has been collected through a structured survey with questionnaires from 234 participants comprising a diverse sample of students, professionals, and ordinary citizens. The research findings revealed that Cyber Security was the most influencing factor upon customer satisfaction; there was also a high correlation between perceived security measures and good user experiences. This result gave the leading role of robust security protocols a great significance in gaining confidence and encouraging people to use online banking services. In contrast, the influence of Financial Literacy on the level of satisfaction with online banking was statistically insignificant; while financial education is very important, it is not as central in shaping the user experience, at least when questions of security dominate. The findings of this study revealed that financial institutions in Pakistan need to give consideration to the enhancement of security and addressing customer's data protection concerns in order to develop a better level of satisfaction and increase online banking adoption. The non-significant influence of Financial Literacy suggests that further research is required for a better understanding of how financial literacy interacts with other influences on online banking. Future research should give more attention to these relationships and also consider the possible indirect influences of financial literacy on user engagement in the services of digital banking.



Introduction

In the last two decades, the banking services have been growing through the information technology across the world. Online banking services is a web based services that enables bankers and depositors to access their accounts (Pavithra & Jasmine, 2018). Due to the recent growth in electronic banking, the physical location of bank has become less important since transactions can be done online. Banks have increasingly adopted online services for the payment of cash deposits, loans, tracking, transactions history etc. The empirical study findings indicates that online banking has gained importance and it will accelerate at a faster pace in near future. A strong and dynamic banking system is very essential for economic development and growth of any country in the world (Raza et al., 2017). Internet banking has affected and altered the way of businesses. Now customers in country like Pakistan are switching towards the online purchasing to save their time and less security risks. As Pakistan is a developing nation so different new technologies are introducing to boost its economy, and online banking is one of them so that people get awareness about it and start adopting it over a period of time. On the basis of online banking it is easy for state bank of Pakistan to regulate the rules and regulations for the banks are going to adopt the online banking in Pakistan. Now many banks are focusing towards the behavior of customers after adopting the online banking that how they behave if they have adopted this technology because online banking chiefly comprise of internet connection to process. By looking at the current scenario in Pakistan's regarding law and order situation many people wish to switch themselves towards online banking because they think that going to bank to collect or deposit cash is not safe for them so online transfer is the best option if they could adopt because this process takes minimum time and less security risk also (Kazmi, 2015).

In Pakistan now banks are making new strategies regarding the expansion of their business in adopting online banking among customers. Online banking has more sophistication and services for corporate banking customers; because of present technological development in banking sectors, banks are now focusing more customer oriented rather than product oriented by introducing new and smart options in online banking. Electronic banking comprises of wire transfer, ATM, phone banking, EFT and credit card this is secure, easy to use, cost saving and 24 hours availability. Due to fast competition among the banks of Pakistan, the banks want to provide more efficient, effective and rapid customer services to enhance online banking services. Foreign banks are the initiators of online banking in Pakistan in 1990s then local banks also adopted the same technology after 1990s (Dar, 2012).

Problem statement

Cyber security is the most important problem which a depositor is concern. The bank provides a security code or a password to open an account i.e. account number or ATM pin code. Online banking involves a cybercrime threat of password being hack or theft. Transactions could be done easily if the card is being hack or snatched (Awan & Memon, 2016). Most of customers don't like online banking because they don't have awareness of how to use online banking. It take a lot of time for opening an account for the deposit to proceed for bank account. It acquires a lot of personal information. Once a password is forgot or misplaced the account couldn't be proceed (Awan & Memon, 2016). Besides some advantages online banking has a lot of technical issues also, if the card get struck in ATM the depositor has to contact the bank for the release of card, depositor can't use the card if it got expired. There are some restrictions from bank in case of withdrawal, depositor couldn't withdraw the excessive amount of cash against a certain limit given by the bank.

As we are doing research in Pakistan for online banking so we have taken some problems which are particularly related to depositors' attitude towards online banking. Pakistan is a developing economy so the awareness of online banking among the people is taking place with the passage of time, the main concern for depositor while adopting this technology is about cyber security problems because people used to hesitate while adopting any new technology specially about their personal bank accounts or payment issues as the crime ratio in Pakistan is little bit higher as compare to other developed countries. The other problem arises is the awareness of online banking and transactions issues, as we all knows that the literacy rate in Pakistan is low so people don't have knowledge about the online banking except the few. They don't know how to use this technology, what the benefits of using this are and how it helps them in future. The number of automatic teller machines (ATMs) per one hundred thousand adults in Pakistan from 2005 to 2016 were approximately 9.8 ATMs per hundred thousand adults in Pakistan (Mohsan, Nawaz, Khan, Shaukat & Aslam, 2011).

Purpose of Study

The purpose of study is to check the behavior of depositors whether the depositors in Pakistan are attracting to adopt online banking or they are more comfortable in using the old way of banking system by visiting the bank physically for the withdrawal or depositing of cash. It is also helpful to produce awareness about online banking products and services and to attract the customer's attentions. This is detailed research to provide enough knowledge about online banking.

Research Questions

1. What are the depositor's attitude towards online banking?
2. Does the level of security compete to their level of expectations?
3. Does knowledge influence on online banking?

Significance of Study

Noreen (2015), conducted a study to analyze the people's awareness regarding online banking in Pakistan. Pretheeba (2019) also conducted a study in India to check the awareness of people who are willing to adopt online banking. My study is different from others is that I'm focusing on cyber security and knowledge regarding online banking in Pakistan. Because there are few people who are not interested in using the online banking because they thought that it may cause them security issues regarding their bank account. Those who are already using are very much comfortable with this piece of technology because it saves their time, provides confidentiality and save them from the cash being theft when they draw any amount of cash from visiting the bank physically.

Literature Review

The growth of online banking in Pakistan is a continental drift of sorts in the financial services industry, propelled by rapidly evolving technology and deepening penetration of the internet. Yet, the vast majority of Pakistani bank customers remain extremely cautious about fully embracing this set of digital banking solutions. This simply underscores a critical need to understand factors that impact online banking adoption and satisfaction. As financial institutions increasingly move to digital platforms for dispensing services, it becomes very relevant to study the role of financial

literacy and perceptions about cyber security in this area to optimize user experiences for increasing service delivery. Therefore, a literature review on both elements is of great essence in giving a holistic understanding of these factors quantitatively on customer satisfaction with online banking services in Pakistan.

Financial Literacy and Online Banking Adoption

Financial literacy is among the most critical factors that influence the adoption and effective usage of online banking services. According to Usman et al. (2022), financial literacy gives people the ability to know how to effectively manipulate online banking platforms. The study was guided by TAM and explored the influence of financial literacy in regard to perceived ease of use and perceived usefulness of online banking. The authors argue that increasing financial literacy will enhance users' ability to comprehend and make use of online banking features, thus leading to an increase in the adoption rates. This would therefore imply that educating customers on the use of digital financial tools might help improve their engagement in regard to online banking. What's more, it's not only the issue of online banking diffusion; financial literacy also goes hand in glove with the quality related to financial decision-making. Aamir, (2024), has asserted that the higher the level of financial literacy a customer has, the more he or she will be likely to use and trust digital banking services. Their study underlined that users who are financially literate are more capable of handling their online transactions and make informed decisions about financial products. It, therefore, results in making sound financial decisions and thus leads to higher satisfaction with the use of online banking services. The promotion of financial literacy will help the banks have a more educated customer base that will appreciate innovations in online banking.

Moreover, perceived value for online banking services is inextricably tied to financial literacy. In that regard, a person who has a rich knowledge background relating to the management of finances in a better position to appreciate the effectiveness of online banking in terms of such aspects as convenience and cost savings. According to Usman et al., (2022), financial literacy positively influences users' perceptions about the usefulness and perceived ease of use of online banking. It is then that such enhanced perception increases the rate of adoption and sustains online banking usage. Banks that invest in financial literacy programs and resources can better link the perceived value with greater customer satisfaction when it comes to their digital offerings (Zafar, Aziz, & Hainf, 2020).

Zia Uddin (1998), stated that the main factors of bottleneck investment in the economy of Pakistan was the high rate of interest ,inflation, small economies of scales and unemployment and there were few banks which were linked with their head offices and some were working on their own side without having interruption. As Pakistan was under developing economy so there was a vast gap in investing in different banking sectors. There were many reasons which were preventing the foreign investors investing in online banking because of the security, high rate of interest and borrowing costs, high rate of unemployment and very few people having the knowledge of online banking and few people who were already using online banking (Raza, Frooghi, & Aziz, 2020). Government of Pakistan must encourage the investors by lower the rate of interest, create new jobs to overcome the unemployment ratio and provide free of cost training to the depositors who were willing to adopt the online banking in Pakistan.

The banking sectors recognized as of the dominant internet users for using internet banking among the people for their banking transactions for that a questionnaire had been distributed among a sample of 300 people to recognized the use of online banking in their daily life .Results revealed

that most people feel unsecured about using online banking which had established a negative relationship among the internet and the people who were willing to adopt that technology (Aziz & Pangil, 2017). Knowledge and information on online banking were considered as an independent variables because as people would get more awareness about IT and knowledge about e-banking then the scope of that technology would gain strength among people who were curious in using that technology (Pretheeba, 2019). Banking system played important role in nation's economy, a strong banking system helped making economy work more efficiently and effectively. Online banking was providing financial services to its depositors regarding the use and scope of that technology in society for that a size of 25 sample data had been collected from customers and used different statistical tools. The objective of that study was to test that how much people were attracted towards online banking and how it helped in the economy of any country to grow so that people could invest more in online banking in near future (Kalaiarasi, Lakshmi & Stephanan, 2017).

That research work was based on e-banking technology in which customers had more accurate, less time consuming and fast source of banking service. The research study based on about Pakistani banks so the main focus of this study was towards the people living in Pakistan and how they were behaving towards that technology that whether they were accepting it or they don't liked to accept any new ideas which were introducing by banks in the form of form of online banking. The research data was based on secondary data that was from annual reports, websites or journals. The main reason of not accepting the online banking in many people because of very limited or no knowledge about that technology that how did it work and what were the benefits of using that technology (Rahimuddin & Bukhari, 2010). Loannidou and Penas (2010), evaluated the behavior of depositors towards online banking. The data used here was time series data for taking the consideration of people whether they wanted to adopt online banking or not. The independent variables used in this research was currency, macroeconomics indicators and scope of knowledge among people about the e-banking. It was also mentioned that, the introduction of online financial transaction system had developed a perception among the depositors that the evidence on efficiency of implementing the online banking in growing economy had developed an ambiguity in the society.

Lastly, it can be observed that higher financial literacy lowers the barriers to the adoption of online banking. According to Muneeba and Qadir (2022), in their study, the major problem with online banking is that most people do not understand digital tools (Shah, 2020). Such knowledge gaps could be bridged by the banks through focused financial literacy trainings, and hesitancy on the part of the people concerning the adoption of online banking would be minimized to a large extent. Better educated customers tend to overcome first resistance and have more intensive engagement with the online banking service, which ultimately results in higher adoption rates and customer satisfaction.

Cyber Security and Customer Satisfaction

Cyber security concern is a major determinant of customer satisfaction with online banking services. Muneeba and Qadir, 2022, examine the security and usability of online banking applications. The research establishes that security issues are major inhibitors to the usage of online banking applications. Despite the increased adoption of mobile banking, the study established that users often experience challenges associated with security and usability relating to authentication processes and exposure to data breaches. The findings of this research back the implementation of reliable security measures in banks, with an emphasis on improving user

satisfaction levels. This is further supported by Khurram and Waqas (2021), who find trust in the security of online banking to be important for its adoption. Their study shows that in the event that customers believe there is a high risk of fraud or data breach associated with the conduct of online banking business, they are unlikely to use such platforms. The lack of trust will, therefore, act as a drawback to the uptake of digital banking services, and it impacts customer satisfaction. Therefore, cyber security should be the top agenda by banks in ensuring trust with their customers by guaranteeing them that online banking platforms are secure and reliable.

Cybersecurity also has to do with customer satisfaction beyond the basic measures. Muneeba and Qadir, 2022 postulate that an extension in the user's awareness regarding online transaction security features and standards is required. Protection from information theft and how to identify secure online banking practice should be instructed to the users. This will reduce part of the misgivings connected with the security concerns of the customers regarding online banking. This will, in turn, improve their confidence in online banking and help lead to increased satisfaction levels among customers by this proactive strategy.

Kazmi (2000), stated that Pakistan should work effectively in establishing a network for financial transactions because without these network it would be difficult for the organizations to provide effective solution with high standards and low cost. There must be inter banking network between the banks so that they would easily do business transactions at lower cost and could encouraged the other depositors also so that they could also switch towards the online banking. That paper deal with the depositor's reactions towards online banking subject to their awareness and how to use the online banking (Aziz, 2019). The sources of data collection was from primary and secondary data and it was collected on random basis. Primary data came from statistical tests like chi-square, t-tests or on percentage basis whereas, secondary data came from internet, books or newspaper. That study told that how people reacted to that technology if they were willing to adopt in near future, very few of them were well aware about that technology and were using it. Majority of the people stated they would not use any online technology for banking transactions and they were happy with the physical banking transaction system but there were some people who were willing to adopt that online banking and willing that banking would provide them guarantee when they wanted to adopt that online banking (Amutha, 2016).

Noreen (2015), conducted a study to analyze the people's awareness regarding online banking in Pakistan. The primary data was collected from university students who were engaged in their different fields, the size of data was 150 students who gave the answers of questionnaire. In that, data was run by using SPSS descriptive tool. That research study tell about the depositors level of knowledge regarding using e-banking in their lives and many people don't know how to use it in their daily life as online banking was the simple tool for paying any types of bills but still people were using traditional banking system because they don't know how to use it.

Online banking was the fastest growing banking services to provide its depositors an effective way of using banking channel for paying or deposit of cash (Acharya, Baldawa, Junghare & Pawar, 2013). The concept of online banking was getting edge and was pushing people to adopt it because it was time saving and worked effectively for paying cheques, bills or opening bank accounts rather going to bank physically. In Pakistan there were many banks like UBL, MCB, HABIB BANK and some more which were providing online banking services to its customers and were providing them full assistance so that people came to know about that technology how to use it and what were the benefits of that technology. Internet was the main thing that effect all the people living anywhere in that world similarly online banking was also becoming famous among the

people as Pakistan was the developing economy so online banking was not much common among the people but very few of them were using it. The dynamics of Pakistan were totally different from any other country where the rate of using e-banking was higher, it was because there were mostly advanced economies with having higher rate of literacy and knowledge about online banking (Salman, Hasan, Iqbal, Naseem, & Aziz, 2024). People in Pakistan were willing to online banking but the law and order situation in Pakistan was not as much satisfactory as compared to other countries. People had given proper training about that technology so that people could use that in banking transaction like payment or deposits of cheques or bills. Rather going to bank physically for cash withdrawn or deposit online banking was safe and secured because there were less chances of being theft or robbed (Nadeem, Ahmed, Batool & Shafique 2015).

Advanced security technologies, such as multi-factor authentication and encryption, are highly critical in this regard. In their paper on the subject, Jahanzaib and Khan (2023) have pointed out that digital channels bring great benefits, but at the same time, they open up more security threats than ever. Banks that invest in the latest security solutions and keep updating their security protocols will be better positioned to safeguard customers' information and retain a good reputation. This concern for security could indeed enhance the overall level of customer satisfaction with online banking and thereby create loyalty in the long term.

Impact of Digitalization on Financial Performance

The impact of digitization on financial performance is one element for which online banking adoption plays a very crucial role in understanding the broader implications. Aziz, Salman, Hassan, Younus, and Uddin (2023), in their paper, assess this relationship between digitalization and financial performance of banks with respect to Pakistan. They found out that a higher volume of digital transactions shows a positive association with profitability, which simply interprets that when more people start using online banking, that results in more digital deposits and correspondingly better financial performance. Through this, it would underline the place of customer satisfaction in improving their digital interaction and financial performance.

This finding is supported by Aamir, 2024, who has shown that the services of digital banking have an essential impact on the banks' profitability. It can be found in the study that those banks with higher levels of digital transactions have a positive effect on financial performance due to the increased deposits and transaction fees from customers. This correlation indicates that an investment in enhancing digital banking is a strategic and business imperative to improve financial performance. It means better financial results and improved market positioning for banks through upgraded online banking services, thereby serving the needs of their customers. Further, digitalization provides avenues for banks to seek new sources of income and lower operational costs. Jahanzaib and Khan, 2023, discuss how digital channels help banks smooth operations with reduced costs associated with traditional banking methods. Such efficiency attained through digitalization can bring about improved profitability and financial performance. The banks that make use of digital technologies in fine-tuning their operations and offering innovative services can, in that direction, gain a competitive edge and assure better financial performance (Iqbal, Salman, Naseem, Hasan, & Aziz, 2024).

Other proofs of the positive effect on financial performance would be increased customer retention and loyalty. According to Aamir, 2024, customers who are highly satisfied have a greater intention to continue using online banking services and will probably recommend these services to other people. In this regard, higher customer loyalty would contribute to stable revenue growth and

enhance the financial performance of the banks. In so doing, by offering quality services and constantly increasing the threshold of customer satisfaction with respect to digital banking, banks can formulate long-term relations which translate into business success (Farooq, Salman, Ali, Hassan, & Aziz, 2023).

Banking industry had witnessed a tremendous change as the scope of information technology IT had gained strength. Banks also shifted their most of their work on online basis for that they started providing their users online banking for financial transactions to make their life easier and less time consuming ,for that research the data collection was secondary data that was from articles newspaper, news etc (Uddin, Salman, Hassan, Latif, & Aziz, 2023). At the start of that service many depositors were at denial mode then later on they started accepting it in their daily lives as they had gained little knowledge about that technology and how it would helped them in using that (Marimuthu & Velmurugan , 2018).

According to the reports the potential of Pakistan in the terms of adopting online banking system was very slow and it was also effecting the growth of financial markets and economy of the country. As Pakistan was a growing economy so the rate of interest was higher which resulted in inflation in the economy. Bank usually preferred online banking because it helped them reducing their operational cost but banks were doing telemarketing strategies to encourage their depositors to shift towards the online banking for the payment of their utilities bills or fees via their smart phone without going to bank physically and wasting their time at banks (Saleem & Rashid, 2011).

Banking sectors were shifting to online banking services, which helped their depositors to login to their account without visiting the bank to online banking system. There were already many banks operating in Pakistan and there was a very aggressive competition among all the banks so every bank wanted to provide fast, efficient and effective banking services to their customers. As world was shifting towards the plastic money rather being dependent on paper money which cost them more also. Online banking reduced the operational cost, provide better services and it was long lasted (Kazmi & Hashim, 2015).

Comparative Studies and Emerging Trends

One of the important aspects of the broader implications that could be understood with regard to the adoption of online banking is the impact of digitalization on financial performance. Jahanzaib and Khan (2023) assess the relationship between digitalization and financial performance of banks in Pakistan. According to them, there exists a positive correlation of increased digital transactions with profitability. Their study argues that with more customers using online banking, banks receive higher digital deposits and a higher level of digital transactions which actually add up to bring better financial outcomes. This relationship underlines the need for growing customer satisfaction to feed improvements in digital engagement and financial performance.

These findings are supported by Aamir 2024, who discloses that digital banking services have a great influence on the profitability of the banks. It was indicated in the study that the higher the number of digital transactions processed by these banks, the better their financial performance, due to increased deposits by customers and at the same time transaction fees. This relation indicates that the investment in digital banking improvement is of strategic importance, increasing financial performance. Improvement in services in the area of online banking and fulfillment of customer needs will improve financial results and enhance their position in the market for any bank. It also provides opportunities for banks to create newer revenue sources and decrease operational costs.

According to Jahanzaib and Khan, (2023), the digital channels allow banks to streamline operations and decrease costs associated with traditional banking methods. Thereby, digitalization efficiency may increase profitability and improve financial performance (Salman, Hasan, Hayat, Iqbal, & Aziz, 2024). The competitive advantage for banks operating in the same area may increase and bring better financial outcomes if the banks leverage digital technologies to optimize their operations and provide new services.

Customer retention and loyalty also prove the positive impact of digitalization on financial performance. According to the observation of Aamir (2024), those satisfied customers are more likely to continue using online banking services and recommend them to others. Customer loyalty may actually lead to financial performance improvements by having sustained revenue growth for banks. If customer satisfaction is placed at the top of the agenda and e-banking services are improved on a continuous basis, then banks will create lifelong customers that will translate to financial success.

Literature survey is conducted in order to get more insight of the research study. Literature view consists of past studies and research related to this topic. It includes mostly domestic research conducted by the own local scholars (Mashhood, 2000) stated he that the role of information technology in financial services was to support operational efficiencies, give customer services, manage risk and support in decision making (Zinnaira, Salman, & Hasan, 2022). The Government of Pakistan had ordered the State Bank of Pakistan to open online accounts so that the depositors may easily transfer, deposit and withdraw cash easily. It was also used to pay the utility bills, pay orders, local and foreign trade and to facilitate clearing and e-reporting in bank. It also help in saving time for the depositors and provide security for the online transactions rather than going to bank and standing in long ques. The e-commerce financial action plan had been established according to the guidelines provided by the government. The plan was to connect branches of 25 foreign banks in 12 major cities. In phase 1 branches in one city were linked with their head office. In phase 2 all banks and financial institute were connected together. In phase 3 private and public sectors ultimately e-commerce network were included in financial trade and custom network with international link (Aqdas, Ishak, Salman, & Sultan, 2024).

Another research study had occurred on online banking via the cell phone was trending on large scale as it was the best service provided by any bank. In that study the base country was Jordan where we were testing the behavior of people regarding the online banking in Jordan. The advantages of using online banking was that it don't need any help from any member of bank who would provide technical support to its customers, that was because it was easy, safe, less time consuming and any person could do financial transactions regarding bill, payments, cheques or fees could easily transferred deposit or withdrawn through online banking system without going to bank physically. Jordan Ahli Bank, HSBS Bank, Capital Bank the statistical tools were used to test the hypothesis through the simple regression. After completing all the research requirements it was cleared that people in Jordan were satisfied by adopting online banking in their lives (Asfour & Haddad, 2014).

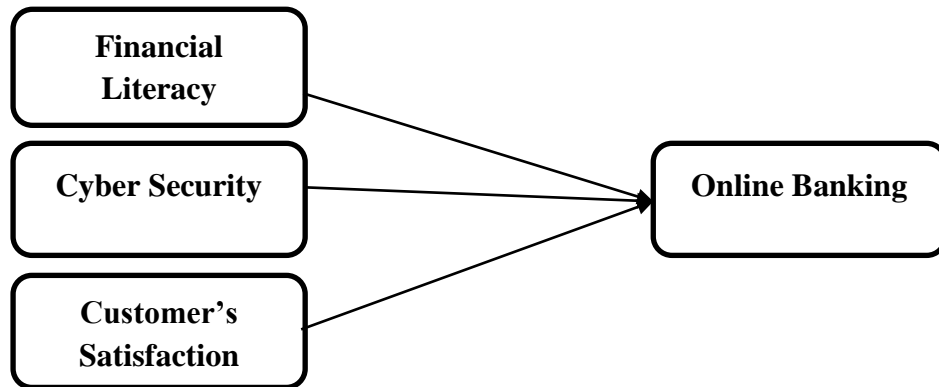
Hypothesis Statements

H1: Financial literacy has an insignificant impact on online banking.

H2: Cyber Security has a significant effect on online banking.

H3: Customer's Satisfaction has not a significant effect on online banking.

Conceptual Framework



Research Methodology

This research was based on the scope of online banking in Pakistan and aimed to understand how depositors behave in adopting online banking. The data used in this study was primary data, collected through the completion of questionnaires.

Approach

The approach which used in this research is deductive approach because it explain the reasoning from generalized or specific, this approach expressed the impact between dependent and independent variable.

Sample Design

Random sampling was selected for this study as it is comprised of questionnaires. This has been achieved by the efforts to get as many as possible within the given time period of study deadlines from different people of different ages and backgrounds.

Data Collection

For this study, strata sampling was chosen as the most effective approach. Samples were selected from different groups, including students, professionals, and ordinary citizens of Pakistan. Fifty questionnaires were distributed to each group, resulting in a total of 234 samples for the research. These participants were asked to complete a questionnaire that explored their behavior and attitudes towards online banking, particularly focusing on their initial experiences with this technology.

Statistical Technique

The technique was evaluated once the data was obtained. At that point, CFA (Confirmatory Factor Analysis) or SEM (Structural Equation Modeling) were considered as potential methods for analysis, in line with the suggestions provided by the evaluator. This approach allowed for a more thorough examination of the data and its implications for the research.

Ethical Consideration

While conducting a research the researcher must keep in mind that ethical consideration is the most important part of any research. There should be no biasness in collecting any data or any manipulations regarding conducting data survey. The participant should not be victimized or being threatened to give the data according to the researcher's perspective or which researcher wants to obtain, everyone should be free of fear while giving their views and feedback. There should be right of freedom and dignity of participant should be considered first and ask for their consent first while approaching for their further views. If any of the participants give negative views then their privacy should not exposed and respect their views.

Results and Findings

Establish construct validity and reliability of reflective constructs

Exploratory factor analysis (the initial test)

Figure 2 presents the scale measuring model, which is an essential part of SEM. The figure depicts the conceptual structure and its relationship with latent variables, including customer satisfaction, online banking, cyber security, financial literacy, and online banking.

The indicators are needed to measure latent variables, which are the abstract concepts emanating from theory without which the reality studied could not be apprehended. For instance, the operationalization of abstract notions occurs through observable indicators such as customer satisfaction, cyber security, financial literacy, and online banking. Indicators or measurement items have to do with specific questions or statements based upon which responses produce data about latent variables. For instance, FL1, FL2, FL3 are measurement items for financial literacy. A higher factor loading represents a stronger relationship between the indicator and the latent variable: factor loadings put a numerical value on the strength of a relationship.

A close look at these factor loadings is instructive regarding the efficacy of the measurement model, as the indicators of customer satisfaction, online banking, cyber security, and financial literacy show strong measures of the respective constructs on factors. Where the factor loadings are in the negatives, specific indicators may be assessing somewhat different parts of the scale than others.

In a word, the factor loadings in Figure 2 suggest that there is a well-specified measurement model, though the necessary checks of validity and assessment of reliability are called for to verify model quality and make sure the indicators for measuring latent variables really do so.

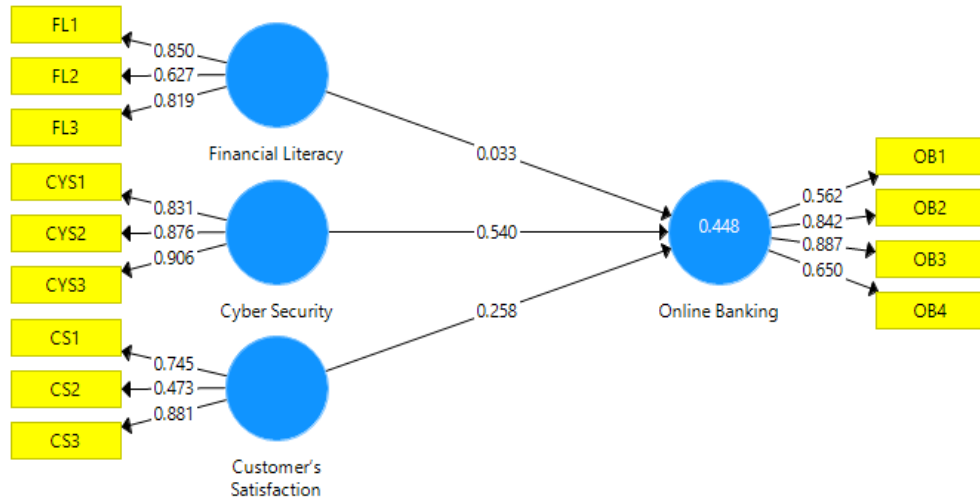


Figure 2: Measurement Model: Author Source

The initial test has shown that removing (2) reflective indicators would improve the quality and the predictive relevance of the structural model, and achieve noticeable improvements in the internal consistency, convergent validity and discriminant validity of the reflective measurement constructs. Consequently, the researcher has removed the following indicators one at a time CS2 and OB1. Figure 3 illustrates the structural equation model for this study after conducting the required modification.

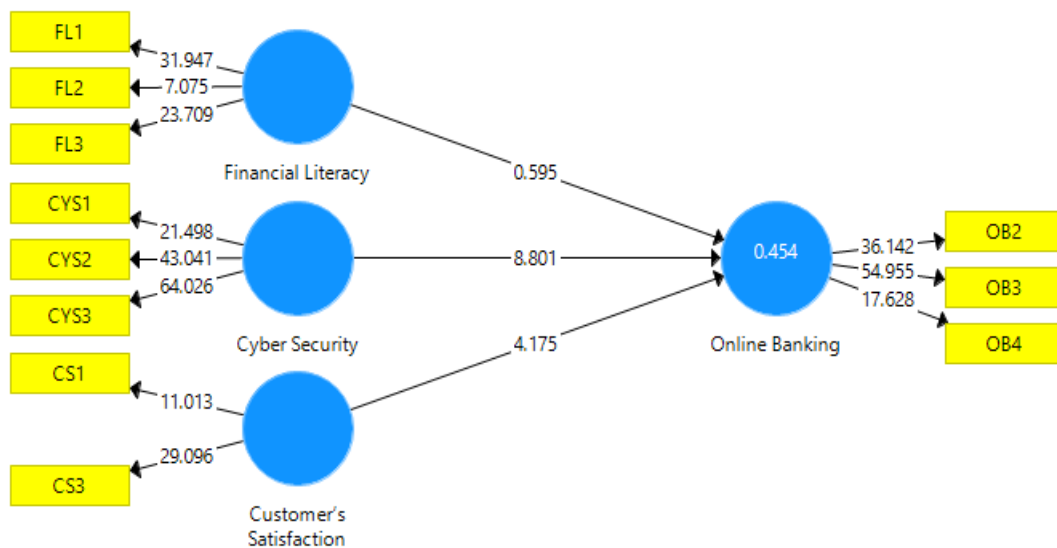


Figure 3: Structure Equation Model: Author Source

Measurement Model Analysis

A model with convergent validity, discriminant validity, and composite reliability that describes the relationships between each block of indicators and their latent variables used after then to evaluate the accuracy of tools and the validity of conceptions. Table 1 presents the construct reliability and validity.

Table 1: Construct Reliability and Validity

Construct	Item	Convergent Validity	Internal Consistency Reliability		Discriminant Validity	
			AVE	Cronbach Alpha	Composite Reliability	HTMT
		>0.50	0.60-0.90	0.60-0.90	Confidence Internal Does Not Include 1	<5.00
Customer's Satisfaction	3	0.518	0.627	0.753	Yes	1.240
Cyber Security	3	0.759	0.842	0.904	Yes	2.062
Financial Literacy	3	0.596	0.671	0.813	Yes	1.372
Online Banking	4	0.558	0.726	0.830	Yes	1.624

Table adapted from Hair et al. 2017

**AVE: Average Variance Extracted; HTMT: Heterotrait-Monotrait Ratio; VIF: Collinearity Statistic*

Table 1 evaluates the constructs utilized in the study "Evaluating the Impact of Financial Literacy and Cyber Security Perceptions on Customer Satisfaction with Online Banking Services in Pakistan" in terms of construct reliability and validity. Convergent Validity refers to how well the respective indicators of a construct represent the underlying latent variable. For Customer Satisfaction, the AVE is 0.518, well above the threshold value recommended of 0.50, which suggests that the items satisfactorily measure this construct. On the other extreme, Cyber Security indicates a very robust AVE of 0.759, way over the threshold, hence the indicators will be able to effectively capture cyber security perceptions of the respondents. The requirement of financial literacy is also met with an AVE of 0.596, indicating that this construct has valid representation in its items. For Online banking, the AVE is 0.558, which is above acceptable levels, thus satisfying the indicators as appropriate in the measurement of this construct.

Internal consistency reliability describes the comprehensiveness of the items within each construct. Therefore, all the constructs will have Cronbach's Alpha and Composite Reliability coefficients above a minimum threshold of 0.60 to 0.90 to be regarded as internally consistent. Customer Satisfaction was 0.627 for Cronbach's Alpha and .753 for Composite Reliability. Higher values were given for reliability for Cyber Security: 0.842 for Cronbach's Alpha and .904 for Composite Reliability. Financial Literacy and Online Banking also demonstrate adequate internal consistency with 0.671 and 0.726 for Cronbach's Alpha and 0.813 and 0.830 for Composite Reliability, respectively. Discriminant Validity ensures that the constructs differ from one another. The HTMT values are all below the threshold of 1.0 for all constructs, thus showing each construct is distinct and not highly correlated with any other. For example, the HTMT for Customer Satisfaction is 1.240, which is within a very comfortable margin from the critical threshold, thus assured of adequate discriminant validity.

Variance Inflation Factor-VIF represents the multicollinearity between measures. All the constructs have VIF values beneath the J-critical cut-off point of 5.00, which indicates there is no problem of multicollinearity and that the items are not highly interrelated to one another. The

summary for all the constructs is that Customer Satisfaction, Cyber Security, Financial Literacy, and Online Banking were found to have good convergent and discriminant validities, adequate internal consistencies, and acceptable levels of multicollinearity. This will mean that the measurement model is reliable and valid, hence the robustness of the findings from the research.

Discriminant Validity

Table 2: Fornell-Larcker Criterion-This presents the approach towards the assessment of discriminant validity as regards "Assessing the Impact of Financial Literacy and Cyber Security Perceptions on Customer Satisfaction with Online Banking Services in Pakistan." This criterion involves matching the root AVE for each construct against the sharing of the construct correlation to ensure that each construct is different from another.

Table 2: Fornell-Larcker Criterion

	Customer's Satisfaction	Cyber Security	Financial Literacy	Online Banking
Customer's Satisfaction	0.720			
Cyber Security	0.213	0.871		
Financial Literacy	0.455	0.595	0.772	
Online Banking	0.388	0.615	0.472	0.747

The values on the diagonals in Table 2 represent the square root of AVE for each construct, while the values off the diagonals represent the correlations between different constructs. The square root of AVE for each construct should be greater than its correlation with other constructs to satisfy the discriminant validity. For the Customer Satisfaction construct, the AVE is 0.720. This value is higher compared to its relationship with Cyber Security, 0.213; Financial Literacy, 0.455; and Online Banking, 0.388. This means that Customer Satisfaction is adequately different from the other constructs, hence the requirement of discriminant validity.

It should be noticed that the AVE square root value for the Cyber Security construct was 0.871, which was far greater than its respective correlations with the constructs of Customer Satisfaction, Financial Literacy, and Online Banking constructs, respectively. Thus, this means Cyber Security is properly differentiated and represents discriminant validity from other constructs within this model. The square root of the AVE for Financial Literacy is 0.772. This value outperforms the shared variances between Customer Satisfaction at 0.455, Cyber Security at 0.595, and Online Banking at 0.472, thus proving that financial literacy differs from the other constructs and has a high degree of discriminant validity.

Finally, the AVE of Online Banking is 0.747. Its correlations with Customer Satisfaction (0.388), Cyber Security (0.615), and Financial Literacy (0.472) are all less than 0.747. This level of indication assumes that Online Banking is different enough from other constructs. Therefore, according to Fornell-Larcker Criterion expressed in Table 2 below, one is able to assert that all the constructs-for instance, Customer Satisfaction, Cyber Security, Financial Literacy, and Online Banking-are unique from one another. The average variance extracted for each construct is greater than the square root of its correlations with other constructs; this shows that the measurement model is valid and the constructs are appropriately differentiated to analyze the relations among them in this research.

Table 3: Heterotrait-Monotrait Ratio (HTMT)

	Customer's Satisfaction	Cyber Security	Financial Literacy	Online Banking
Customer's Satisfaction				
Cyber Security	0.276			
Financial Literacy	0.694	0.765		
Online Banking	0.431	0.771	0.607	

The HTMT for the study "Assessing the Impact of Financial Literacy and Cyber Security Perceptions on Customer Satisfaction with Online Banking Services in Pakistan" is represented in Table 3. The HTMT ratio has been used to assess discriminant validity based on how different the constructs are from one another. If the value is less than 1.0, then the HTMT criterion is considered adequate; the smaller the value, the better the discriminant validity.

From Table 3, the HTMT values indicate that the constructs are distinct. The HTMT ratios for Customer Satisfaction from other constructs are low, for example: Cyber Security is 0.276, Financial Literacy 0.694, and Online Banking 0.431. The values are way below the threshold of 1.0; this therefore justifies that the construct Customer Satisfaction is distinct from Cyber Security, Financial Literacy, and Online Banking. Cyber Security also shows high discriminant validity by having the HTMT values of 0.765 and 0.771 against Financial Literacy and Online Banking, respectively, therefore justifying the distinctiveness of the constructs. Financial Literacy and Online Banking show appropriate discriminant validity with an HTMT value of 0.607, hence they are adequately different from each other. The overall implication of the HTMT ratios is that each construct in this model differs from one another, which means the robustness of this measurement model is maintained to analyze the impact of financial literacy and cyber security perception on customer satisfaction with online banking services.

Structural Model

R^2 can also be used to compare the dependent construct, the value of the path coefficient, or the t-value of each path so as to evaluate the association between the constructs in the structural model. R^2 is also a measure used to describe the extent to which the free variable is deviating from the bound variable. The larger the value of R^2 , the better the production model.

Table 4: R Square

	R Square	R Square Adjusted
Online Banking	0.448	0.441

Table 4 provides the R Square and Adjusted R Square values for the construct of Online Banking in the context of "Evaluating the Impact of Financial Literacy and Cyber Security Perceptions on Customer Satisfaction with Online Banking Services in Pakistan." These metrics are used to assess the proportion of variance in the Online Banking construct that is explained by the independent variables, which in this case include Financial Literacy and Cyber Security Perceptions.

The R-square value being 0.448 means that approximately 44.8% of variance in Online Banking is well-explained by Financial Literacy and Cyber Security Perceptions. This means there is a moderate level of explanatory power; hence, while these two factors significantly contribute, many other variables not included in this model may also affect Online Banking. The Adjusted R Square value of 0.441 is close to that of the R Square and will adjust for the number of predictors in the model to further support its reliability in terms of its explanatory power. This slight adjustment thus confirms that the model keeps on having a good fit and presents variance explained by the predictors as remaining substantial, even accounting for model complexity. Taken together, these findings confirm the significant influence that the levels of Financial Literacy and Cyber Security Perceptions may have on the Online Banking phenomenon while also underlining the necessity to further investigate other parameters which may be related to the provision of Online Banking services.

Testing Hypothesis

Table 5: Hypothesis Assessment

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Customer’s Satisfaction -> Online Banking	0.258	0.263	0.073	3.529	0.000
Cyber Security -> Online Banking	0.540	0.544	0.064	8.372	0.000
Financial Literacy -> Online Banking	0.033	0.028	0.098	0.337	0.736

Table 5: Hypothesis testing results for the study "Evaluating the Impact of Financial Literacy and Cyber Security Perceptions on Customer Satisfaction with Online Banking Services in Pakistan." This table shows the relationships between Financial Literacy, Cyber Security, and Online Banking by testing the strength and significance of these relationships with various statistical measures.

The results indicate that perceived Cyber Security significantly affects Online Banking, with a sample coefficient of 0.540, an original sample mean of 0.544, and a high T statistic of 8.372, combined with a p-value of 0.000. This thus tells that perceptions of Cyber Security strongly and significantly positively influence Online Banking. This confirms the hypothesis that improved cyber security perceptions imply improved online banking. In contrast, Online Banking is significantly positively influenced by Customer Satisfaction with an original sample coefficient being 0.258, the sample mean of 0.263, T statistic of 3.529, and p-value of 0.000, thereby showing that higher customer satisfaction influences Online Banking positively. However, Financial Literacy does not affect Online Banking, as shown by an original sample coefficient of 0.033, a sample mean of 0.028, a T statistic of 0.337, and a p-value of 0.736. The implication drawn from this is that, within this study, Financial Literacy does not have any significant direct effect on Online Banking services.

The data confirms that Cyber Security and Customer Satisfaction are significant predictors of Online Banking, with strong statistical support for their positive relationships. Conversely, Financial Literacy does not appear to directly influence Online Banking, highlighting the need for

further investigation into how other factors or indirect effects might play a role in enhancing online banking services.

Discussion

As our research is based upon online banking so we have chosen different independent variables to check the validity of our research. For that we have taken customer satisfaction, financial literacy and cyber security as our predictors. There are already many researches are available on online banking but the difference in their research and our research is the difference of variables and conducted in different countries. We are doing our research in Pakistan so we have test the behavior of citizens living in Pakistan towards the online banking. The findings from the hypothesis assessment, as outlined in Table 5, offer valuable insights into the impact of Financial Literacy and Cyber Security Perceptions on Online Banking Services in Pakistan. The results reveal that Cyber Security has a substantial and statistically significant effect on Online Banking, with a coefficient of 0.540 and a p-value of 0.000, highlighting its critical role in shaping user experiences and satisfaction. This also points to the fact that past literature, such as Khurram and Waqas (2021), has shown how security concerns play a vital role in the adoption and user trust of online banking. When security is properly implemented and concerns about data breaches are negated, customers express increased satisfaction and start using digital banking services more actively. The strong relationship indicates that trust and improved customer experiences can only be achieved when the financial institutions implement appropriate security technologies and transparently communicate about the same security practices.

While financial literacy, on the other hand, has an insignificant statistical effect on online banking; the coefficient with the original sample is estimated to be 0.033 with a p-value of 0.736. Contrary to the findings of Usman et al. (2022) and Aamir (2024), this finding develops the notion that greater financial literacy will enhance user engagement in, and satisfaction with, online banking by improving the ability of users to navigate and use the online platforms for accomplishing their goals. The lack of significant impact in this study may therefore suggest that, whereas financial literacy may be important, other factors such as concerns over security or specific features of the online banking sites play a more potent role in driving customer satisfaction (Ali, Faraz, Memon, Salman, & Aziz, 2024). This may imply that further investigation is needed into how financial literacy interacts with other variables and whether it could exert its influence indirectly on the use of online banking via other channels.

Overall, these findings suggest that cyber security is the most influencing factor on customer satisfaction regarding the selection of online banking services in Pakistan. Banks have to make improvements in their security features and try to alleviate various types of customer concerns in order to build up trust and satisfaction (Ali, Faraz, Salman, Memon, & Aziz, 2024). In the meantime, the constrained direct impact of financial literacy on online banking signals the need for a better understanding of how education about digital financial tools interacts with other drivers of online banking adoption and satisfaction. Investigations in the future could focus on such interactions, including possible indirect influences of financial literacy on user experience and engagement with online banking platforms.

Conclusion

The study concludes by drawing on the underlying determinants that impinge on customer satisfaction with online banking services in Pakistan and focuses highly on Cyber Security and

Financial Literacy. The analysis hence confirms that Cyber Security is a major determinant of customer satisfaction with substantial positive impact on Online Banking services. The essence of this factor underlines the need for substantial security measures and publicized practices that can establish trust and further optimize user experience. Banks that invest in state-of-the-art security technologies and take customer concerns about the protection of their data seriously will surely record increased customer satisfaction and more usage of the facilities.

The study also finds out that Financial Literacy is not considerably affecting Online Banking directly, which is contrary to some previous researches that have argued about its role in the strengthening of the user experience of the service. That would seem to indicate that despite financial literacy being valuable, other factors, including perceptions of security, may play a stronger role in affecting online banking experiences. Put differently, future research should examine the eventual possible indirect effects of financial literacy and investigate how it is related to other factors that may influence online banking satisfaction.

These findings bring to the fore the fact that, as important as the need to prioritize Cyber Security may be by financial institutions, the context within which Financial Literacy operates should not be divorced from this. In this regard, security enhancement and customer concerns about solutions will be central to satisfaction and increased usage of online banking services in Pakistan. In fact, with the digital scene continuing to change with each passing day, grasping these dynamics will be key to efforts by banks to optimize their online services for long-term success.

Managerial Implications

Results would, therefore, imply that Cyber Security will need to be a key building block for any online banking strategy in Pakistani banks. Considering the strong relationship between Cyber Security and customers' satisfaction, it is likely that the financial institutions would further invest in advanced security technologies and customer communication strategies in order to address the concerns related to data breach and online fraud. This could facilitate the inculcation of more robust security protocols and a very palpable way of transparency in security practices, possibly enhancing customer trust and encouraging broader adoptions of online banking services.

On the contrary, a non-significant high level of a direct effect of Financial Literacy on online banking is likely to make banks reconsider their strategy of educating customers. Though financial literacy is an important aspect, its limited influence on customer satisfaction here calls for the need to adopt a more nuanced strategy. In other words, the banks could focus on integrating financial education with such factors as user interface design and personalized customer support to contribute indirectly to the improvement of customer satisfaction. Further research might delve deeper into these interactions, which would give the banks greater insight into how to use financial literacy effectively with the other variables to improve the totality of the customers' experience in online banking.

Limitations of the Study

Although this study is of great importance in understanding the factors that may influence customer satisfaction for online banking in Pakistan, there are a few limitations. First, the research is geo-bound within the nation of Pakistan, which may limit the generalization of findings across countries operating under different cultural, economic, and technological environments. The

motivations, issues, and expectations of online banking users in Pakistan can therefore be quite unlike those of other countries and cannot easily be generalized. This study's limitations therefore provide avenues for a number of avenues for future research: for instance, studying this model across different contexts may reveal some interesting and unexpected results that could be applied to increase adoption. For instance, there were only three independent variables considered in the study: Cyber Security, Financial Literacy, and Customer Satisfaction. Although these variables are very fundamental, they are not exhaustive for all the factors that can affect online banking experiences. Other variables which were not included, but also might be of great significance, are those that concern aspects such as the design of the user interface, quality of customer service, internet accessibility, and demographic elements like age, income level, and education. This might limit the comprehensiveness of the conclusions from this study. Future research should consider more factors to see how all those aspects interact in determining the customer's satisfaction with online banking.

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