DIGITALIZATION OF MORTGAGE LENDING PROCESS IN INDIA

by

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ABSTRACT

The digitalisation of mortgage lending in India transforms the financial sector by addressing loan management issues like efficiency, transparency, and client experience. Digital technologies can overcome traditional obstacles and accelerate expansion in India's housing and real estate sector, which relies on mortgage lending.

Purpose/Objective

The primary goal of this study is to develop a model based on the Unified Theory of Acceptance (UTAUT) to examine the acceptance of the digitalization of mortgage process in India.

The results of this study will be valuable to financial institutions, policymakers, and technology providers to better understand the effectiveness of digital mortgage platforms and how they can further improve operational efficiencies, customer satisfaction, and financial inclusion in the Indian mortgage sector.

Methodology/Approach

This study uses a quantitative research approach to methodically look at the elements affecting digitalization of mortgage loans in India. The quantitative method makes it possible to gather and statistically examine numerical data, therefore helping to identify links among the variables of interest.

Findings/Results

The findings revealed that performance expectancy, effort expectancy, social influence, and facilitating conditions significantly contribute to users' intention to adopt digitalized mortgage solutions.

Among these, social influence and effort expectancy emerged as the most influential factors, underscoring the importance of perceived benefits in motivating users to embrace digital platforms for mortgage processing.

Significance/Implications

Digitalisation could improve mortgage lending ecosystem decision-making, operational

efficiency, and customer happiness, according to the research. The study emphasises stakeholder collaboration to solve problems and promote innovation.

Conclusions

This study systematically examined the factors influencing the adoption of digitalization in mortgage loans in India using the Unified Theory of Acceptance and Use of Technology (UTAUT) model, augmented with trust and anxiety constructs. The findings revealed that performance expectancy, effort expectancy, social influence, and facilitating conditions significantly contribute to users' intention to adopt digitalized mortgage solutions.

Among these, social influence and effort expectancy emerged as the most influential factors, underscoring the importance of perceived benefits in motivating users to embrace digital platforms for mortgage processing.

Limitations

The study's dependence on current data and concentration on India limit its conclusions, highlighting the necessity for comparative studies across countries and marketplaces.

Recommendations/Future Research

Future study should expand the user base with rural background and user other non-English languages to collect the data as that will improve the sample size in Indian context. Additionally, Digital mortgage solutions' socio-economic effects should be studied longitudinally to better understand this subject. Also, future studies should focus on the adoption of emerging technologies such as quantum computing and advanced predictive analytics.

TABLE OF CONTENTS

DIGITALIZATION OF MORTGAGE LENDING PROCESS IN INDIA 1
CHAPTER -1 9
INTRODUCTION 9
1.1 Background 9
1.2 Research Problem 16
1.3 Research Motivation 17
1.4 Research Gaps 18
1.5 Research Questions 19
CHAPTER -2 21
LITERATURE REVIEW 21
2.1 Introduction 21
2.2 Digitalization 23
2.3 Theories of Effectiveness of Digitalization 33
2.3.1 Technology Acceptance Model (TAM) 33
2.3.2 Disruptive Innovation Theory 35
2.3.3 Network Effects Theory 38
2.3.4 Diffusion of Innovation (DOI) 40
2.3.5 Unified Theory of Acceptance and Use of Technology (UTAUT) 44
2.3.6 Dialogical Public Relations Theory 47
2.3.7 Theory of Planned Behavior (TPB) 50
2.3.8 Sociotechnical Systems Theory 52
2.4 Culture as an important factor to technology adoption 54
2.5 Digital transformations in Indian banks 55
CHAPTER-3 77
RESEARCH METHODOLOGY 77
3.1 Statement of the Problem: 77
3.2 Research Gaps 78
3.3 Rationale for deciding UTAUT as the research model 79
3.4 Hypotheses 80
3.5 Objectives 83
3.6 Methodology 84
3.7 Research Questions Analysis Approach 87
Chapter 4 90

Data Analysis 90
4.1 Introduction 90
4.2 Conceptual Model 90
4.3 Results 91
4.4 Descriptive Statistics 91
4.5 Quantitative Analysis 103
4.6 Hypotheses Validation 109
Chapter 5 112
Conclusion 112
5.1 Summary 112
5.2 Contributions 113
5.3 Recommendations for future studies 114
5.4 Implications of study 115
APPENDICES 117
Appendix A: 117
Research Questionnaire 117
Appendix B: 131
Interview Consent Form 131
Bibliography 132

CHAPTER -1

INTRODUCTION

1.1 Background

The digitalization of India's mortgage lending industry has transformed loan processing, disbursement, and management. This transition is driven by technical advances, a rising digital environment, and customer demands for faster and more efficient services. Indian mortgage lending has historically been characterized by excessive paperwork, bureaucracy, and a lengthy approval procedure. According to Agrawal et al. (2018), digital technologies allow financial institutions to streamline procedures, improve customer experiences, and cut costs while preserving security and compliance.

Government initiatives like Digital India and the cashless economy have pushed digital mortgage lending in India. These initiatives have increased digital platform adoption in financial services and other areas. According to Brynjolfsson et al. (2014), the Reserve Bank of India (RBI) and other regulators have also encouraged technology integration into banking procedures, making digital solutions easier to deploy. Since many banks and non-banking financial organizations (NBFCs) have built online platforms, clients can apply for mortgages digitally, track their application status in real-time, and receive approvals faster than through traditional methods.

Digitalization in mortgage lending reduces loan approval turnaround time, a major benefit. Traditional mortgage applications took weeks or months to process owing to physical document verification, credit evaluations, and manual underwriting. According to Gawer (2021) , however, digital platforms have automated many of these stages, allowing lenders to process applications faster. Real-time credit scoring, employing data analytics and machine learning algorithms analyzes a borrower's financial history and accurately predicts their creditworthiness. According to Fountaine et al. (2019), this speeds up loan approval and lowers human error, making the system more dependable.

Digitalization has also made mortgage loans more accessible, especially in rural and semi-urban India, where traditional banking services were scarce. Due to internet ubiquity and smartphone use, many people, who previously had little to no access to official financial institutions, can now apply for mortgage loans online. According to Hirt et al. (2014) ,this

has increased financial inclusion, a government goal in India. Borrowers can upload documents online and avoid bank visits, thanks to digital platforms.

Improved client experience is another key benefit of mortgage financing digitalization. Customer expectations now are fast, smooth, and personalized, and digital mortgage platforms meet them. AI and big data analytics allow lenders to customize mortgage solutions for customers based on their financial profiles and needs. According to Kapoor et al. (2016), chatbots and virtual assistants are now being utilized to answer questions and help borrowers apply 24/7. This has increased consumer satisfaction and decreased lender operational expenses.

Security and compliance are crucial in digital mortgage lending. Given the sensitive data involved, including personal and financial information, digital platforms must be secure. To safeguard consumer data, Indian lenders use encryption, two-factor authentication, and biometric verification. According to Kane et al. (2015), digitalization also improves regulatory compliance. Digital platforms may automatically verify for KYC and AML compliance, ensuring transparent and secure transactions.

The COVID-19 outbreak has hastened India's mortgage lending digital revolution. Lockdowns and movement restrictions pushed banks and financial organizations to use digital alternatives to operate. E-signatures, video KYC, and digital documentation became common, allowing borrowers to complete the mortgage procedure from home. This change has lasted, with many institutions offering these digital services after restrictions were eased.

Digitalization in mortgage financing has apparent benefits but also problems. The digital divide in India, where a large percentage of the population lacks internet access or digital literacy, is a major issue. This is especially true in rural regions where conventional banking is still used. Financial institutions must invest in digital literacy and infrastructure to ensure that all people can benefit from digitalization.

Traditionally, banks were having a monopoly in the banking industry, especially before globalization. Banks were primarily concerned with their margins and had limited focus on the client experience or ease of operations.

The traditional lending process of the traditional banks was quite complicated. A typical lending cycle was looking for some of the key processes like Loan application submission, documentation (Address Proof, Identity Proof, Bank Statement, Income Proof, etc.)

submission, Field Verification, Credit Bureau Check, Policy and eligibility check, Underwriting check ,Legal verification, Loan agreement finalization, and Loan disbursal. These processes were not as straightforward as a workflow step, rather these processes sometimes are recursive and customers are not able to really produce all required documents in a single step or with ease. Especially customers who are new to lending, will not have credit bureau scores (CIBIL is one of the credit bureaus in India), hence more difficult for traditional bankers to decide their creditworthiness and identify associated risks.

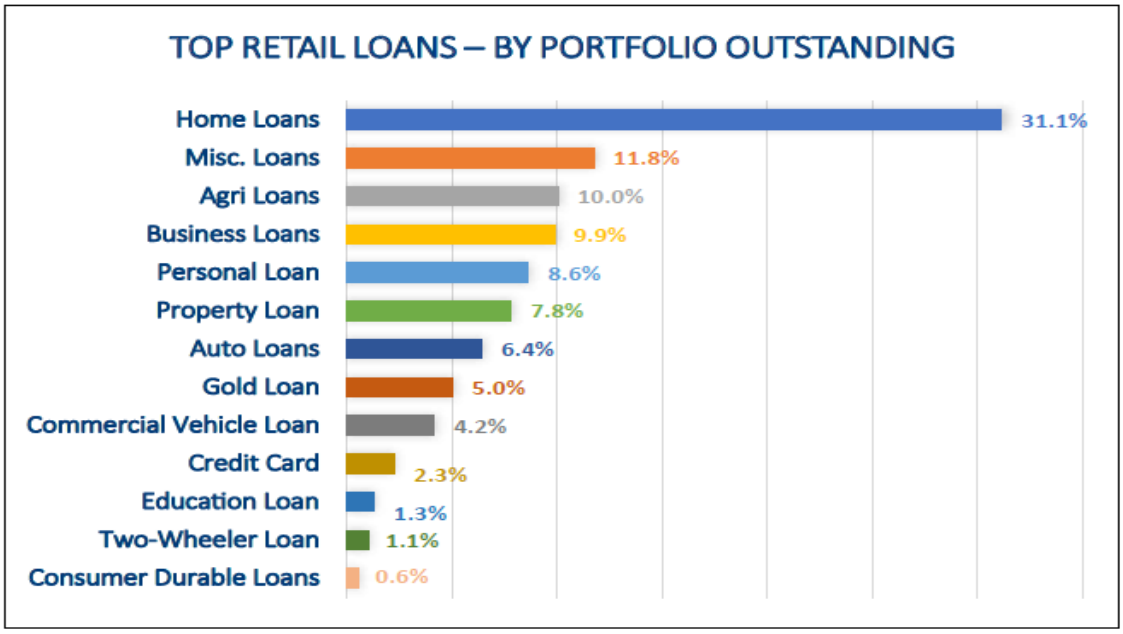
Such process challenges gave a good space to Fintech players, who believed in the automation of many of these processes via technology and improving the TAT to disburse the loan. FinTech's are not only focusing on improving TAT but are also equally concerned with simplifying these requirements and identifying alternate methods. According to Mugdha Variyar (2016), alternative lending startups, which do not demand collateral or use CIBIL scores like traditional banks, are using machine learning and innovative methods such as psychometric tests to ensure loans don't sour.

India's lending market is relatively complex primarily because of its huge geographic setup, low urbanization of the population, and variety of needs. Additionally, level of education, consumer behaviour, and high penetration in non-service-based occupations are some other parameters that add more colour to the complexity of lending.

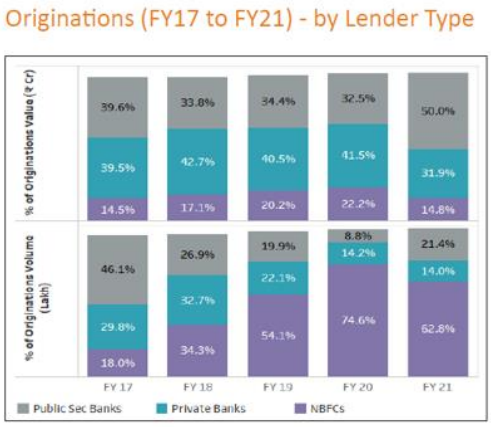
The Indian lending market offers multiple types of lending products to the Indian consumer. Some of the popular retail lending loans are Consumer durable loans, Vehicle loans, Two-wheeler loans, Personal loans, Education loans, Home loans, Business loans, and Home improvement loans.

According to Vipul Jain et al. (2021), the size of the total lending market in India as of Mar'21 is at ₹ 156.9 Lakh crores, a growth of about 100% from FY17 to FY21. Retail and commercial lending each contribute 49% to total lending in India while microfinance contributes 2%. The period from FY17 to FY21 can be characterized by the growth of small-ticket retail loans. This is evidenced by flat growth of average balances per borrower despite a 2X increase in active retail loans. Another significant trend is borrowers holding 4 or more active retail Loans increasing and borrowers holding 1 or 2 Retail Loans reducing. This study indicates the market potential of lending business in the Indian banking sector.

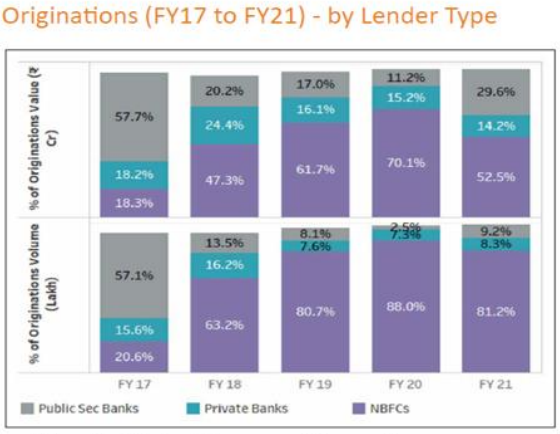
According to Vipul Jain et al. (2021), following diagrams provides more statistics on the distribution of various loan types and also the pie of Public Banks / Private Banks / NBFCs:



(Source: How India Lends FY 2021)

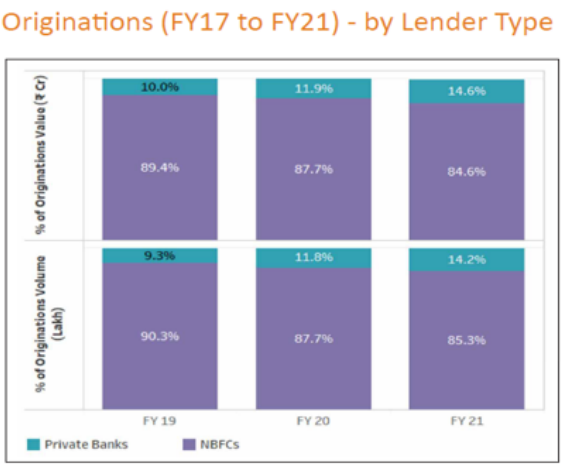


(Personal Loans)

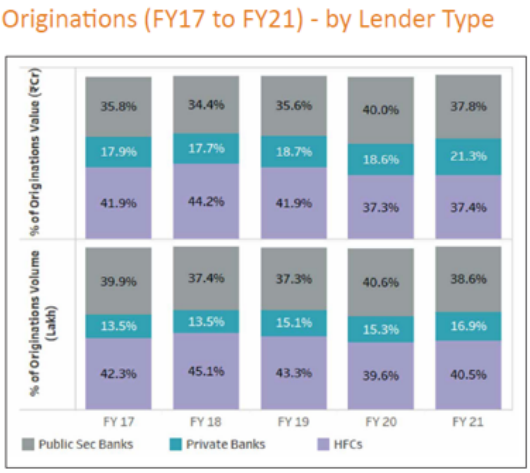


(Small Ticket Personal Loans)

(Source: How India Lends FY 2021)



(Consumer Durable Loans)



(Home Loans)

(Source: How India Lends FY 2021)

It is quite evident from these studies that home loan is the largest portfolio in the retail lending business while consumer durables / small ticket personal loans are the smallest portfolio in the retail lending business. It is also evident that the NBFCs (or FinTech's) have penetrated well in consumer durables / small ticket personal loans, but they have much lower penetration in big-ticket size loans like home loans.

It is important to study the reason that Fintech / NBFCs could not penetrate to digitize and disrupt the Indian mortgage industry. In addition to the standard lending process, the mortgage lending process also requires some additional steps like Mortgage property ownership check and Mortgage property valuation

Banks are joining the digitalization wave to compete with Fintech / NBFC in small ticket size loans but banks / HFCs are still very conscious (or conservative) in processing the mortgage loans, hence following the traditional mortgage lending process.

To a great extent, the Subprime crisis also impacted the mortgage policies and regulations worldwide and India was no exception. As per the study done by Bandyopadhyay et al. (2011a), the empirical results suggest that borrower defaults on housing loan payments are mainly driven by the change in the market value of the property vis-à-vis the loan amount and EMI to income ratio.

According to a study by Fuster et al. (2019), technology-based lending transformation is restructuring the US market and adding more scalability to demand.

The expansion of the Indian economy, the implementation of new regulations, and the development of new technologies have all contributed to a spectacular revolution in the mortgage lending industry in India during the past few decades. According to Delen et al. (2018), mortgage lending in India may be traced back to the early 20th century, when housing finance was mostly unregulated and informal. This is when the country's mortgage lending history began. In the past, mortgages were mainly handled by private moneylenders or local cooperative organizations. According to Grewal et al. (2020), these mortgages were frequently offered at excessive interest rates and with rigid terms, which made it difficult for many Indians to obtain affordable housing financing.

The development of the banking and financial services sector in India, as well as the growing desire for homeownership, as a result of urbanization and population increase, are all strongly connected to the evolution of mortgage lending in India. According to Manyika et al. (2013), beginning in the 1950s and continuing into the 1960s, the government of India acknowledged the significance of housing for both the maintenance of economic stability and the advancement of social development. On the other hand, the housing finance industry continued to be disjointed and poorly managed, with constrained institutional frameworks that could not support large-scale mortgage lending. The true push for structured mortgage lending came in the 1970s, when the Indian government began establishing housing laws with the intention of creating a more organized and controlled market for housing finance. According to Marr (2018), these policies were intended to bolster the market for housing finance.

In 1970, the Housing and Urban Development Corporation (HUDCO) was established, which is considered to be one of the most significant landmarks in the history of mortgage lending in India. According to Tapscott (2014), the Housing and Urban Development Corporation (HUDCO) was a pioneer in the provision of long-term housing loans, more specifically to public sector institutions and state housing boards. The beginning of the country's structured home finance system may be traced back to this event. According to

Vial (2019), in spite of these efforts, individual homebuyers continued to face substantial obstacles when attempting to gain access to affordable home loans. These obstacles included the high cost of borrowing money and the absence of a formal credit infrastructure.

One of the most significant developments that occurred during the 1980s was the establishment of the National Housing Bank (NHB) in 1988. This bank was a subsidiary of

the Reserve Bank of India (RBI). According to Tilson et al. (2010), the National Housing Bank (NHB) was established with the purpose of fostering the growth of housing finance institutions, regulating housing finance enterprises, and ensuring that housing financing became available to a wider range of people in society. It was about this time that the Housing Development Finance Corporation (HDFC), which was India's first private sector housing finance firm, came into being in 1977. According to Fountaine et al. (2019), this event further changed the mortgage lending industry. Homeownership became more accessible to people in the middle class as a result of HDFC's introduction of new housing loan products and customer-centric procedures. These practices included offering lower interest rates and extended payback tenures.

Another factor that contributed to the expansion of the mortgage lending industry in India was the liberalization of the Indian economy in the 1990s. According to Davenport et al. (2016), the market for financial services was opened up as a result of economic reforms, which eventually led to the admission of new competitors. These new players included private banks and non-banking financial firms (NBFCs), which resulted in a considerable expansion of the mortgage market. According to Hirt et al. (2014), during this time period, both public sector banks such as the State Bank of India (SBI), and private banks such as ICICI Bank and Axis Bank began offering house loan products. This led to an increase in competition, which in turn drove down interest rates. In addition, during this time period, advantageous regulatory frameworks and tax incentives were introduced for homebuyers, which further increased the demand for home loans.

The decade of the 2000s was marked by a period of significant rise in mortgage lending, which coincided with the expansion of India's urban population and the spike in real estate development. According to Lamberton et al. (2016), as a result of this period of time, the availability of home loans increased, and financial institutions and housing finance companies launched flexible lending solutions that catered to a variety of income brackets. By implementing criteria for priority sector lending (PSL), the Reserve Bank of India (RBI) made it obligatory for financial institutions to allot a specific proportion of their loans to specific industries, such as the housing industry. According to Manyika et al. (2013), this resulted in an increase in the amount of credit that was available to the housing market. In addition, the Indian Income Tax Act provided tax breaks on the interest and principal repayments of home loans, which encouraged more people to invest in real estate and fueled the demand for mortgages.

Another significant step in the development of mortgage financing in India was the introduction of the Pradhan Mantri Awas Yojana (PMAY) in 2015. This program, which was introduced in 2015, had the objective of making housing affordable for all people by the year 2022. This government program, in conjunction with Credit Linked Subsidy Schemes (CLSS), made it possible for economically disadvantaged and middle-income segments of society to get subsidized home loans, hence increasing the number of people who have access to housing. According to Agrawal et al. (2018), because it brought financial institutions and housing finance firms into alignment with the government's objective of providing affordable housing, the PMAY project was a game-changer for the mortgage industry. As a result, there was a huge increase in the number of applications for house loans.

Over the course of the past few years, the mortgage lending sector in India has continued to develop in tandem with the expanding impact of technology and widespread digitization. According to Kane et al. (2015), the proliferation of financial technology businesses and online banking platforms has ushered in a new era of mortgage lending that is characterized by increased convenience and efficiency. Mortgage approvals may be processed much more quickly, thanks to digital platforms, which enable the automation of the loan application process, real-time credit evaluations, and quicker loan disbursements. This drastically reduces the amount of time it takes to get a mortgage approved. Because borrowers can now apply for loans, upload documents, and check the status of their applications fully online, this transition has proven to be very useful in terms of improving customer experiences. According to Manyika et al. (2013), further streamlining of the mortgage lending process has been achieved by the implementation of technological advancements like as electronic know-your-customer (e-KYC), digital signatures, and video-based customer verification. According to Lamberton et al. (2016), these advances have reduced the need for physical paperwork and verification in person.

1.2 Research Problem

The mortgage lending process in India has traditionally been slow, cumbersome, and paper-intensive, leading to inefficiencies that affect both lenders and borrowers. The complexity involved in processing mortgage applications, including extensive documentation, manual verification, and delayed approvals, has created barriers for potential homeowners, particularly in underserved and rural areas. Additionally, the reliance on traditional methods has contributed to higher operational costs for financial institutions, limiting their ability to

offer competitive interest rates and services. In light of these challenges, digitalization has emerged as a potential solution to streamline and modernize the mortgage lending process. However, questions remain regarding the effectiveness of digital tools in addressing the existing bottlenecks, the role of technology in improving accessibility and transparency, and the impact of digital transformation on financial inclusion in India.

According to Gupta et al. (2012), studied the innovation challenges in Indian mortgage industry though their study was specific to ICICI Bank Ltd. They further researched the innovations and existing practices followed by ICICI Bank Ltd for their mortgage business. In the research conclusion, Gupta et al. (2012) further concluded in the study that banks like ICICI should emphasize on the parameters valued by the customers.

A similar study was done by Riyaz et al. (2024). According to the study, approval processes are the critical hindrance for timely loan disbursements, impacting customer satisfaction.

According to a study published by Jackson (2024) , demographic factors; related to the credit decisioning of the home loan applicants; were analysed for South Indian Bank Ollur branch.

R. K. Gupta (2023a) also studied that several significant changes have taken place within the realm of financial institutions. Nevertheless, after years of operating in a conventional manner, the mortgage business is in dire need of digitalization from a technological standpoint.

In this study, we aim to research the determinants of mortgage digitalization acceptance in India. This study holds significant value as it contributes to understanding how digitalization can transform mortgage lending in India.

By identifying the behavioral determinants influencing the acceptance of digital mortgage services, the findings could help financial institutions optimize their strategies to enhance customer experience and streamline operations.

1.3 Research Motivation

With over two decades of experience in the banking industry, including 12 years specializing in lending finance, I observed that the mortgage loan process remains largely manual, despite significant investments in the digitalization of the banking sector. This disparity always fascinated me to understand the reason for full end-to-end digitalization ineffectiveness, especially when small ticket loans have a great success story of digitalization.

According to Khan (2012), the potential of affordable housing in India identified that the Banks and HFCs can play a critical role by increasing the reach of rural and urban public to these home loan products.

According to Rajasekar et al. (2024), digital financing may be a game changer for underserved businesses and people if they get access to better financial services. They further mentioned that digital lending in Indian has a lot of untapped potential.

Revathy et al. (2020) studied the determinants of behavioural intention on e-wallet usages. Researchers further studied the approaches to overcome the barriers in behavioral intention of e-wallet users during Covid-19 lockdown.

These studies further motivated me to study the impact of digitalization on mortgage loans. Through this research work, I aim to explore the factors influencing the digitalization of mortgage lending processes in India. This study seeks to uncover the challenges and opportunities associated with the digital transition, focusing on improving efficiency, accuracy, and accessibility in mortgage loan processing.

1.4 Research Gaps

Several studies were conducted on the digitalization of banking and lending, but the primary focus had been either on banking in general or small ticket-size loans. There is an insufficient study performed on the digitalization of mortgage loan processing in India, while mortgage loans hold a 31% stake in the overall retail lending industry of India.

A similar study is done by Morales et al. (2019) for mortgage lending digitalization for the Philippines mortgage industry.

Gupta et al. (2012) also studied the innovation challenges in Indian mortgage industry though their study was specific to ICICI Bank Ltd. They further researched the innovations and existing practices followed by ICICI Bank Ltd for their mortgage business. In the research conclusion, Gupta et al. (2012) further concluded in the study that banks like ICICI should emphasize on the parameters valued by the customers. Their study did not focus

more on the exact parameters which can be considered as critical factors for digitalization across mortgage industry in India.

According to the study done by Riyaz et al. (2024), lengthy approval processes are the critical hindrance for timely loan disbursements, impacting customers satisfaction. They further studied the challenges related to documentation process which directly impacts loan approval cycle. However, overall factors impacting the adoption of mortgage loans digitalization was studied specific to a sub set of processes.

As per study by Jackson (2024) , demographic factors were studied related to the credit decisioning of the home loan applicants, but this behavior study was specific to South Indian Bank; Ollur branch; and did not study the digitalization aspect of the mortgage loans, which can be standardized across Indian banking sectors.

R. K. Gupta (2023a) also studied that several significant changes have taken place within the realm of financial institutions. Nevertheless, after years of operating in a conventional manner, the mortgage business is in dire need of digitalization from a technological standpoint.

The existing body of knowledge exhibit that there are many studies performed related to the digitial transformation of banking or digtialization of specific process steps of mortgage. There are also studies done for other countries, emphasizing on the factors related to the effectiveness of mortgage digitalization. But from Indian mortgage industry perspective, there is a gap in indentifying the determenants for effectiveness of mortgage industry digitalization. This present study aims to explore the determenants for effective usage of diigtal mortgage platforms.

For significant return on lenders' investment, It is crucial to analyze customer acceptance of the digitalization of mortgage lending in India.

1.5 Research Questions

The primary purpose of this research is to evaluate the behavioral intentions of Indian mortgage clients toward accepting digital mortgage services. The study will examine how various constructs of the UTAUT model, such as performance expectancy, effort expectancy, and social influence, impact the adoption of digital mortgage services, while considering the moderating effects of demographic factors.

This study will answer the following research question(s):

1. What are the determinants of bank mortgage clients' behavioral intention to accept digital mortgage services in India?

   Considering India's diverse population and geographical distribution, it is critical to study the relationship of various demographic factors like gender, age, educational qualification, state, and technology awareness for adopting digital mortgage platforms. In this study, we shall identify the determinants of bank mortgage clients that may influence behavioral intention.

   A similar study was done by Morales et al. (2019) for digitization of mortgage banking in the Phillippines.

2. To what extent do the four constructs of the UTAUT model such as performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) influence bank mortgage clients' behavioral intentions (UI) to accept digital mortgage services in India?

   As the UTAUT model is the basis for this study, we shall analyze the relationship of these four constructs – PE, EE, SI and FC with UI. This quantitative study should help us to determine the critical factors which may influence behavioral intentions of the users toward digital mortgage platforms.

   A similar study was done by Morales et al. (2019) for digitization of mortgage banking in the Phillippines.

CHAPTER -2

LITERATURE REVIEW

2.1 Introduction

The digitalization of the mortgage loan process has emerged as a key trend in the worldwide financial services industry. This movement is being pushed by technical improvements as well as the growing demand from customers for financial transactions that are faster, more efficient, and more transparent. The mortgage sector in India has also adopted digital technologies in recent years, which have revolutionized traditional banking practices by delivering automated, paperless, and streamlined procedures. This has led to the industry's adoption of digital technologies. Not only has the incorporation of artificial intelligence (AI), blockchain, and big data analytics into the ecosystem of mortgage lending resulted in an increase in operational efficiency, but it has also resulted in a transformation of consumer experiences by reducing the amount of time and effort required to apply for and receive house loans.

This move towards digital mortgage platforms is a part of a larger trend towards financial inclusion in India. The goal of this trend is to enable underserved people, such as those living in rural and semi-urban areas, with better access to home financing. Digital platforms have improved transparency, reduced transaction costs, and granted banks and other financial institutions access to real-time data, which has enabled them to make better informed lending decisions. This has been accomplished by eliminating a significant number of the manual processes that are associated with mortgage lending. However, in addition to these advantages, digitalization also brings several obstacles, such as worries around data security, the requirement to comply with regulatory requirements, and the possibility of customers who are less knowledgeable about technology being excluded.

The purpose of this literature review is to investigate the research and studies that have already been conducted in relation to the transformation of the mortgage lending process in India. A comprehensive analysis of the problems and opportunities connected with the digital transformation of the mortgage lending sector is presented, as well as an examination of the influence that digital technologies have had on the effectiveness, accessibility, and consumer satisfaction of mortgage lending services. The purpose of this study is to provide a comprehensive overview of the current state of digital mortgage lending in India as well

as its potential future advancements. This will be accomplished by evaluating both national and international viewpoints.

According to Sharma (2016), the digital India drive is a dream project of the Indian Government to remodel India into a knowledgeable economy and digitally empowered society, with good governance for citizens by bringing synchronization and co-ordination in public accountability, digitally connecting, and delivering the government programs and services to mobilize the capability of information technology across government departments.

To support digitalization, the Government of India (GOI) has recently enforced many new initiatives like digital payments via Unified Payment Interface (UPI), AADHAR Card (Unique Identification number for Indian Citizens), Digital Locker (To digitally store documents), eSign framework (Digitally sign a document using AADHAR card authentication).

High penetration of the Internet, mobiles, and digital initiatives are encouraging more and more banking services to be digitalized. The lending process is also not untouched by this digital disruption. According to a study by Lobo et al. (2022) , in India, there are 1.1 billion smart/mobile phone connections. The % of people with a mobile connection is 79.
There are many types of lending products supported by banks in India and worldwide: Personal loans, consumer durable loans, auto loans, two-wheeler loans, credit cards, mortgage (home) loans, business loans, peer-to-peer loans, etc.

With the continuous increase in income and consumption patterns, demand for retail credit is also increasing day by day. To disrupt legacy banking, many Fintech / NBFCs are taking advantage of digitalization in India. These NBFCs / Fintech companies are providing near-to-real-time lending approvals for some of these lending products. Other established public/private sector banks are also focusing on digitalization to face the competition.

Unfortunately, Quick lending approval turnaround time (TAT) is limited to a handful of lending products like personal loan, consumer durable loans, and two-wheeler loans. But despite the digitalization era in India, mortgage loans are still lagging and take a few days to weeks in some cases.

This brings me to explore the opportunities in the digitalization of mortgage loans. Not only for first-time loans but even refinancing the loans is still a lengthy process in India. Existing loan processes currently take a long time to complete due to manual verification, resulting in poor accuracy and efficiency due to human error.

Though some institutions have enabled digital sourcing of mortgage loan applications, still, processing time has not been reduced, which indicates that mortgage loan processing in India is complex and needs a systematic study of digitalization challenges. Currently, digital mortgage technology-related research studies are minimal (or almost non-existent) for the Indian mortgage industry, hence there is a gap in the systematic literature study on the acceptance of digital mortgage technology.

2.2 Digitalization

The incorporation of technology to enhance productivity, accessibility, and the quality of experiences provided to customers has resulted in the transformation of a variety of industries and sectors. According to Manyika et al. (2013) , in the context of mortgage lending and other financial services, digitalization involves a number of different components that collectively make it possible to automate operations, improve security, and speed up the supply of services. According to Nambisan et al. (2019), the following is a list of most important factors that are driving digitalization across all industries:

Automation of Processes

A key component of digitalization is automation, which is one of its central poles. It involves the utilization of technology in order to carry out tasks without the involvement of a human being. According to Marr (2018) , automation has the potential to streamline the whole lifecycle of loan processing in the mortgage lending industry, beginning with the original application and continuing through approval, underwriting, and disbursement. Brynjolfsson et al. (2014) stated that it is possible for businesses to dramatically cut down on processing time and reduce the amount of errors caused by human intervention by automating operations that are repetitive and manual in nature, such as document verification, credit scoring, and data entry.

Data Analytics and Big Data

At the heart of digitalization is the concept of data. Organizations are able to make decisions that are based on accurate information when they have the capability to gather, analyze, and extract insights from massive amounts of data. According to Agrawal et al. (2018) , when it comes to mortgage lending, big data analytics assists lenders in conducting more in-depth evaluations of borrower profiles. These evaluations take into account a variety of elements, including income history, spending habit, and social data, in order to arrive at more precise lending judgments.

Artificial Intelligence (AI) and Machine Learning (ML)

According to Tapscott (2014) , AI and ML are extremely important to the process of digitalization because they make it possible for machines to learn from data and carry out jobs that have historically needed the intelligence of humans. Artificial intelligence is heavily utilized in the financial services industry for a variety of functions, including customer care (via chatbots), fraud detection, and credit risk assessment. Algorithms that learn through machine learning are able to make predictions about client behavior, assess complex data patterns, and provide assistance in decision-making processes such as underwriting.

As an illustration, chatbots that are driven by AI are able to give customer assistance around the clock, direct users through the process of applying for a loan, and provide quick responses to questions. According to Delen et al. (2018) machine learning models can be utilized to evaluate the creditworthiness of borrowers by studying their financial data in real time. This can be accomplished by examining the data in real time.

Cloud Computing

Computing in the cloud is another crucial component of digitalization. It offers scalable infrastructure and makes it possible to access digital services through the internet. Cloud-based platforms enable financial institutions to store, manage, and access enormous volumes of data in a safe manner, eliminating the need for them to rely on physical storage systems.

According to Grewal et al. (2020) , cloud computing also improves flexibility and scalability, making it possible for organizations to rapidly adjust to shifting business requirements and provide services in a variety of geographical locations.

Blockchain Technology

According to the Manyika et al. (2013) , the blockchain technology is gaining acceptance as an essential component of digitization, particularly in industries that require records that are secure, transparent, and tamper-proof. Blockchain technology can be utilized in the mortgage lending industry to protect property titles, loan agreements, and other essential documents, thereby lowering the likelihood of fraudulent activity and errors. The term smart contract refers to an extension of blockchain technology that consists of automated contracts that carry out their predetermined terms and conditions. This is something that can be applied to mortgage agreements, where the loan distribution might take place automatically once the property verification and other conditions have been satisfied.

Mobile Technologies

According to Marr (2018) , mobile technology have been one of the most prominent and influential aspects of the digitalization process. The way in which services are provided to customers has been revolutionized by mobile applications and platforms, which provide consumers with access to information and transactions in real time. In the realm of mortgage lending, mobile applications make it possible for borrowers to submit loan applications, check the progress of their applications, upload documents, and contact with lenders at any time and from any location.

Accessibility has also been improved because to mobile-first solutions, which have made it possible for underserved populations in rural places to obtain mortgage services remotely via their smartphones.

Digital Identity and E-KYC

e-KYC, which stands for electronic know your customer, is a critical component that assures compliance with regulatory standards and promotes the security of digital transactions. Digital identity verification is also a key component. Electronic Know Your Customer (e-KYC) enables the rapid and effective digital verification of a customer's identity through the use of biometric or digital authentication methods. This is particularly useful in industries such as mortgage lending, where it is necessary to verify personal and financial information.

In this process, there is no requirement for physical documentation or verification in person, which results in a reduction in both the amount of time and money required to onboard new consumers. According to Brynjolfsson et al. (2014) Further, the implementation of digital

identification solutions in India, such as verification based on Aadhaar, has made it simpler for financial institutions to adhere to regulatory standards while simultaneously enhancing the speed with which they serve their customers.

Cybersecurity

In tandem with the rise of digitalization comes an increase in the likelihood of cyber attacks and data breaches. As a result, cybersecurity is an essential component in the process of maintaining the security and confidentiality of digital transactions. Because of the sensitive nature of the personal and financial information that they manage, banking institutions, in particular, are primary targets for cyberattacks. According to Vial (2019) , platforms that provide digital mortgage lending services are required to include robust encryption, multi-factor authentication, and secure access restrictions in order to safeguard consumer information against any efforts at hacking or illegal access.

Regulatory Compliance

For the purpose of ensuring security, transparency, and justice, digitalization in areas such as banking and mortgage lending must comply to a solid regulatory framework. Compliance with Know Your Customer (KYC) rules, anti-money laundering (AML) regulations, data protection requirements, and financial reporting standards are all included in this context". According to Agrawal et al. (2018) , when it comes to creating guidelines that encourage digital innovation while simultaneously protecting customer data and interests, governments and regulatory agencies play a crucial role in the process.

Automation, artificial intelligence, and analytics are the means by which regulatory technology, often known as RegTech, assist organizations in more effectively complying with regulations. With the help of these technologies, non-compliance concerns can be automatically identified, reports can be generated, and systems can be updated in response to changes in the regulatory landscape. According to Delen et al. (2018), this ensures that digitalized processes are in accordance with legal standards.

Customer Experience and Personalization

According to Tapscott (2014), when it comes to digitalization, it is not only about automating processes and increasing efficiency; it is also about providing an improved experience for customers. Customers have come to expect individualized services, interactions that are frictionless, and help that is available in real time. A consequence of this is that digital

platforms are developed with the intention of enhancing the user experience by means of user-friendly interfaces, personalized recommendations, and instant support.

Tools that are powered by artificial intelligence assist personalize products and services to fit the specific requirements of individual customers. According to Manyika et al. (2013) , when it comes to mortgage financing, this may entail making individualized loan recommendations to the borrower based on their financial profile, their ability to repay the loan, and their preferences regarding the property. In addition, providing clients with support around the clock through chatbots or virtual assistants guarantees that they will be able to get assistance whenever they require it.

The digitalization of businesses like mortgage lending relies on the integration of numerous components, each playing a significant role in optimizing processes, strengthening security, and improving customer experience. According to Marr (2018) , automation, data analytics, AI, blockchain, cloud computing, mobile technologies, and cybersecurity are the primary components that have powered this change. Together, these technologies are not only making services faster and more efficient but also determining the future of how industries function in a quickly expanding digital environment.

By bringing technology-driven solutions that improve efficiency, production, and accessibility, digitalization has altered industries all over the world for the better. Sectors such as finance, healthcare, retail, and education have been profoundly impacted as a result of its transformation of how businesses function, how they connect with clients, and how they provide services. “Especially as businesses embrace digital technologies to optimize operations and improve customer experiences, digitalization offers a multitude of benefits that are far-reaching and substantial. Some of the most important advantages that digitalization brings to a variety of industries are listed below.

Increased efficiency and productivity are the critical benefits of digitalization. The huge boost in efficiency and production that was brought about by digitalization is one of the most apparent benefits of this technology. This eliminates the need for human intervention and reduces the number of errors that occur. Through the use of digitization, for instance, operations such as the approval of loans, the evaluation of credit, and the processing of transactions have become more efficient in the financial industry. According to Vial (2019) , the completion of tasks that used to take days or weeks to complete may now be

accomplished in a matter of minutes, which enables businesses to serve a greater number of consumers in a shorter amount of time.

Cost savings is another key benefit of digitalization. Businesses are able to realize significant cost savings as a result of digitalization because it lowers their operational expenses. According to Fountaine et al. (2019), through the implementation of automated processes and the removal of the requirement for physical infrastructure, businesses have the ability to reduce costs related with personnel, materials, and time. One example is the digitization of documents and the utilization of cloud storage, which decreases the requirement for paper, printing, and physical storage. Additionally, the automation of processes reduces the expenses associated with labor.

According to Brynjolfsson et al. (2014) ,when it comes to the banking industry, for instance, digital banking platforms and mobile applications enable users to carry out transactions and gain access to services without having to physically visit a branch. This results in a reduction in the operational costs that banks incur. Additionally, the elimination of the requirement for manual processing is another way that costs can be reduced through the use of online loan applications and automated underwriting.

Enhanced customer experience significantly contributes towards benefits of digitalization. As the digital age has progressed, customers have developed new expectations, which include the demand for services that are more expedient, more personalized, and more convenient. The use of digitalization enables businesses to fulfill these expectations by delivering platforms that are streamlined, user-friendly, and that enhance the experiences of their customers. According to access to services, real-time updates, and personalized recommendations based on consumer data are all made possible by digital platforms, which are available around the clock.

In the retail industry, for instance, digitization has made it possible for firms to provide customers with personalized shopping experiences by means of targeted marketing, product recommendations, and discounts that are adapted to the customer's behavior and interests.

Improved Data Management and Analytics is an indirect benefit of digitalization. The collection, storage, and analysis of data in businesses has been revolutionized as a result of digitalization. According to Delen et al. (2018) , for organizations, the ability to exploit big data enables them to obtain significant insights into the behavior of their customers, trends in the market, and the success of their operations. Using data analytics technologies, firms

are able to make decisions based on accurate information, pinpoint areas in need of improvement, and ultimately enhance their plans.

For instance, in the field of finance, big data analytics enables banks and other financial institutions to more correctly evaluate credit risk, identify instances of fraud, and forecast market trends. Through the use of data analytics, businesses are able to better understand the preferences of their customers and improve their marketing campaigns in order to achieve higher levels of engagement and conversion rates.

Better decision-making is another critical benefit of digitalization. When organizations have access to data in real time through digital platforms, they are able to make decisions that are both more informed and more appropriately timed. Businesses now have the ability to quickly evaluate huge volumes of data thanks to digitalization, which provides them with insights that can be put into action and can help them make strategic decisions. Because of this, resource allocation is improved, customer targeting is strengthened, and operational efficiency is increased.

artificial intelligence-driven analytics solutions enable organizations in the financial sector to make decisions in real time regarding investments, risk management, and customer service.

Increased access and connectivity is one of the most important benefits of digitalization. As a result of the elimination of geographical boundaries brought about by digitalization, businesses are now able to access a larger audience and conduct operations on a worldwide scale. According to Manyika et al. (2013), cloud computing, mobile technologies, and online platforms have made it simpler for businesses to provide services to customers regardless of where they are located. As a result of this enhanced access and connectivity, businesses are able to enter new markets and broaden their client base.

By way of illustration, e-commerce platforms make it possible for businesses to sell their items on a worldwide scale, and digital banking services make it possible for clients to manage their funds from any location in the globe. According to Marr (2018), the emergence of online learning platforms has been a direct result of digitization in the field of education. These platforms have made education more accessible to students who live in underserved and remote places.

Enhanced security and compliance are key outcomes of digitalization. There has been an improvement in the security and compliance of business processes as a result of digitalization, particularly in sectors that deal with sensitive data, such as the healthcare and financial industries. According to Agrawal et al. (2018), a number of technologies, including blockchain, encryption, and biometric authentication, have contributed to an increase in data security by delivering tamper-proof and secure systems for the management of personal information and financial activities.

By way of illustration, blockchain technology provides a decentralized and unchangeable record of transactions, which helps to reduce the likelihood of fraudulent activity and ensures transparency".

Flexibility and scalability adds value towards the organizational growth target. Through the use of digitalization, businesses are able to gain the flexibility and scalability necessary to adjust to shifting market conditions and the expectations of their customers. With the help of cloud computing and software-as-a-service (SaaS) platforms, businesses are able to expand their operations without having to make substantial expenditures in physical infrastructure. Consequently, this makes it possible for firms to react rapidly to possibilities for expansion or swings in demand.

Cloud-based platforms, for instance, make it possible for businesses to add or remove services according to the requirements of their customers, and digital marketing tools make it. According to Grewal et al. (2020), possible for businesses to scale their campaigns according to the circumstances available in the market. When it comes to manufacturing, digitalization makes it possible to have more flexible production processes, which in turn enables businesses to alter production based on demand projections.

Financial inclusion is automatically benefited from the digitalization. Digitalization has been a crucial factor in the advancement of financial inclusion, particularly in countries that are still in the process of developing. According to Delen et al. (2018), individuals who previously did not have access to formal financial services are now able to participate in the financial system thanks to the proliferation of peer-to-peer lending services, mobile wallets, and digital banking platforms. Because of this, individuals and small businesses have gained the ability to save money, make investments, and gain access to credit by providing them with opportunities.

For instance, mobile banking services like as Paytm in India and M-Pesa in Kenya have made it possible for millions of people who do not have bank accounts to carry out transactions, save money, and even gain access to loans using their mobile devices.

Brynjolfsson et al. (2014) stated that through the encouragement of entrepreneurial endeavors and the enhancement of financial stability in underserved regions, this has made a contribution to the development of the economy.

When the business and governments are worried about sustainability and environmental issues, digitalization can help to achieve these goal. By minimizing the environmental effect of company operations and reducing the need for physical resources, digitalization has the potential to make a contribution to sustainability. By way of illustration, the digitization of documents and the utilization of cloud storage leads to a reduction in the consumption of paper. Additionally, the automation of energy management systems can assist firms in optimizing their energy use and lowering their carbon footprint.

There are numerous advantages that come with digitization, which include the transformation of industries through the enhancement of consumer experiences, the reduction of costs, the improvement of efficiency, and the promotion of innovation. For businesses that continue to adopt digital technologies, they are gaining a competitive advantage in a market that is constantly shifting and developing. According to Marr (2018), the process of digitalization is not only altering sectors, but it is also encouraging financial inclusion, sustainability, and global connectivity. As technology continues to improve, it is expected that the benefits of digitalization will grow even further, thereby offering new opportunities for both consumers and businesses alike.

Despite the fact that digitalization gives a number of opportunities for improvements, it also poses a number of obstacles for individuals, corporations, and governments. As businesses become more reliant on digital technology to enhance their processes and services, they face challenges in a variety of areas, including cybersecurity, data protection, digital literacy, and infrastructure, amongst others. In order for businesses and governments to successfully traverse the intricacies of digital transformation and ensure successful implementation, it is essential for them to have a solid understanding of these problems. Some of the most significant difficulties that are related with digitalization are as follows:

The environmental impact of digitalization must be addressed by organizations through the implementation of sustainable practices. According to Vial (2019), these practices include

the utilization of energy-efficient data centers, the utilization of renewable energy sources, and the management of electronic waste in a responsible manner. It is a significant problem for both private companies and public administrations to strike a balance between the advantages of digitalization and the preservation of the environment.

In spite of the fact that digitalization brings a number of critical obstacles, it also provides enormous potential for enhancing productivity, accessibility, and creativity across all sectors of the economy. According to Marr (2018) , among the challenges that firms must overcome, some of the obstacles include cybersecurity risks, concerns regarding data privacy, the digital divide, and the complexity of regulatory requirements. To effectively address these difficulties, it is necessary to engage in strategic planning, make investments in digital skills, encourage collaboration among stakeholders, and place a strong emphasis on cultivating a culture that values innovation and trust. According to Tapscott (2014) , in order to ensure that the benefits of digitalization are realized while simultaneously limiting the dangers and obstacles associated with it, businesses and governments need to collaborate in order to keep pace with the ongoing development of digital technology.

According to Manyika et al. (2013), as digitalization continues to alter industries and transform economies, emerging trends are determining the future of how individuals, corporations, and governments engage with technology. These trends are creating new opportunities and challenges. Artificial intelligence (AI), machine learning (ML), blockchain, and the Internet of Things (IoT) are examples of digital technologies that are rapidly advancing, and they have the potential to significantly improve efficiency, connectivity, and innovation. The digital environment is projected to be dominated by the following important themes in the future years, which will drive greater transformation across a variety of industries:

As time goes on, workplaces will become increasingly hybrid, consisting of a combination of working from home and working in an office setting. Productivity will be increased through the automation of administrative work by technologies powered by artificial intelligence, and collaboration platforms will make it possible for multinational teams to communicate and manage projects in a seamless manner.

As digital technologies continue to advance, initiatives to reskill and upskill workers will be required on a continual basis in order to facilitate workforce transformation. To ensure their

success in the new digital economy, businesses will need to make investments in training programs that provide their employees with the digital skills they need to succeed.

The coming years of digitization will be characterized by fast innovation and transformation across all sectors of the economy. Emerging technologies such as artificial intelligence (AI), blockchain, fifth-generation (5G) wireless networks, the internet of things (IoT), and augmented reality and virtual reality (AR/VR) are expected to revolutionize the way businesses function, enhance the customer experience, and propel sustainable growth. In order to maintain their competitive edge in a world that is becoming increasingly digital, companies need to maintain their flexibility and adaptability while keeping up with the rapid advancement of digital technology. It is expected that digitalization will continue to create new opportunities, reshape industries, and have a significant impact on the future of economies all over the world.

2.3 Theories of Effectiveness of Digitalization

Many basic ideas that describe the adoption, integration, and impact of technology are the basis for the efficacy of digitalization in altering sectors. These theories provide an explanation for the impact of technology. A thorough knowledge of how individuals, organizations, and markets react to technological improvements is provided by these theories. These theories also offer useful insights into the dynamics of digital transformation.

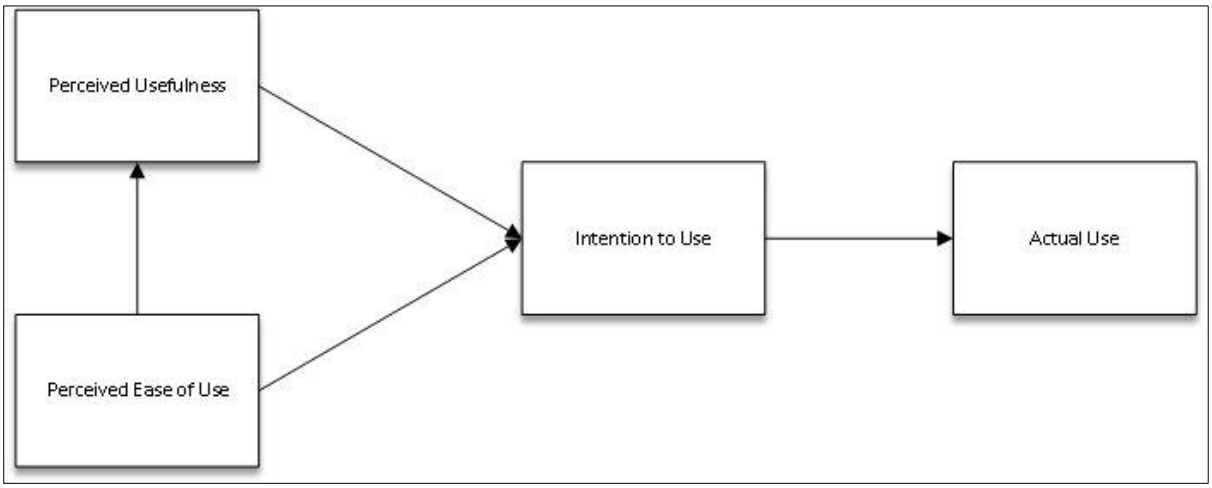
2.3.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), which was proposed by Davis, F. D. (1989), recognizes perceived usefulness (PU) and perceived ease of use (PEOU) as important characteristics that influence the acceptance of technology. Users have a greater propensity to adopt technology if they have the perception that it is advantageous and simple to operate. Following subsequent improvements to the TAM, external factors such as social influence, conducive conditions, and hedonic motives were integrated into the model. This made the model more adaptable for the purpose of analysing contemporary technology developments. Theory

Technology acceptance is a three-stage process, according to the Technology Acceptance Model (TAM). This process begins with the activation of cognitive reactions (reported ease of use and perceived utility) by external variables (system design elements), which then are

followed by the formation of an emotive response. The conduct is represented by the TAM, which is the outcome that is anticipated by the perceived ease of use, perceived usefulness, and behavioural intention and is shown in Figure 1. The beliefs that good behavioural outcomes will be achieved and the expectations that behaviour will not be labour-intensive are captured by the perceived simplicity of use and perceived usefulness of a behaviour modification tool.

Figure 1: Technology Acceptance Model



(Source: Technoloogy Acceptance model by Davis, F. D. (1989))

According to the study done by Li et al. (2008) , there is continuous progress in modernizing enterprises by information technology but the output shows a low adoption rate. They further mentioned that the TAM has become the main model for understanding and explaining the adoption of information technology platforms.

Another study done by Silva (1989) also referred to TAM as the basis of study as technology acceptance model (TAM) is considered one of the most widely used model by researchers to study the technology adoption.

According to the findings of a study published by Ngai et al. (2007) , the results established that the technical support has a direct impact on the PU and PEOU. They applied technology acceptance model (TAM) as the basis for their study. They used this study to analyse the effective utilization of e-learning tools.

2.3.2 Disruptive Innovation Theory

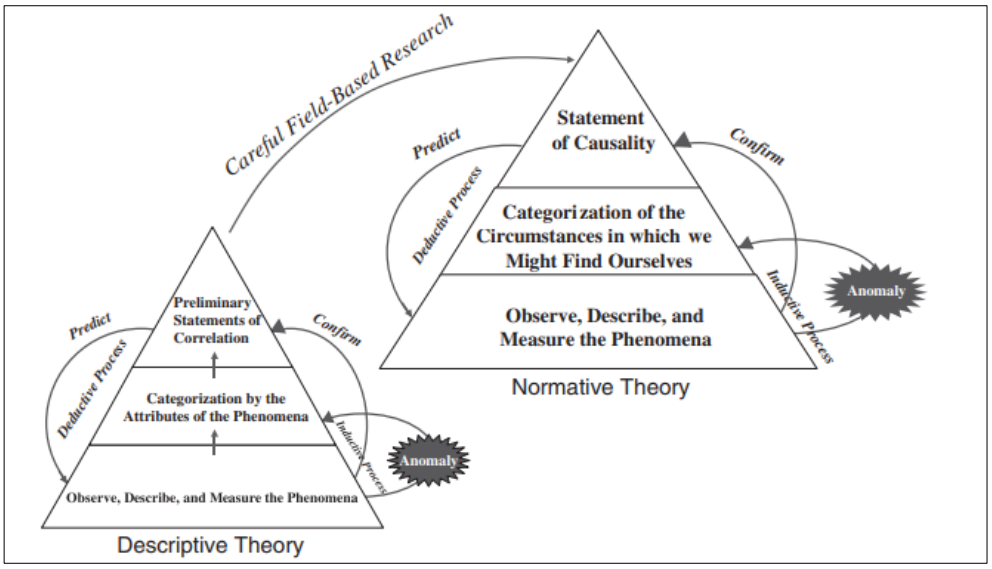
In a study published by Christensen (1997), idea was devised to explain how new technologies, which are frequently considered as inferior at first, disrupt established businesses by targeting client niches who are either neglected or underserved. These technologies continue to advance throughout time, posing a threat to established market leaders and generating new market paradigms. According to Christensen (1997) , the purpose of this theory is to highlight the potential for digitalization to democratize access to services, particularly financial goods such as mortgages, by utilising solutions that are both scalable and inventive.

According to Markides (2006), though primary focus of disruptive innovation theory was on the technology innovation but later theory was widened to include other factors like product innovation and business model innovation.

The landscape of organisations, economies, and communities has been revolutionised as a result of digitalisation, which has also reshaped some industries and redefined the process by which value is created and delivered. The Disruptive Innovation Theory, which was first presented by Clayton M. Christensen in the middle of the 1990s, is widely considered to be one of the most prominent frameworks for assessing the impact and effectiveness of digitalisation. This theory offers a lens through which one can examine the ways in which digital technologies impact the functionality of organisations, the dynamics of markets, and the development of industries. New technologies and business models, which are frequently easier to use and more accessible than their predecessors, have the potential to create totally new markets or redefine current ones, so posing a challenge to incumbent players and driving digital transformation. This phenomenon is referred to as disruptive innovation.

Kumaraswamy et al. (2018) studied relational perspective of disruption. As per their study, the innovation starts with an inferior offering but which is cheaper from the offering available in mainstream market. Established market players generally ignore such innovations and continues to focus on their existing offering. Over the period, innovators improves the product by keeping that as low cost offering compared to the mainstream market and gradually, these innovations become mainstream market offerings.

In a document published by Christensen (2006) , researcher established a model of the theory building process. As per this study, researchers go through three steps of observation, categorization and association before they develop the normative theory for disruption.



The transition from descriptive theory to normative theory

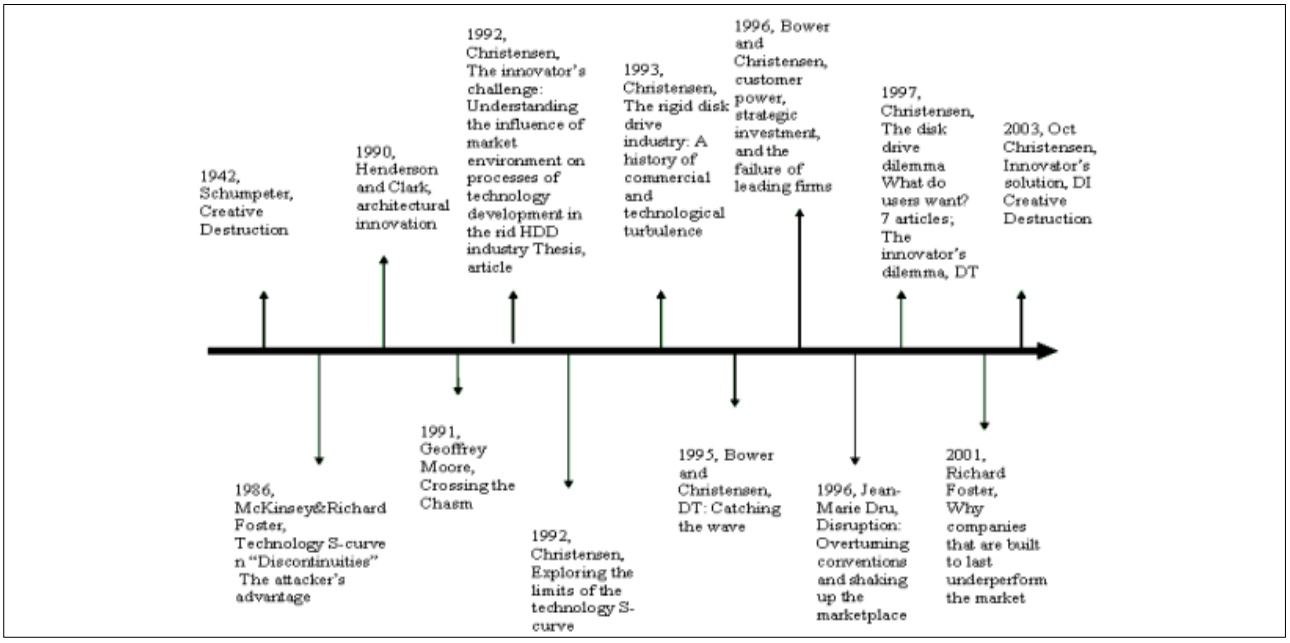
(Source: Christensen (2006))

Guttentag (2015) studied Airbnb as a case study for disruptive innovation. In this article, they explored the emergence of Airbnb which provides access of low-rent accommodation to tourists and also allows the common people to rent out their properties. He studied the concept of disruptive innovation, which was used in the business model of Airbnb.

This case study also supports study done by Kumaraswamy et al. (2018), where they highlighted that innovation generally starts with low-cost alternative to mainstream offering and gradually becomes the mainstream itself. In this case, Airbnb provided a low-cost accommodation to the tourist instead of high-cost hotels as provided by mainstream products, and progressively, Airbnb became a well-established mainstream offering in the tourism industry.

Pegoraro (2014) studied Twitter as disruptive innovation in sport communication. As per their study, Twitter was a new communication model, that did not start with a very clear purpose, but gradually it developed its own market and users adopted those for specific use cases.

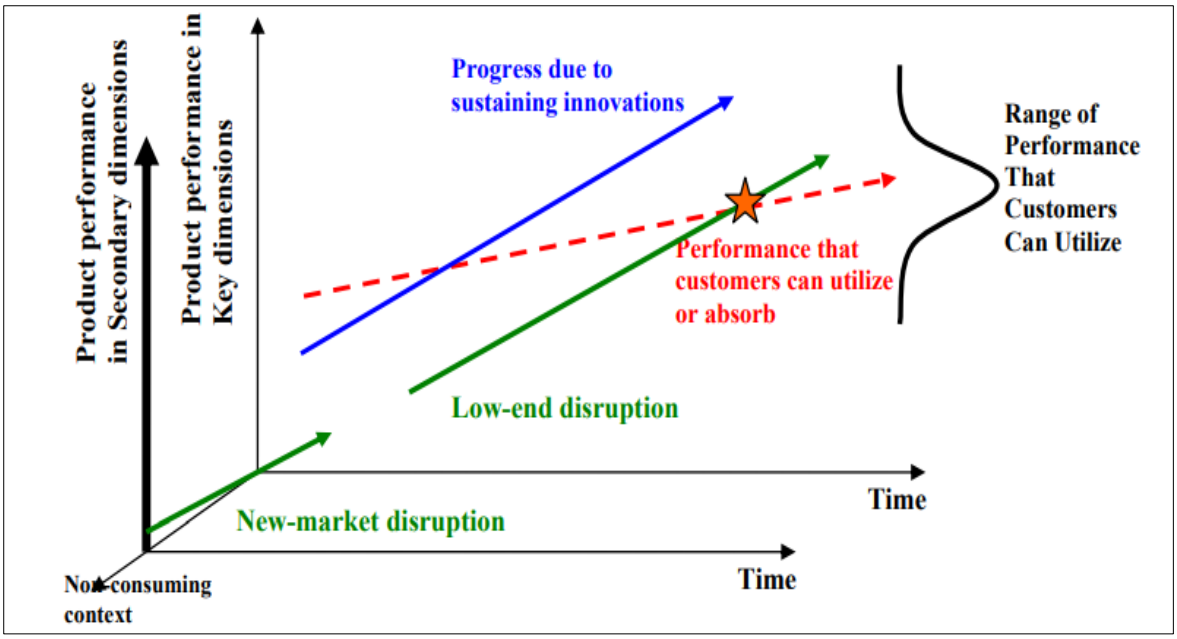
As per a study conducted by Yu Dan et al. (2008) , the theory of disruption evolved over the period of time.



Timeline of evolution of disruptive innovation theory

(Source: Yu Dan et al. (2008))

In their study, Yu Dan et al. (2008) researchers described the disruptive innovation model and highlights that disruptive innovation is a continuous process which starts with low end disruption and gradually improves to sustain the innovation.



The disruptive innovation model

(Source: Yu Dan et al. (2008))

In the study, Yu Dan et al. (2008) also studied the organizational challenges of disruption success. They identified 7 aspects of organizational challenges: leadership, organizational structure, organizational culture, new product development process, employees, spin off and growth engine.

2.3.3 Network Effects Theory

In the paper published by Michael L. Katz et al. (1985) , researchers introduced the theory of network externalities, which is also known as network effect. They highlighted that the value of a product or service increases as the number of people who utilize it grows. The application of this idea is especially pertinent in the context of digital platforms, as larger networks attract a greater number of users and encourage market domination respectively. Network effects are seen in mortgage lending through the use of data-driven platforms, where higher user interactions lead to improvements in personalization, service efficiency, and customer happiness.

In its most fundamental form, Network Effects Theory is predicated on the idea that the utility of a product or service increases in proportion to the number of people who use it. There are two primary types of network effects that can be distinguished from this

phenomenon: direct network effects and indirect network effects. The value of a product is said to have direct network effects when there is a direct correlation between the size of the user base of that product. This is demonstrated by social media platforms such as Facebook and Twitter, which demonstrate that the greater the number of users a platform has, the greater the value it gets to each individual because they are able to connect with a substantially larger audience. Another type of network effect is known as an indirect network effect, and it occurs when the expansion of one user group results in an increase in the value of the platform for another user group. For instance, in two-sided marketplaces such as Uber or Airbnb, an increase in consumers (riders or guests) draws more providers (drivers or hosts), so establishing a growth cycle is beneficial to both parties involved.

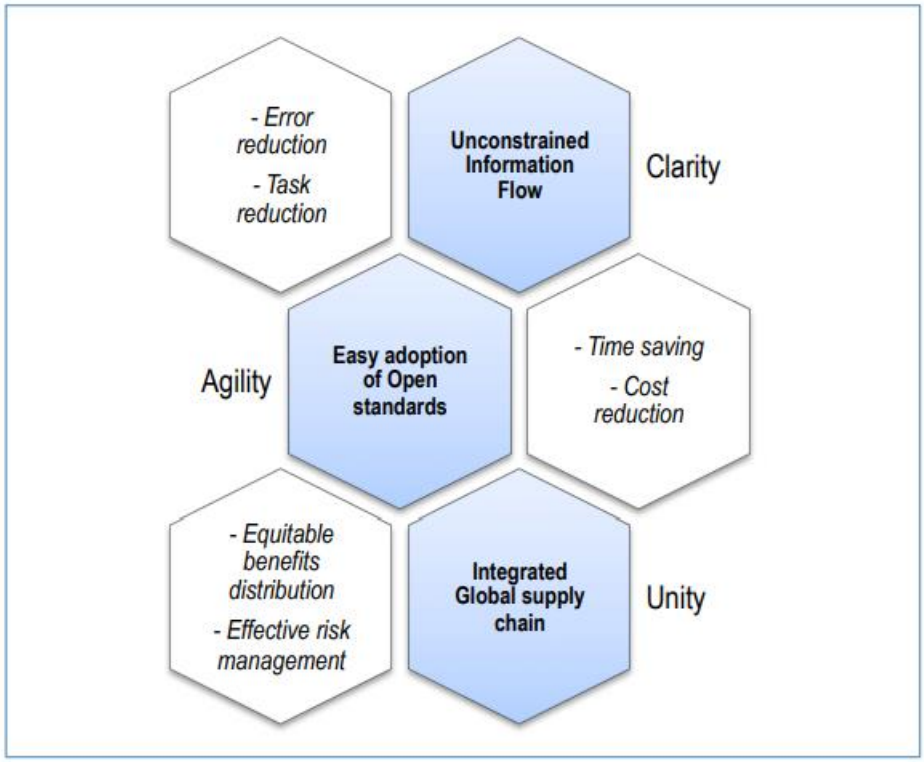
According to the paper published by Janiesch et al. (2019) , SaaS platforms enable noticeable economic benefits for scaling and transforming a business. Hence, providers should design these platforms in a way that they can self-enforce value generation, which is an implementation of network effects. They mentioned two types of network effects. Direct effect, where increase in use directly leads to an increase in value. Telecommunication is an example of this type of direct effect. Another effect is where the use of the product may be influenced by complementary network effects. Free sample products or services are example of such complementary network effects.

According to the study by Weitzel et al. (2000) , it is observed in some markets that the buying decision of one user may influence the decision of other users while some markets are influenced by the need of product compatibility. They quoted information technology and telecommunication markets as the example of network effects.

Michael L. Katz et al. (1985) studied the impact of networks on the market competition and how firms can make decisions based on the network impact. They discussed a formal model of network competition and studied equilibrium related to consumers, firms, fulfilled expectations and welfare. They argued that the companies might choose to compete with other competitors offering if network effect is significant in those markets.

Laeeq Khan (2011) referred the network effect theory to develop framework for global supply chain information system. They highlighted that the network effect theory can help to understand the need for and the potential benefits of global supply chain systems designed

based on open standards.



(Source: Robust global supply chain model by Laeeq Khan (2011))

Agbo et al. (2022) analyzed the direct and indirect network effects on mobile money adoption. In this study, they concluded that with the increase of mobile money users, utility derived is not increasing (direct network effect) but if mobile money users also communicate with each other on the phone, the utility derived is significantly increasing (indirect network effect).

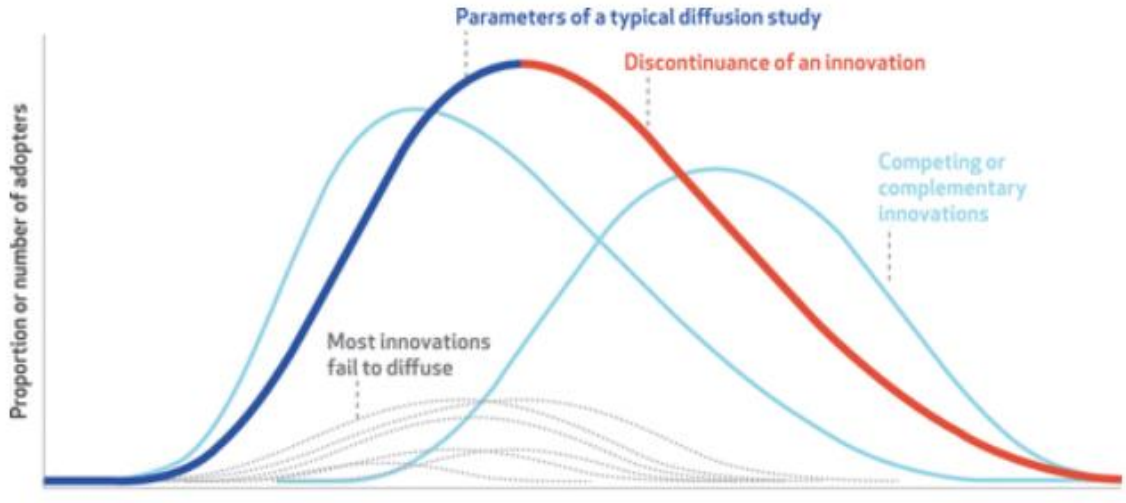
In their study, Weitzel et al. (2000) , highlighted the challenges of network effect theory. They concluded in the study that the existence of network effect; in many cases; may lead to inferior standard processes. They also highlighted that in this theory, socio-economical factors of interacting adopters is neglected.

2.3.4 Diffusion of Innovation (DOI)

Rogers (2003) utilized previous research to provide an explanation for how innovations propagate throughout a population. Innovators, early adopters, early majority, late majority, and laggards are the categories under which adopters are classified according to the idea. There are a number of elements that influence adoption rates, including relative advantages, compatibility, complexity, trialability, and observability characteristics. In the context of the Indian mortgage market, having an awareness of various adopter types can help lead different initiatives for digital outreach and education.

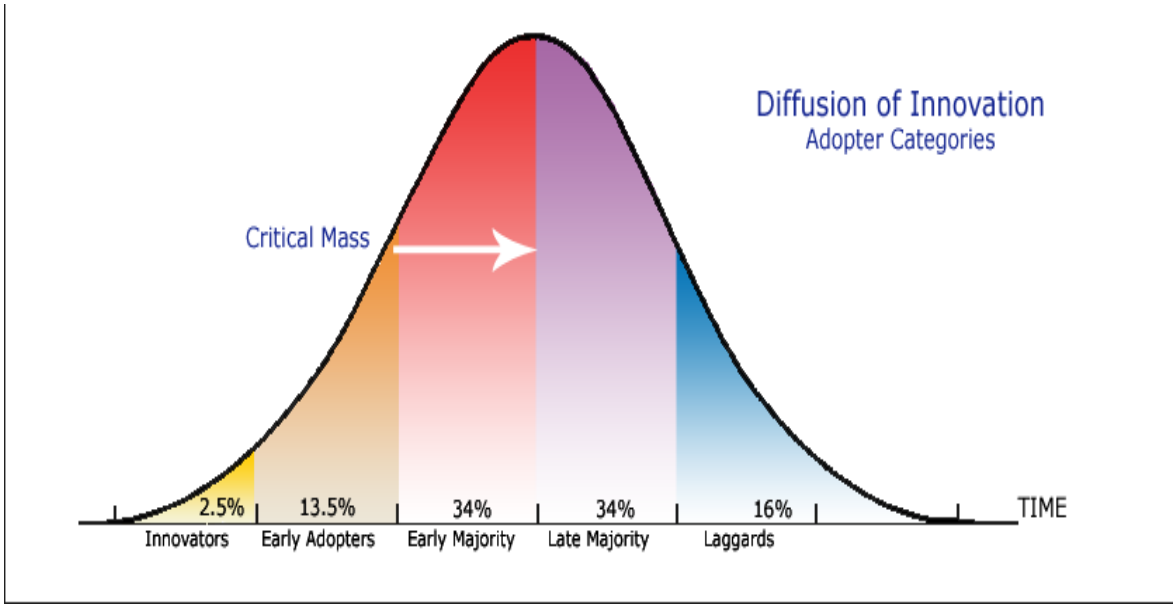
The analysis of the factors that impact the acceptance of new technologies, practices, and ideas is the focus of this theory, which offers useful insights into the efficiency of digitalisation. DOI provides an explanation of how digital tools, platforms, and innovations are adopted by individuals, organisations, and societies within the framework of digital transformation. This explanation focusses on the stages of adoption, the characteristics of adopters, and the role that social systems play in the embracing of these innovations.

Dearing et al. (2018) reviewed diffusion of innovation theory in this study. As per the published paper, "Diffusion is a social process that occurs among people in response to learning about an innovation such as a new evidence-based approach for extending or improving health care. In its classical formulation, diffusion involves an innovation that is communicated through certain channels over time among the members of a social system. The typical dependent variable in diffusion research is time of adoption, though when complex organizations are the adopters, subsequent implementation is a more meaningful measure of change."



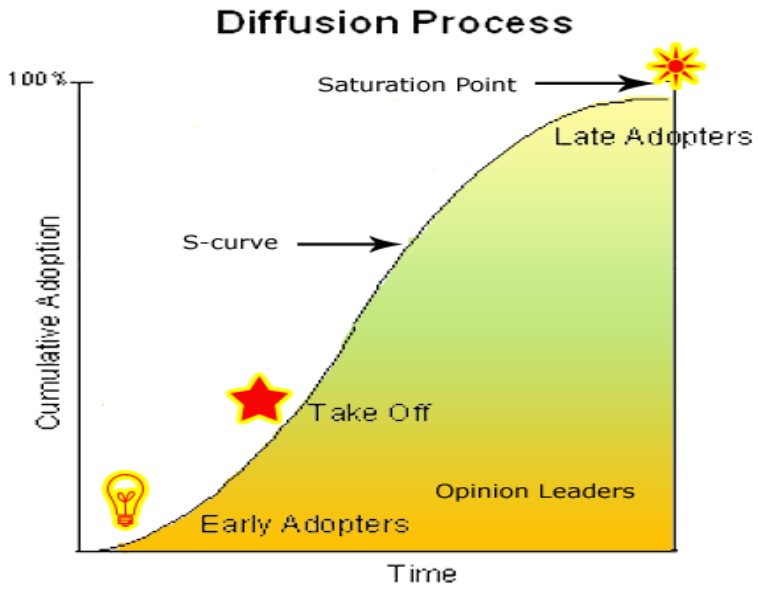
(Source: Dearing et al. (2018))

In the study Kaminski (2011) , also simplified diffusion of innovation theory: “The diffusion of innovation refers to the process that occurs as people adopt a new idea, product, practice, philosophy, and so on. Rogers mapped out this process, stressing that in most cases, an initial few are open to the new idea and adopt its use. As these early innovators ‘spread the word’ more and more people become open to it which leads to the development of a critical mass. Over time, the innovative idea or product becomes diffused amongst the population until a saturation point is achieved.”



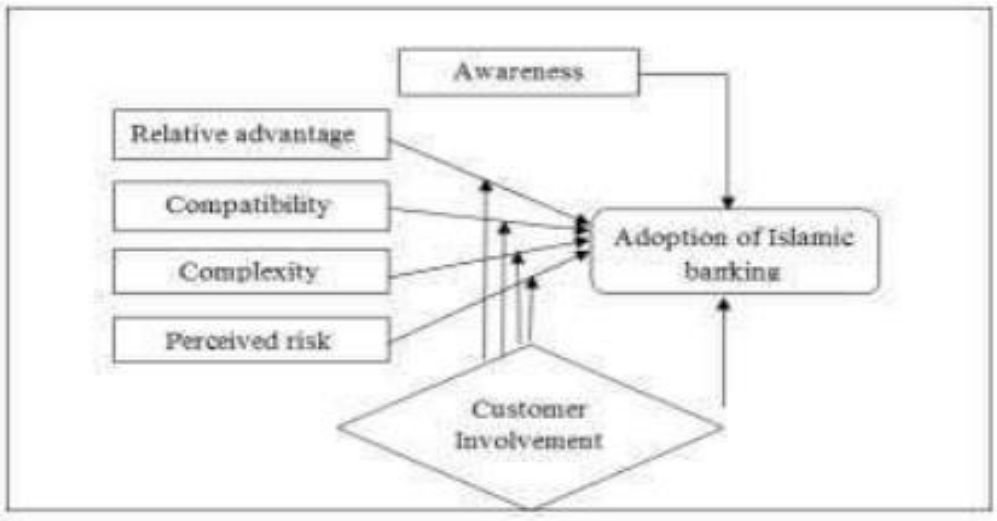
(Source: Kaminski (2011))

They further highlighted in the study that the goal of diffusion of innovation theory is not to move people from five categories (innovators, early adopters, early majority, late majority and laggards) into another category, rather diffuse the innovation to satisfy the need of all five categories.



(Source: Kaminski (2011))

In the study performed by Yahaya et al. (2016) , researchers adopted the application of diffusion of Innovation theory to investigate whether the perceived attributes of innovation have an effect on the customer's adoption of the products of the bank. Picture below represents the research framework; adopted from DOI; used in this study,

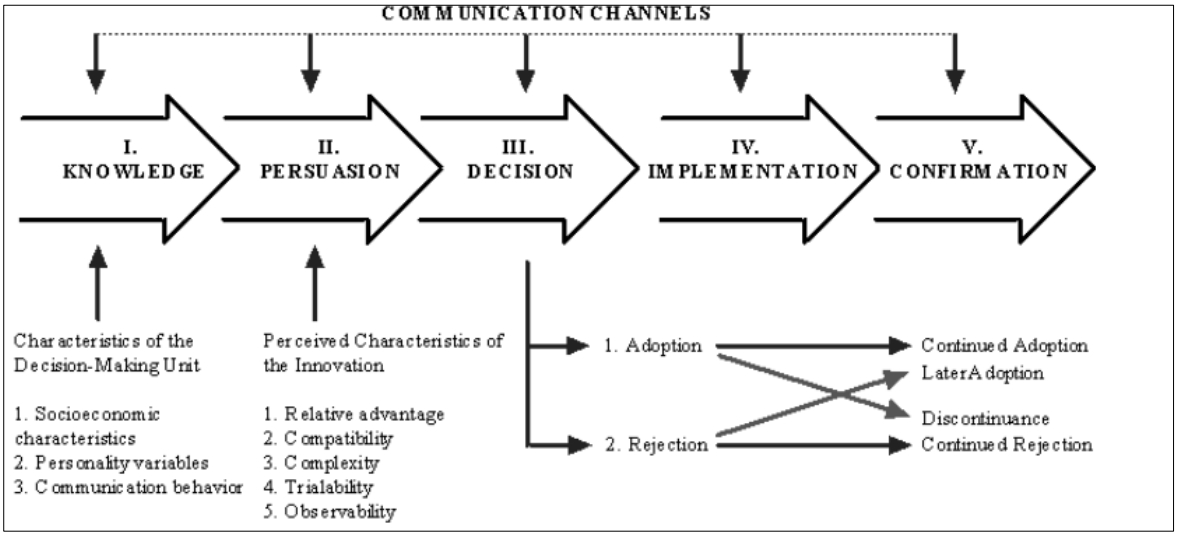


(Source: Yahaya et al. (2016))

Al-Jabri et al. (2012) adopted the diffusion innovation theory to examine the factors affecting the mobile banking adoption. In this study they concluded that the relative

advantage, compatibility and observability have positive impact on adoption, while trialability and complexity have no significant effect on adoption.

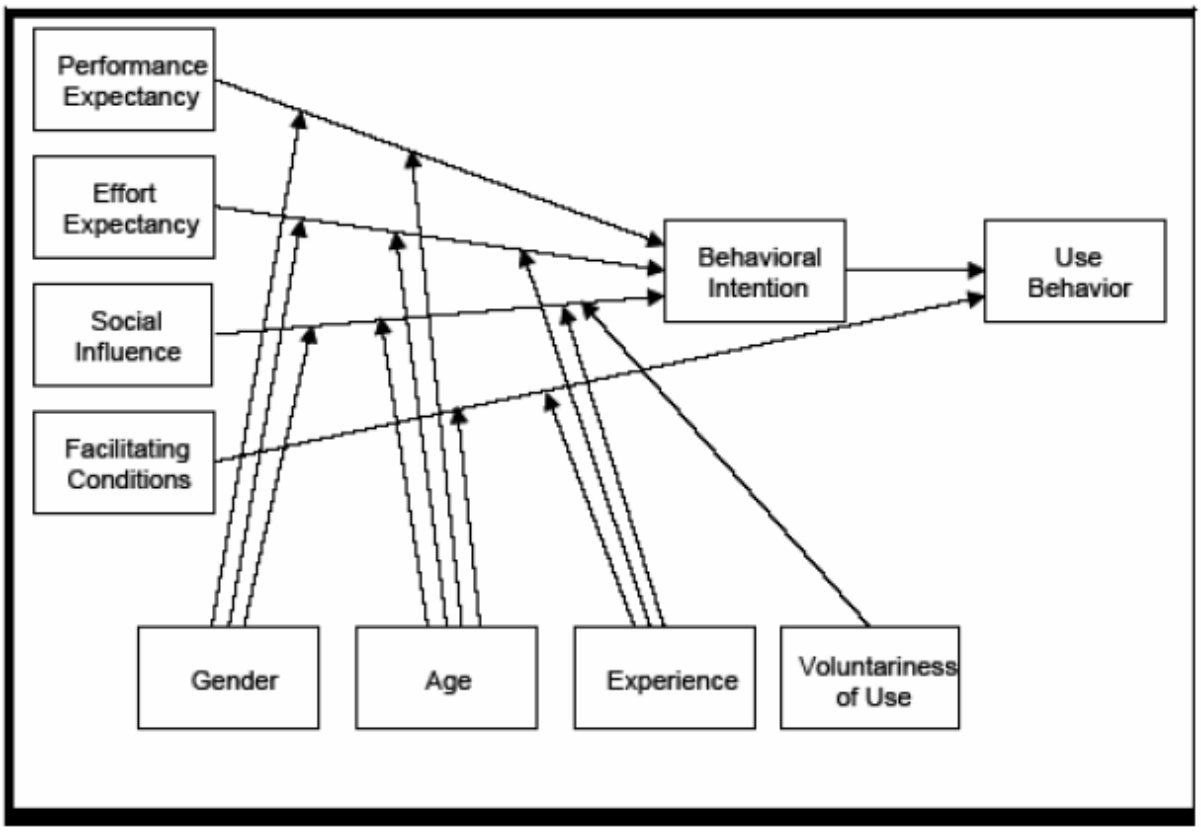
According to Iftakhar (2016), diffusion of innovation theory is the most appropriate for investing the adoption of technology in higher education and educational environments. They also discussed the innovation-decision process as presented in below picture.



(Source: Iftakhar (2016))

2.3.5 Unified Theory of Acceptance and Use of Technology (UTAUT)

In order to provide an explanation for the adoption of technology, Venkatesh et al. (2003) combine aspects from a number of different frameworks, including TAM and TPB. A number of factors, including social influence, enabling environments, performance expectancy, and effort expectancy, are identified by UTAUT as being predictive of behavioral intentions. The application of this theory is particularly well-suited to the investigation of the acceptance of digital mortgages in India, where socio-economic and cultural circumstances strongly impact the attitudes of users.



(Source: UTAUT model by Venkatesh et al. (2003))

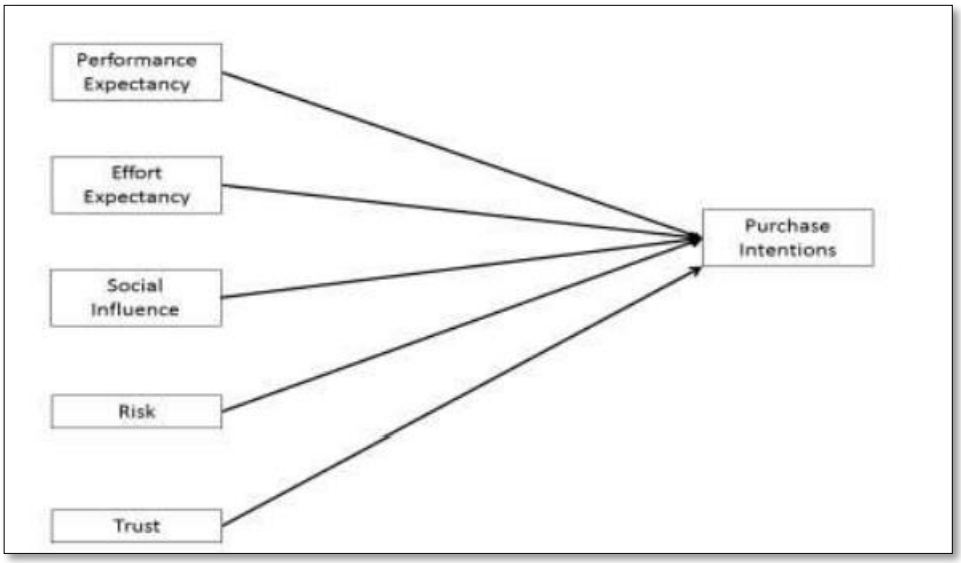
According to Venkatesh et al. (2003), the UTAUT model offers a framework that can be utilized to validate the notion that the four variables (namely, performance expectancy, effort expectancy, social influence, and facilitating conditions) are direct predictors of the behavioral intention to utilize technology. A further consideration that the UTAUT model takes into account is the possibility that the link between four basic components may be influenced by four moderating variables: gender, age, experience, and voluntariness of use.

Sumak et al. (2010) used UTAUT model to study the factors that may influence the adoption of virtual learning environment. In their study, they performed quantitative analysis on UTAUT constructs (performance expectancy, effort expectancy, social influence, facilitating condition and user intention) and concluded that the performance expectancy and social influence have a significant impact on user intention to use the virtual learning environment.

Wu et al. (2007) adopted UTAUT model to explore the behavior of 3G mobile communication users. As per study, UTAUT model integrates four determinants:

performance expectancy, effort expectancy, social influence, facilitating condition; and four control variables: gender, age, experience and voluntaries of use. Study concluded that performance expectancy, social influence and facilitating condition are the key factors to significantly influence user intention, while effort expectancy did not.

Javed (2018) studied the drivers of mobile banking adoption by using UTAUT model. In this study, 5 independent variables: performance expectancy, effort expectancy, social influence, risk and trust were used to predict the behavior of purchase (i.e. user intention). This study concluded that performance expectancy, and risk perception significantly influence user intention to adopt mobile banking services while social influence and trust factors had no significant influence on user intention.



UTAUT Model adopted for mobile banking study

(Source: Javed (2018))

Rahi et al. (2018) investigated the role of unified theory of acceptance and use of technology (UTAUT) in internet banking adoption context. They collected data using survey form and performed quantitative analysis. Study concluded that for UTAUT constructs (performance expectancy, effort expectancy, social influence, and facilitating condition) were significantly influencing user intention.

Bouteraa et al. (2023) used UTAUT model to study the adoption challenges of green banking technology in the UAE. As green technology may help in reducing the carbon

footprint, adoption of these technologies is critical. In this study, researchers used a mixed approach, where qualitative analysis was done by a series of semi-structured interviews, and later, a structed online survey was designed based on qualitative analysis outcome to perform quantitative analysis of UTAUT constructs. This study concluded that customer awareness (social influence), personal innovativeness (effort expectancy), system quality (performance expectancy) and bank reputation (facilitating condition) were significantly influencing the user adoption of green bank technologies in the UAE.

Purwanto et al. (2020) studied the intention and use behavior of the mobile banking system in Indonesia. They adopted UTAUT model for this study and used UTAUT constructs as the basis for their quantitative analysis. As study collected the sample data from urban population, they concluded that performance expectancy and social influence are not significantly influencing user intention but effort expectancy and facilitating conditions are.

IVANOVA et al. (2022) studied the use of mobile banking in central Asia by adopting UTAUT model. Study found that UTAUT constructs are influencing mobile banking technology acceptance in central Asia. Study also revealed that the perceived risk is not having a significant impact on user intention to use mobile banking technology.

Jena (2022) used UTAUT model to examine the factors influencing the adoption of blockchain technology in the banking sector. The researcher collected sample data from banks and fintech and used that data for quantitatively study the UTAUT construct. Study concluded that performance expectancy, facilitating conditions and trust were the significant factors for user intention to use blockchain technology. As trust is not the original construct of UTAUT model, researcher has extended UTAUT framework to include trust as additional predictor.

Rahi et al. (2019) studied the role of performance expectancy and effort expectancy in internet banking adoption, which are among the four constructs of UTAUT model. Study found that assurance (facilitating condition), performance expectancy and effort expectancy are significant influencers of user intention to adopt internet banking.

2.3.6 Dialogical Public Relations Theory

According to Rybalko et al. (2010a) , there should be communication in both directions between organizations and the stakeholders. In the context of digital mortgage services, this theory emphasizes the significance of communication that is both interactive and transparent in order to establish trust, address problems, and cultivate positive relationships with customers.

The Dialogical Public Relations Theory, this concept, which was first presented by Kent and Taylor in the late 1990s, places an emphasis on the significance of communication in both directions between organizations and the people they serve. By promoting a dialogical approach that encourages mutual understanding, trust, and collaboration, this theory presents a challenge to the conventional models of communication that only transmit information in one direction. When considered in the context of digitalization, the idea becomes more pertinent because digital platforms offer organizations options that have never been seen before to participate in meaningful and dynamic interactions with their audiences.

Rybalko et al. (2010b) studied online relationship building by Fortune 500 companies to engage their stakeholders using Twitter, which used dialogical public relations theory framework. In this study, researchers mentioned that "result of the present study supports the statement that the technology itself can neither create nor destroy relationships; rather it is how the technology is used that influences the organization-public relationship."

Genuine dialogue has the potential to strengthen relationships between organisations and the publics they serve, which is the fundamental premise around which the Dialogical Public Relations Theory is founded. There are five fundamental elements that Kent and Taylor identified as being the foundation of good dialogical communication.

As studied by Kent et al. (2002) , mutuality is the first fundamental element. Instead of developing a hierarchical relationship, organisations and stakeholders should engage in the process as equal participants, with the goal of cultivating a spirit of partnership and collaboration.

As studied by Kent et al. (2002) , propinquity is the second fundamental element. In order to enable stakeholders to participate in decision-making processes that are relevant to them,

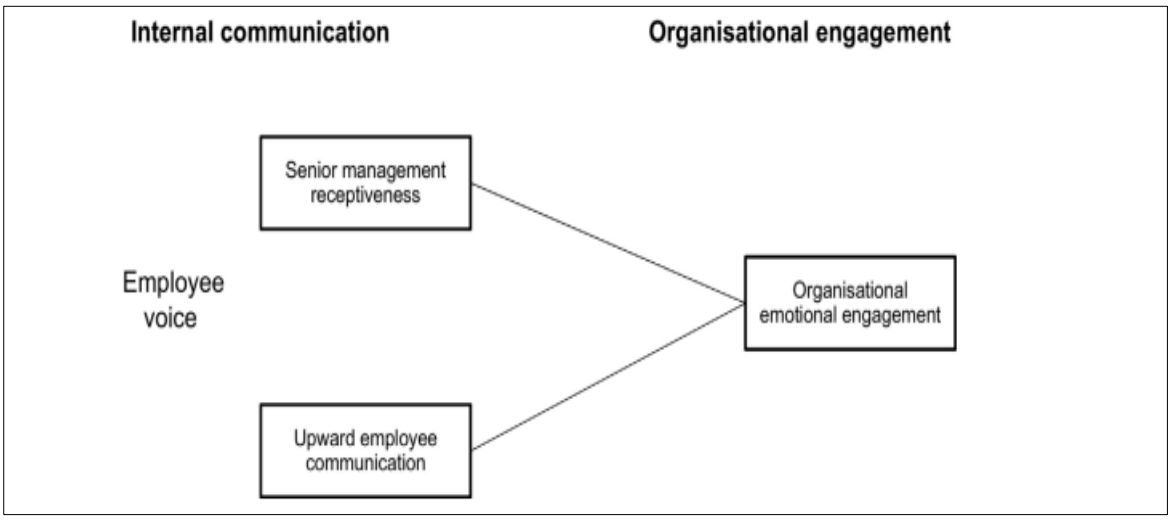
communication should be prompt and proactive while also being timely.

As studied by Kent et al. (2002), empathy is the third fundamental element. It is imperative for organisations to demonstrate a commitment to the well-being of their stakeholders by demonstrating that they comprehend and respect the viewpoints, needs, and concerns of their stakeholders.

As studied by Kent et al. (2002) , risk is the fourth fundamental element. It is necessary for organisations to be receptive to criticism and willing to modify their policies or procedures in response to the input they get from stakeholders in order to engage in dialogue.

As studied by Kent et al. (2002) , commitment is the fifth and last fundamental element. For the purpose of establishing trust and establishing long-term partnerships, sustained and real participation is vital.

Ruck et al. (2017) studied employee satisfaction with opportunities to exercise their voice and assess the quality of management receptiveness to the employee voice. This study referred to the dialogical public relations theory. Results of the study revealed that employee satisfaction level was moderate level for exercising their voice and management receptiveness to the employee voice.



(Communication- voice- engagement conceptual framework model)

(Source: Ruck et al. (2017))

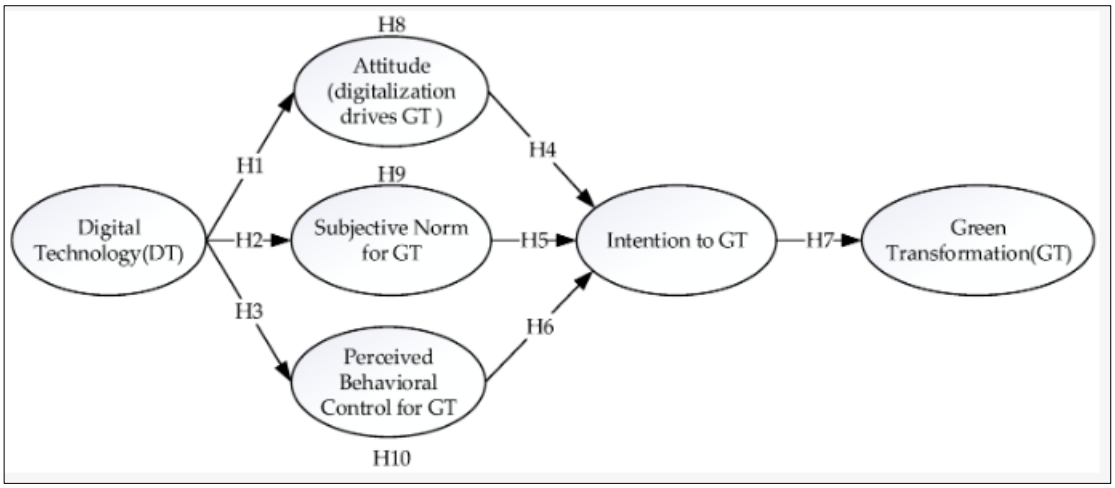
Men et al. (2014) referred to the dialogical public relations theory to study the effect of employee organization relationship.

2.3.7 Theory of Planned Behavior (TPB)

According to the theory of planned behavior presented by Ajzen (2012) , this theory extends the scope of the Theory of Reasoned Action (TRA) by include the concept of perceived behavioural control as a factor that influences both intents and behaviours. Having this model is quite helpful in gaining a knowledge of the ways in which attitudes, norms, and control perceptions influence the acceptance of digital mortgage platforms by Indian customers.

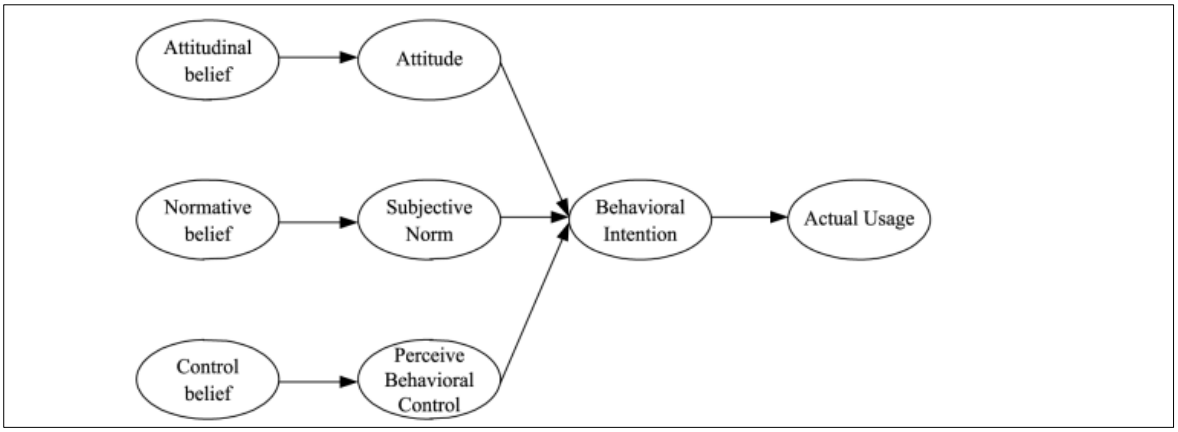
The Theory of Planned Behavior (TPB), Icek Ajzen's framework, which was developed in 1985, offers a robust foundation for understanding and forecasting human behaviour, particularly in situations that require conscious decision-making. Within the context of driving behaviour, this theory places an emphasis on the role that individual intentions play, which are impacted by attitudes, subjective norms, and perceived behavioural control. The theory of planned behaviour (TPB) is especially pertinent in the digital era since it helps in analysing how individuals embrace digital technology, interact with online platforms, and make decisions that are impacted by social and environmental circumstances.

Gao et al. (2023) used the theory of planned behavior (TPB) to construct a theoretical model of digital technology to determine the impact mechanism of corporate green transformation. As stated in this study, “The theory of planned behavior (TPB) argues that the drivers of individuals’ behavioral decisions mainly include behavioral attitude variables, subjective normative variables, and perceived behavioral control variables, which together indirectly influence behavior through behavioral intentions.” Based on TPB, researchers, defined the following theoretical model:



(Source: Gao et al. (2023))

Shih et al. (2004) adopted the theory of planned behavior (TPB) to study the internet banking in Taiwan. Study primarily focused on three fundamental factors of TPB – attitude, subjective norms and perceived behavioral control.



(The pure form of the theory of planned behavior)

(Source: Shih et al. (2004))

Ala Mahdi Sahi (2024) adopted the theory of planned behavior (TPB) to examine the factors influencing the user intention to adopt digital banking services in Iraq.

George (2004) used the theory of planned behavior (TPB) to investigate the determinants of user intention to purchase online. Study mentioned that "according to TPB, an individual's performance of a certain behavior is determined by his or her intent to perform that behavior. Intent is itself informed by attitudes toward the behavior, subjective norms about engaging

in the behavior, and perceptions about whether the individual will be able to successfully engage in the target behavior".

Nazaripour et al. (2024) adopted the theory of planned behavior to the study the role of materialism in using banking applications in Iran. This study contributed in validating TPB constructs, proposed an extended model of TPB theory and also illustrated the influence of materialism on user intention.

2.3.8 Sociotechnical Systems Theory

This theory investigates the ways in which individuals, technical advancements, and organizational systems interact with one another. It highlights how important it is to match technology advances with human and organizational elements in order to enable successful implementation and adoption of the innovations.

According to a study done by Appelbaum (1997) , "STS theory is probably the most extensive body of conceptual and empirical work underlying employee involvement and work design applications today. Originally developed at the Tavistock Institute of Human Relations in London, this approach to designing work has spread to most industrialized nations in a relatively short period of time. In Europe and particularly Scandinavia, STS theory is almost synonymous with work design and employee involvement. In Canada and the USA, STS theory has become the major underpinning of efforts involving work design."

Ropohl (1999) also mentioned in the study that "the concept of the socio-technical system was established to stress the reciprocal interrelationship between humans and machines and to foster the program of shaping both the technical and the social conditions of work, in such a way that efficiency and humanity would not contradict each other any longer."

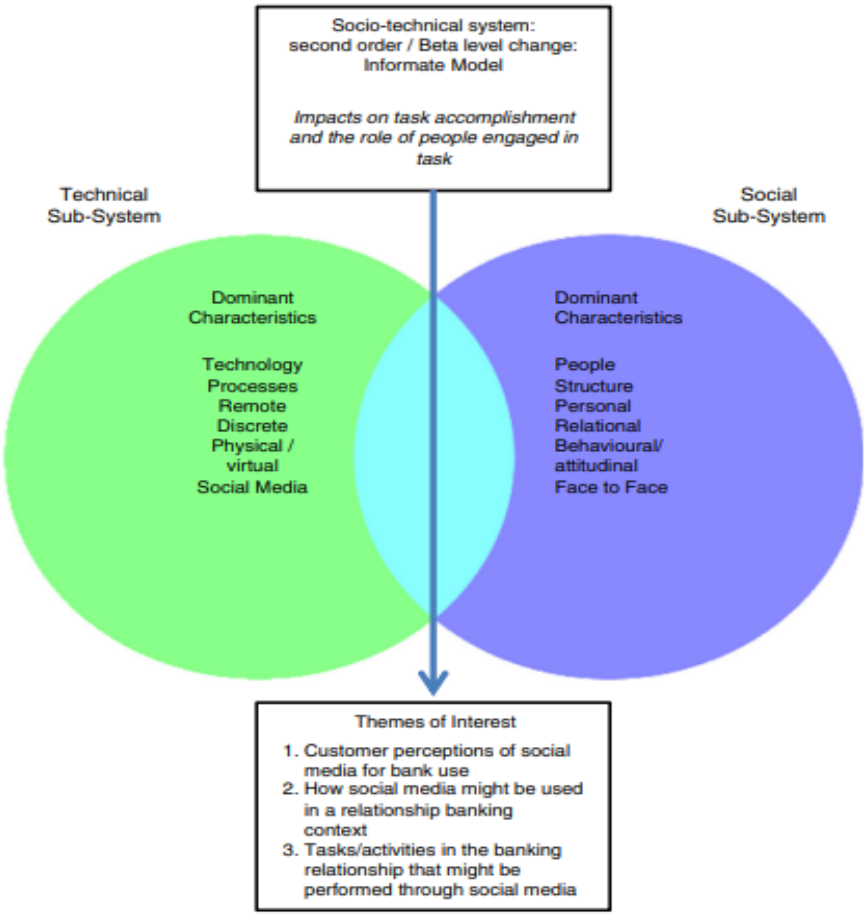
The sociotechnical systems theory, also known as STS, is a basic framework that investigates the interdependence that exists between the social and technical components that are components of organizational systems. STS is a management theory that originated from the work done by the Tavistock Institute in the middle of the 20th century. It places an emphasis on the necessity of "joint optimization," which is the process of aligning the social subsystem, which includes people, relationships, roles, and culture, with the technical

subsystem, which includes tools, technologies, and processes, in order to achieve optimal performance.

Bostrom et al. (2009) adopted the sociotechnical systems theory to define a meta theory for examining the information systems for an organization.

Fox (1995) presented sociotechnical system principles and guidelines in his paper, where he mentioned that “the term sociotechnical systems (STS) reflects the goal of integrating the social requirements of people doing the work with the technical requirements needed to keep the work systems viable with regard to their environments. These two aspects must be considered independently, because arrangements that are optimal for one, may not be optimal for the other, and tradeoffs are often required. Thus, there is a need for both dual focus and joint optimization”.

Durkin et al. (2015) adopted the sociotechnical system theory to study the social media adoption for retail banking industry. Study was performed on a variety of age groups and different age groups reflected their expectations from social media extension of retail banking platforms.



(Character of social and technical sub systems)

(Source: Durkin et al. (2015))

Kudina et al. (2024) used the sociotechnical system theory to understand the AI system functioning and issues related to social, political and ethical aspects of AI.

According to a study done by (Rami) Shani et al. (1994) the sociotechnical system theory can be used as a framework for understanding the new IT changes implications in an organization.

2.4 Culture as an important factor to technology adoption

When it comes to the adoption and diffusion of technology, cultural factors play a significant role beyond the innovation itself. According to Deligiannaki et al. (2011), for effective adoption of digital mortgage lending, it is crucial to consider cultural aspects such as trust in technology, openness to change, and societal norms. According to Tolba et al. (2013)

cultural influences significantly shape the acceptance and usage of electronic communication systems. Recent studies highlight that consumer behavior is increasingly influenced by factors such as word-of-mouth, social signals, and network externalities Peres, According to Mahajan et al. (1990), in developing countries, inadequate infrastructure, lower education levels, and weak governance systems often hinder the adoption of new technologies, making it essential to address these cultural and structural barriers.

2.5 Digital transformations in Indian banks

According to Suryono et al. (2020), as a consequence of digital transformation, every industry and business sector is confronted with significant challenges. The expansion of digital transformation has also unquestionably been a driving force behind the emergence of fintech (financial technology) initiatives, which are widely acknowledged as being among the most significant innovations in the financial sector. The evolution of digital transformation has had an impact on these efforts since it was first implemented.

According to Kusuma et al. (2020), the goal of financial institutions is to expand their knowledge in connection to technological innovation. This can be accomplished by collaborations with technology businesses, investments in or acquisitions of such companies, or both types of partnerships. Despite this, there is a significant gap between the degree to which market players are prepared for the changes that are occurring in practice. According to (Anon 2020), it is necessary to connect India's rural villages to both local and global supply chains in order to facilitate the economic growth of rural areas. However, rural Indians are kept from engaging in these supply networks due to the high rates of financial exclusion that they experience. “Based on our analysis of the existing literature on financial inclusion, adoption, and blockchain technology in India, we propose that in order to address the issue of financial exclusion, it is necessary to overcome the four difficulties of geographical access, high cost, inadequate banking products, and financial illiteracy inside the country.

According to Gupta et al. (2021) , the Financial Services Industry The current methods for obtaining a loan take a considerable amount of time to complete because every step of the process need manual verification. Because of the presence of human error, this leads to a decrease in both accuracy and efficiency during the process. In the area of financial technology, digital lending is a relatively new market that is undergoing revolutionary

transformation. This transition is also occurring in the financial sector. Digital lending is the technique of employing technology to originate and renew loans in order to shorten the amount of time it takes to offer and make choices. The name "digital lending" refers to the activity.

According to Pinto et al. (2021) , the business correspondent (BC)–agent banking paradigm in India is addressed against the context of community-based rural livelihood programs. The research also examines the significance of this approach in terms of promoting financial inclusion in rural areas that are underserved, as well as its potential to reduce the gender gap in terms of financial inclusion. According to the findings of the study, there is still a lack of fundamental banking services that are available to women, particularly women living in rural areas.

According to Liu et al. (2021) , the combination of digital finance and financial inclusion has the potential to better address the requirements of individuals who have limited access to all types of financial services. The purpose of this study was to analyze the ways in which urban and rural areas differ in terms of the factors that determine and the mechanisms that facilitate the growth of digital financial inclusion. According to (Kumar et al. 2021), credit in rural areas is one of the most important financial resources for agricultural output all over the world. However, despite the numerous advancements that have been made in digitalization in developing and emerging countries, there is still a significant portion of the population that is not included in the mainstream of banking transactions. This includes rural youth, small farm owners, and female farmers. These individuals are receiving new hope as a result of technology that is based on machine learning.

According to Kale (2021) , the government created a success story out of the process of opening bank accounts (known as the Jan Dhan Yojana) for the millions of people in India who did not have bank accounts, it has opened up a number of other opportunities, perspectives, and challenges as well. To provide just one example, the widespread availability of bank accounts has been a big influence in making it possible for the government to grant benefits directly to individuals.

According to Barroso et al. (2022), organisations are well-equipped with the technology that is necessary to surpass the capabilities of traditional financial institutions.

According to Parvin et al. (2022), the idea of digital financial inclusion (DFI) was born out of the need to provide digital financial services to underserved communities that did not previously have access. Both opportunities and challenges are presented by digital financial inclusion, and the purpose of this research is to investigate both of these aspects. The ABCD analysis was utilised in this study to evaluate the advantages and drawbacks of this notion. This was done in addition to assessing the opportunities and risks that are offered by digital financial inclusion. Proceed with: The use of secondary sources is important for this research since it allows for the presentation of a thorough evidence-based analysis on the opportunities and challenges associated with digital financial inclusion. Implications for Practice: Financial institutions and FinTech companies can utilise this research as a road map to improve the delivery of digital services and to gain a better understanding of the many challenges that citizens confront.

According to Yadav et al. (2022), technology has played a critical role in the lending sector and addressed the key challenges that were blocking credit accessibility for mass people. Fintech is taking lead in reshaping the financial industry in India and enabling the inclusiveness of financial services fundamentally. Fintech is innovating new applications and business models that can make the lending industry more competitive. These new digital innovations by Fintech are helping to provide access to financial services to rural customers and to the underserved customer base. Even the low income group, which are generally are deprived of lending facilities by the mainstream banks, are able to get access to the lending facilities in India. The convenience of digital financial services, developments in technology, and cost-effective business methods are all factors that are expected to contribute to the rapid growth of digital lending as a percentage of overall credit.

According to Joju et al. (2023), when it comes to the development of bank credit and the prospects of retail credit, particularly housing financing, to push credit growth in an economy such as India, where the credit to GDP ratio and the mortgage to GDP ratio are both quite weak, there is a general sluggishness in the expansion of bank credit. In addition, the findings of their study suggest that active promotion of housing financing and other retail banking products should be taken into consideration in order to generate faster economic growth.

According to Kbalaji (2023), the objective of this study is to analyse the relationship between the management of working capital and the profitability of organisations by utilising a sample of 25 manufacturing companies that were recorded on the India Market between the years 2004 and 2018. The sample will be used to investigate the relationship between the two. Furthermore, the board of working capital is also referred to as the board of current resources and the board of current liabilities. Both of these boards are listed in the previous sentence. It is possible to consider the board of working capital to be an important component of the corporate financial management system. This is because the board of working capital has a direct impact on the profitability of the operations of the companies. When addressing the executives of working capital, it is possible to make a reference to the board of current resources and current liabilities. This is something that may be done. The liquidity of the organisations that are the subject of the investigation will be the subject of our investigation in the following section.

According to Modi et al. (2023a), the emergence of the digital fintech ecosystem in India has resulted in a paradigm shift in the traditional banking techniques that have been utilised in the country to handle financial transactions. An example of one of these practices is the lengthy and complicated process of lending that is commonly used in India. There has been an increase in the availability of lending to the general public as a consequence of the widespread usage of digital credit. This has enabled the requirements of a larger population that was previously unable to make use of this service to be met.

According to Tetteh (2023a), recent advancements in financial technology have made it possible to provide microcredit through the use of digital platforms. This was previously impossible. On the other hand, despite the fact that digital credit may make it possible to have access to consumer credit more quickly and remotely without the need for collateral, very little is known about the impact that it has on the welfare of communities that are underserved.

According to Takhtani et al. (2023a), the influence that digitalisation has had on the process of loan distribution, beginning with the generation of leads and concluding with the lending of money to borrowers. Paper also underlines the benefits of implementing digital lending by any company, as well as the ways in which it streamlines the process of loan origination and maintenance for a consumer. Other advantages include the opportunities that digital lending presents.

Jain (2023) stated that “the digital lending space in India saw phenomenal growth in value from USD 270 billion in the year 2022 to an estimated worth of USD 350 billion by end of next year with a remarkable compound annual growth rate (CAGR) of almost forty percent (39.5%). P2P or peer-to-peer lenders are at the helm on which over 50% depends on for online loan transactions while about 30% is contributed by both digital banks and fintech companies together. It appears that there is a pool of young, technology-inclined loan candidates specifically drawn towards convenient and swiftness offered by these virtual lenders.”

According to Kumar Jonnalagadda et al. (2021) , rural and low income population in India does not have sufficient access to the credit or loan facility. Primarily challenge is related to the income evidence, identity evidence which blocks the traditional credit eligibility check process. In digital lending, artificial intelligence can help to address these barriers for credit eligibility check and offer custom products to these unserved section of the society.

According to R. K. Gupta (2023a), within the area of financial institutions, there have been a number of adjustments that are of substantial importance. Despite this, the mortgage industry is in desperate need of digitisation from a technological point of view. This is because it has been working in a conventional fashion for many years. It is important that the digitalisation of the mortgage process be able to handle all operations from beginning to end. This is true regardless of whether a bank is focussing on the acquisition of new clients or the retention of existing customers.

According to R. K. Gupta (2023a), digital lending is the activity of offering loans using mobile applications or web platforms, with the use of technology for authentication and credit evaluation. The word "digital lending" refers to the practice with the same name.

According to Akhileshwari et al. (2023) , due to the fact that credit underwriting is carried out with the assistance of advanced technology, the environment in which lending organisations operate has undergone substantial transformations over the course of the entire preceding century. If you are looking for a financial institution that is still in business and has not digitised at least one part of the loan process, you will have a very difficult time finding one. Because of the significant breakthroughs that are being made in blockchain technology, artificial intelligence, and cloud computing, the traditional method that is used by lending organisations will soon become a thing of the past.

According to Asamani (2023), a large amount of change has occurred in the context of lending institutions over the course of the past century. From the days when pawnshops would lend money in exchange for collateral to the current day, when sophisticated technology is deployed to carry out credit underwriting, the context of lending businesses has undergone significant change. There was a time when pawnshops would lend money in exchange for collateral. In this day and age, it is extremely difficult to find a financial institution that is still operating and has not digitised at least one component of the processes involved in the loan process. This is because digitalisation has become increasingly prevalent in the financial industry.

According to Tasneem Chherawala et al. (2023) , it is no longer regarded a novelty for customers of Indian banks to make rapid digital payments based on the Unified Payments Interface (UPI) and a wide variety of other financial solutions. This is true even in Tier 2 or Tier 3 cities. Companies that are at the forefront of the financial technology industry are utilising cutting-edge technologies such as data analytics and machine learning in order to deliver technologically advanced services. Platforms such as crowdsourcing, alternative financing, digital lending, and other similar services are included in this category of products. The provision of digital lending services has emerged as one of the sectors in India that is experiencing the most rapid growth among all of them.

According to Akhileshwari et al. (2023) , providing loans and other credit services through digital channels or online platforms is what is meant by the phrase "digital lending," which refers to the practice of financial institutions offering these services. The widespread use of digital services can be attributed to a number of factors, including the internet, smartphones, alternative financing, the convenience and effectiveness of digital platforms, and the simplicity of use of digital platforms.

According to Geneva (2024) , it is becoming increasingly important to take into consideration the fact that new fintech companies and startups are entering the market, which is replacing incumbent competitors and opening up segments that were previously untouched. There are a number of supply-side characteristics that are driving this rapid change. These variables include, but are not limited to, the widespread availability of inexpensive internet, the speed of 5G networks, the rise of mobility, and social media. All of these factors are driving direct digital interaction with customers.

According to Koldovskyi (2024) , within the context of the modern world, the significance of digital currencies as a tool for the transformation of financial systems and the development of economies is growing continuously.

According to Jimmy (2024) , the necessity of adhering to data security protocols in a thorough manner is an essential component of digitalisation. There is a potential answer to the problem of enhancing data security in this sector that may be found in the blockchain technology, which is not only decentralised but also irreversible.

Mishra et al. (2024) provided an overview of the numerous facets of financial inclusion, including its socioeconomic effects on the sustainable development of society as well as future research aims. According to the study, finance access to the underserved segment of society is critical for sustainable development in developing economics.

According to Hardik (2024) , nearly half of all jobs in emerging economies are held by small and medium-sized firms (SMEs), which also play an important part in the growth of these economies. SMEs are responsible for approximately fifty percent of all jobs in developing nations. This research is a qualitative multi-case study that analyses the ways in which Indian banks are attempting to improve the funding of small and medium-sized enterprises (SME) by utilizing digitalization, soft information, and big data.

Adegoke et al. (2024) conducted an in-depth investigation with the intention of examining the crucial intersection of equity and transparent reporting in the context of mortgage lending. It is of the utmost importance to ensure that mortgage loans are distributed as fairly as possible in order to promote inclusive growth and reduce the amount of structural inequalities that exist.

Deshwal (2015) studied the digital banking revolution in India and how retail customers and banks are interacting in the digital era. As per study, a sea change has occurred in India's banking industry as a result of the rise of online banking. This shift, which alters the character of interactions with banks, is the result of a confluence of factors, such as the proliferation of smartphones, the reach of mobile networks, the adoption of innovative digital technologies, and the proactive measures taken by governments. This study used a descriptive research strategy to look at how retail customers and banks interacted throughout the digital banking revolution in India. Secondary data on the evolution of digital banking in India was culled from scholarly journals, government publications, industry magazines,

and financial reports. One of the disadvantages was the inherent lack of control in secondary data processing, which could lead to biases in the chosen data as well as discrepancies in data collection methodologies. Beginning with automated teller machines (ATMs) in the 1980s and concluding with the groundbreaking Unified Payments Interface (UPI) in 2016, this article charts the course of digital banking in India. The factors that are driving the expansion of online banking are examined, such as the increasing number of people owning smartphones, the expansion of mobile network coverage, and government programs. Two government programs, e-KYC and UPI, are examined in detail to show how they can revolutionise financial inclusion, simplify account opening, reduce costs, and increase accessibility. The digital banking landscape in India has been drastically changed by the integration of e-KYC and UPI. This has increased adoption, improved financial literacy, and accelerated economic growth. As India approaches its goal of becoming a digital economy, these measures might greatly impact the future of banking and financial services.

Kubasadgoudar et al. (2019) studied the challenges faced by banks in digital innovation in mobile banking. As per study, In the banking industry, digital technologies have played a significant role in the growth of banks, particularly in India. Prior to the advent of the internet and mobile banking, banks continued to use antiquated methods of customer service. When it comes to developing banking-related communication technologies, the client is king. The same client has been offered a wide range of products and services by the banks. This is one reason why banks have been able to increase the number of products and services purchased by their current clients. Thanks to advancements in both communication and technology, this is now a reality. The recommendations of the Rangarajan Committee in 1980 brought to the introduction of integrated communication technology, which is why banks began to use it. There was a heavy focus on future bank operations in the recommendations. Technology has made it possible to save money on salaries and labour. There has been a shift in the banking industry as a result of the integration of clients and banks through this communication and the enormous cost reductions made possible by technological advancements. These days, banks couldn't function without a certain set of technological tools.

Kumar et al. (2023) studied digital transformation and financial inclusion for State Bank of India. As per study, the State Bank of India (SBI), is the focus of this paper's extensive

analysis of its digital transformation initiatives. The goal of SBI's modernisation efforts is to increase financial inclusion at a time when both technology and customer preferences are changing at a dizzying rate. This study analyses the strategies, challenges, and outcomes of SBI's digital transformation initiatives to provide insight into the ways in which these initiatives have impacted the bank's competitiveness, customer experience, and socioeconomic inclusion. Using a mix of qualitative and quantitative data sources, such as interviews, surveys, and financial reports, this article analyses major digital projects such as biometric verification, online account opening, mobile banking, and combined survey results. Additionally, it assesses the impact of governmental laws and regulations on SBI's digital transformation path. Based on the findings, SBI's digital transformation has been crucial in reaching customers in far-flung areas and improving operational efficiency and customer service. Researchers, lawmakers, and other financial institutions can all benefit from the data presented in this study.

Deshwal (2015) studied mobile banking in India. As per the paper, technology is integral to every sector of the economy, and banking is the foundation of every other sector as well. Technology is playing an increasingly important role, which is good news for the banking sector. One of the most significant financial institutions that frequently investigates the potential of technology to enhance customer service is banking. Banking has come a long way from the days of clients having to wait in queue at physical locations to access their accounts to the convenience of 24/7 online banking. One of the most telling signs of success and advancement in modern company has been technological advancements. Nowadays, the banking business is undergoing a revolution. In the banking industry, information technology has mostly been utilised through two distinct channels. There are two main areas: business process and communication and connectivity. Banks now have wireless and mobile technology in their boardrooms so customers can pay bills, plan payments even when stuck in traffic, get updates on marketing campaigns even when they're at a party, and have more personal and intimate relationships than ever before. This study takes a look at the pros and downsides of mobile banking as a new electronic payment service and how it has affected customer adoption in India.

Narasagondar (2015a) studied the digitalization of banks from India perspective. As per study, the partnerships with tech startups, investments, and acquisitions are all ways that financial institutions are trying to learn more about technological innovation. In spite of this, market players' levels of readiness for these changes in action vary greatly. Innovations like

this let more people get their hands on financial services, but they also have the potential to shift the supply of certain payment services to non-banking organisations that aren't subject to the same regulations as banks. Many online and mobile payment apps strive to improve the user experience by integrating payment transactions more seamlessly into the commerce value chain. Payment processing is the only banking function these suppliers typically provide, and they seldom seek out banking licenses. The principle known as digitisation governs our contemporary environment. The goal of the recently announced Digital India Programme is to make India a knowledge economy and society that is fully digitally empowered. The banking industry is no different from any other part of the economy when it comes to the importance of digitalisation. When it comes to improving services to consumers and offering them opportunities to benefit more in the near future, digitalisation has become crucial for the Indian banking sector. This sector plays a big role in advancing financial inclusion. The digitisation of banking has contributed to the phenomenal growth of India's banking sector in the last several years, which in turn has encouraged a greater level of capital formation. The Indian banking sector is increasingly going digital, but there are still many problems that need fixing, particularly in rural banking. The purpose of this conceptual research study is to seek a fresh viewpoint on the problems and difficulties associated with the digitalisation of rural banking.

As per study by S (2017a) the process of transforming material into a digital format is referred to as digitisation. Adopting new technology is what is meant by the term digitisation. However, these two terms are being used synonymously with one another. In the banking industry, digitisation is not a choice; rather, it is an unavoidable consequence. This is due to the fact that every industry is undergoing digitisation, and the banking sector is not an exception. It is now possible for banks to reach out to a greater number of consumers and provide them with improved services thanks to technological advancements.

Jacob (2018a) studied digital banking and its impact on Indian economy. As per study, a robust and efficient financial system serves as the foundation upon which an economy is built. The transition from a system based on barter to one based on digital banking has brought about significant changes in the economy on a worldwide scale. The modern era has seen a significant advancement in digital banking, which has been accomplished in a shorter amount of time. It is clear that digitalisation has had an effect on the economy of the entire

world because it has resulted in extraordinary improvements in terms of productivity, service quality, and reach. One of the primary reasons for the success of e-commerce is the amazing expansion of a variety of digital payment technologies. These technologies include card payment technologies, which include card payments, electronic fund transfers, payment gateways, E-payments, smart cards, mobile money, wallets, and many others. Making the transition to digital is no longer a choice; rather, it is an absolute requirement if one wishes to collaborate and thrive. The advent of digital banking has made it possible for financial institutions to meet their short-term and long-term technological and business needs with the help of essential solutions.

Mundhe et al. (2024) studied the opportunities and challenges being surfaced due to digital transformation in Indian banking. He mentioned that the digital transformation of the Indian banking sector presents a paradigm shift in how financial services are delivered, accessed, and managed. In this paper, the potential and problems that are related with digital transformation in Indian banking are investigated. The article focusses on key areas such as the evolution of the industry, its current status, opportunities, challenges, case studies, future trends, and outlook within the industry. The purpose of this paper is to provide a complete study of the digital banking ecosystem in India. It does so by drawing on insights from industry reports, measures taken by the government, and case studies of top banks and fintech startups. It draws attention to the enormous development in digital transactions, mobile banking users, and investments in fintech, while simultaneously addressing problems like as constraints in infrastructure, cybersecurity concerns, and the complexity of regulatory requirements. The importance of innovation, customer-centricity, and cooperation in driving success in the digital era is emphasised throughout the paper through the use of case studies of successful digital transformation programs. Artificial intelligence (AI), open banking, and blockchain are some of the future developments that are anticipated to have a significant impact on the development of the banking sector in India. It is possible for financial institutions to position themselves for sustained growth and competitiveness in an economy that is increasingly dominated by digital technology if they embrace these trends and effectively leverage digital technologies.

Malathy (2018a) studied whether core banking solutions can be used as a tool of digital banking in India. It is mentioned in the study that “the objective of the digital India initiative, which was initiated on July 1, 2015 by our esteemed Prime Minister Sri Narendra Modi, is to ensure that government programs are made accessible to individuals through the use of

online infrastructure. This will be accomplished by improving internet connectivity throughout the nation. Moreover, in the modern era, digitalisation has become an indispensable requirement and a subject of the biggest importance in every area of the economy, including the banking industry. Banks are an integral element of human existence, and they play a crucial role in the activities that we engage in on a daily basis. Numerous individuals are unable to complete their day without engaging in some form of financial transaction. Therefore, in order to deliver remarkable services, financial institutions have been continuously improving their technologies. With the current state of affairs, digitalisation in banking, often known as digital banking, is not an option but rather an unavoidable reality for the financial industry. Core banking solutions are a powerful tool that can be used to visualise the concept of digital banking as well as green banking. Customers from all generations, income brackets, and nations who wish to bank whenever and wherever they want, regardless of the branch location or business hours, use core banking channels. This includes customers who are millionaires as well as customers from other generations, economic groups, and countries. The users typically make use of core banking channels such as automated teller machines, internet banking, mobile banking, and NEFT, amongst others. Also, a consumer might use mobile banking or online banking for some transactions one day, and then another day, he might use an ATM or mobile banking for other transactions. In other words, these multiple channels serve to guarantee that clients have flexibility. In light of the fact that we are currently living in an era of digitalisation, the purpose of this paper is to make an attempt to explain how Core Banking channels promote digitalisation, what the potential and obstacles are in the utilisation of Core Banking channels, and what the complex future scenario of Indian banking would be. This is a mainly conceptual paper that is dependent on secondary sources of information."

Mohana (2018a) studied digitalization in banking sector. According to the study, now that the world has entered and is being maintained in modern society, there have been more improvements and developments that have made it possible for people to purchase, sell, interact, and other activities from a single location. One of the reasons for this modernisation is the development of technology and the internet, which paved the path for digitalisation. These days, people are completely reliant on technology and the internet to fulfil each and every common need of man in a rapid and easy manner. This convenience of being able to complete work in a short amount of time has led to the advent of digitalisation, which has

resulted in all industries and sectors of the economy being obsessed with digital notions. The purpose of this article is to discuss the role that digitalisation plays in the banking sector.

In his study, C.A.Subrahmanya Bhat (2019) investigated the effects that digital transformation has had on the banking industry and to illustrate both the advantages and the difficulties that are associated with this quickly evolving sector. The following article offers a historical overview of the development of digital banking as well as the primary factors that have contributed to the digitisation of the banking industry. In addition to this, we investigate the significance of fintech and its influence on conventional banking institutions, as well as the difficulties that the conventional banking sector encounters when attempting to implement digital methods. As well as analysing the potential effects that digitalisation may have on the market for the banking industry, the study investigates the impact that digitalisation has on customer happiness and experience. In addition to this, it examines the benefits and drawbacks of digitisation from the point of view of regulatory authorities and highlights the significance of cybersecurity in the realm of digital banking. This study examines the possible impact that blockchain technology could have on the banking industry and presents projections and trends for the future of banking in the digital era through its findings. The purpose of this research is to provide a comprehensive understanding of the benefits and drawbacks associated with digital transformation initiatives in the banking industry.

As per study by Shettar (2019a), digital banking from India perspective, necessitates the development of creative, resilient, and secure banking systems that are ready to fulfil the demands of customers who are not just empowered but also knowledgeable about technology. In the current context, the demand for banking is anytime, anywhere banking. The transition from traditional banking to the digital realm is what exactly constitutes digital transformation. How banks and other financial institutions learn about, communicate with, and serve their consumers is undergoing a significant transformation as a result of this transition. A comprehensive grasp of digital customer behaviour, preferences, choices, expectations, and goals, among other things, is the first step towards achieving a successful digital transformation. As a result of this transition, the organisations undergo significant shifts, shifting their focus from being product-centric to being customer-centric. This article discusses the role that digitisation plays in Indian banking, the factors that influence the scope of digital banking in India, the trends that characterise digital banking in India, and the technological milestones that have been achieved by Indian banks. This particular study

relies on secondary sources of information. The information was gathered from a wide variety of sources, including research journals, publications from the government of India, numerous bulletins from the Reserve Bank of India, and websites that have been verified. Based on the findings of the study, digital banking has resulted in a significant reduction in the operational costs of banks. Because of this, financial institutions are now able to charge lower fees for their services while simultaneously offering increases in interest rates for deposits. The banks have seen an increase in their profitability as a result of lower operational costs. According to the findings of the study, digital banking also has a significant potential to alter the landscape of financial inclusion. Utilising digital banking in a straightforward manner can hasten the process of integrating the unbanked economy into the mainstream.

Ahmed (2020b) studied the impact of digitalisation on Indian banking sector. A country's financial system is an essential part of its economic growth. It helps with things like raising the savings rate, collecting and distributing savings, creating investment data, attracting foreign investment, and making the most efficient use of existing capital. On the flip side, this system is the leading cause of air, water, landfill, and other forms of pollution, which has a negative impact on the environment and accelerates the rate of climate change. The idea of green banking emerged from banks' efforts to reduce their environmental impact. When people utilise internet banking instead of branch banking, they are engaging in green banking, which promotes eco-friendly practices and reduces the carbon impact from banking activities. Maximising the efficiency and effectiveness of banking processes and the utilisation of IT and physical infrastructure is its primary objective. The term green banking refers to financial institutions that prioritise the use of electronic transactions over paper ones. The advent of online banking has altered the entire process of basic bank transfers and shook up the banking industry. It has made it easier for customers to do things like view their account information, pay bills online, and move money across accounts quickly. Though going digital in the banking sector was initially intended to make things easier for everyone involved (clients and banks alike), it has unintended consequences for environmental protection through the reduction of paper consumption. In addition to becoming more convenient for both consumers and banks, paperless banking helps reduce tree chopping, which in turn aids in reaching sustainable development goals. An effort is made in this research to examine the effects on the environment of the shift from a traditional to a digital financial system in India. Furthermore, this article aims to examine how the

increasing digitisation of India's banking system has contributed to environmental sustainability and the attainment of sustainable development goals since the country's establishment.

S.J.Syed Ashik (2020) studied adoption of digital banking in India. In a technologically advanced world, the introduction of electronic banking services has resulted in a revolution with technology in the provision of banking services. Both the customer and the bank have benefited from the simplified and more comfortable banking activities that have been made possible by a technology system that is both dynamic and flexible, as well as their global reach. The electronic way of fund transfers from one person's account to another person's account anywhere in the world has become more convenient thanks to the implementation of electronic fund transfer (EFT) in digital banking by the financial institution. The purpose of this study was to explore the extent to which digital banking is being utilised in India.

According to the study by G Vijayalakshm (2022), in the banking industry, a digital transformation refers to the process of upgrading existing procedures or introducing new ways of carrying out business activities by utilising digital technologies. This process improves the overall experience of the customer and ultimately results in improved conversion rates for the banking corporation. The term digitisation in the banking business essentially refers to the availability of various services provided by the bank which can be accessed online. The speed with which banks in India have demonstrated their ability to adapt over the course of the last couple of decades is evidence that they will continue to develop on their own. The banking industry in India will continue to expand, and the process of digitisation will proceed even further. The path of digital banking and its growth potential in India are the topics that are discussed in this paper. Banking is going to be an essential component in the expansion of the economy. It is e-banking, sometimes known as digital banking, that will be the future of banking technology.

M.C. Vijayashree (2022) studied the recent Trends, major opportunities and challenges of digital Banking in Indian context. According to the study, digital banking has introduced a plethora of new banking services by making it possible for customers to complete their everyday financial transactions whenever it is most convenient for them. The proliferation of smartphones and internet access is fuelling the rapid growth of digital banking systems in emerging markets like India. There is a great possibility to move towards a cashless and cash-lite society because the banking transaction environment has rapidly shifted from

traditional to convenience banking. In its pursuit of Digital India, the government of India has taken several steps to enhance and fortify the country's online banking infrastructure. Under the strategy, the GoI aims to establish an economy that is Faceless, Paperless, and Cashless through the use of technology. Over the last several decades, the banking industry has seen a number of significant phases of digital transformation. The goal of this adjustment is to ensure that all citizens of the country have easier, more inexpensive, and more accessible banking services. Competitive pressures from both domestic and foreign financial institutions facilitated this shift. Banks play a crucial role in each economy's monetary system. A trustworthy payment system that works for businesses, governments, and individuals can be more easily created and maintained with its help. Additionally, it serves as a means of extending credit that individuals in need of funds can take advantage of. In most economies, the banking sector serves as the nerve centre. As a result, the stability and growth of the banking sector are paramount. The banking sector in India is currently undergoing a digital transformation as part of an information technology revolution. Internet and information technology have revolutionised the banking and financial industries. The banking business in India began to use information technology in the late 80s. But the information technology revolution is now entering a more intense and substantial phase, and it may change the banking environment and the economy as a whole. With the advent of information technology and the internet, the banking industry was able to undergo a period of modernisation that benefited both clients and institutions. The banking sector has grown to encompass transactions that take place outside of physical branches, such as through mobile devices such as tablets and smartphones. It is possible that the phrase Digital Banking adequately characterises the present state of banking. Digital banking services are an important way to reduce costs for the bank and the customer together, helping to lessen customer concerns and increase their faith and beliefs in the bank. Several conclusions were drawn, including the variety of digital banking channels, their availability at the right time and place, and the advantages of comfort and safety. Digital banking services are positively associated with customer trust, according to the statistical analysis. Most importantly, the bank should take an interest in marketing its goods and services, build a secure digital ecosystem to provide clients with flexible solutions as needed, and increase customer knowledge of banking.

According to V. et al. (2022) , banking industry connects the public and economy of any country, hence is the critical piller for economic development. Banks are already offering

many products and services via digital channels. Digital offerings are basically helping to improve the client experience as well as digitalizing their operational processes. In particular, researchers studied the digital platforms usages pattern of aged customers in this study.

Sharma et al. (2023a) studied acceleration of digital banking in India. As per study, India lagged behind many developing nations in digital banking after gaining independence in 1947. The main causes of this were the inability to modernise outdated technology, the high expenses of maintaining branches, and the increasing reliance on legacy systems. Since then, digital banking in India has grown steadily but significantly. To deliver services to clients through online channels, digital banking entails digitising all existing banking products, procedures, and activities. You can access any service offered by any branch of your bank at any time, day or night, using digital banking on any computer, mobile phone, or other suitable smart device. Researchers in this article have taken a look at the current state of digital banking in India, as well as its recent history and future plans.

Vernekar et al. (2023a) studied digitalization in banking sector as a roadway to success from Indian perspective. They mentioned that now more than ever, people can buy, sell, and even connect in one central place, thanks to technology advancements that are bolstering modern culture. The expansion of the internet and other forms of contemporary technology were the primary forces behind this transition to digitalisation. A number of factors have affected the banking industry, including the worldwide trend towards rapidly evolving technology, shifts in customer tastes, the rise of open banking, and economic constraints. All of these things are altering the banking system as a whole. In recent years, financial technology (FinTech) has emerged as a game-changer in the industry. There must be an immediate transition from cost to value management systems and the adoption of value-oriented management practices across all industries. On the other hand, digital transformation refers to the switch from paper-based to digital banking, which signifies a sea change in how banks communicate with their clients and learn about their requirements. A successful digital transformation also requires an in-depth understanding of digital consumer behaviour, choices, preferences, aims, objectives, etc. Businesses also undergo significant changes as a result of this shift, moving from a focus on products to one on customers. The internet and other forms of modern technology have grown indispensable to people's day-to-day lives. Getting things done fast is a key component of digitalisation, which is speeding up the process in all sectors and domains that use digital concepts. This study takes stock of the present state of the sector

and the context in which digital banking is being implemented. Researching the state of online banking is essential because the concept of e-banking came up about 30 years ago. Academic journals, publications by the Government of India (GOI), several bulletins from the Reserve Bank of India (RBI), and other credible websites and pertinent sources were used to compile the data. Digital banking has the potential to significantly alter the current landscape of financial inclusion, according to the study's results. Because of how convenient digital banking is, the unbanked economy can also be mainstreamed far faster.

Radhika (2023a) Ystudied digitization of banking Services in rural India. She mentioned in here study that in today's environment of intense competition, digitisation is crucial for enhancing the service quality component. Important for the banking industry as a whole, the procedure allows financial institutions to better serve their clients. Information is digitised when it is transformed into a digital format through the use of technology. Customers like the convenience and the time savings. Thanks to online banking, customers may now reach their banks at any time. As a result of digitization's ability to decrease human error and increase consumer loyalty, managing big sums of cash has also gotten easier. One more way digitalisation has helped consumers is by making it easier to do business without using cash. Customers may now conduct purchases whenever and wherever they like without worrying about storing or carrying currency. Digitisation facilitates the provision of high-quality services to clients via interactive and technological means of communication. No more making special trips to the bank branch for account management or other banking needs; customers can do it all online. Customers are drawn to banking services due to the assurance of safe and convenient transactions and the fact that they are supplied at no additional cost. Actually, many people find that paying their utility bills online is more convenient and saves them a lot of time. As a result, banks may see a drop in operational costs as well, thanks to digitisation allowing them to serve more consumers without opening more physical branches. With the IT Act, 2000 going into force on October 17, 2000, the Indian government officially recognised online transactions and other forms of electronic business. Digitalisation of financial services cannot be initiated until there is interest. When it comes to money, people will be very careful. The majority of the population resides in rural locations, but providing these e-banking services poses a tremendous task. The provision of these banking services is fraught with difficulties due to the lack of adequate internet connectivity. The purpose of this study was to identify these difficulties and provide solutions.

According to Singh et al. (2023) , customers are adopting digital solutions and technology very fast, which is enabler for banks as well to transform themselves to digital platforms. Even in non-banking sectors, these customers are getting much better experience and they can exercise many things at their convenience. Hence, such customers are expecting even the financial institutions to provide a similar level of services for banking products. This is evident even from the surveys that a large number of customers are using these digital channels for their banking needs. It is also mentioned in the study that mobile banking was used frequently, multiple times in a week. Similarly, even services like bill payments is being preferred via online channels. Even there is a significant uptrend in online payments, online deposits etc.

Manivel et al. (2023a) studied that the term digital banking refers to banking that is conducted online and is backed by an internet connection. Traditional banks are now able to take a breather because digital banking apps and internet banking are already handling a significant percentage of the traffic that customers generate. Customers have the ability to easily access their accounts and payments through the use of digital devices such as smartphones, tablets, laptops, desktop computers, and automated teller machines. When people were confined to their homes due to social distance as a result of the COVID pandemic, the benefits of digital banking became more apparent than they had ever been before. As a growing number of individuals became aware of the advantages of digital banking, the utilisation of digital wallets, bank applications, as well as contactless and cashless payment methods, became increasingly widespread.

Shah et al. (2023a) studied that a number of different industries are essential to the expansion of the economy of every nation. When it comes to the expansion of the Indian economy, the banking sector is the most important contributor. With the passage of time, the banking sector has developed into the central pillar of the Indian economy. There is a clear correlation between any advancements in technology or other features and the expansion of the economy. The banking industry is subject to a variety of changes as a result of the progression of technology. Increasingly, consumers are acquiring more knowledge. These individuals do not wish to be required to wait in queue for a variety of chores, including but not limited to making payments, depositing checks, creating bank accounts, depositing checks, and so on. Digital banking has become a shining star in the financial business as time has passed, and it has become increasingly accessible. Digital banking is a concept that is widely accepted by the current generation, and it has rapidly become a more popular

means of transaction in the market. Within the scope of this study, we investigate the subject of digital banking. What effect does it have on the lives of people? Data from secondary sources are used in the study. In the realm of the financial industry, the concept of digital banking paves the way for an abundance of opportunities. However, there is a risk associated with each and every gain. In addition, there are a variety of dangers that are connected to using digital banking techniques.

Swamy (2023a) studied a digital transformation strategy for Indian banks. It is mentioned in the study that the method in which businesses operate and interact with their customers has been fundamentally altered as a result of digital disruption. There is a lot of demand on Indian banks to modernise their operations in the digital age. All banks need to have a digital transformation plan in order to maintain their competitive edge. This article provides an overview of a strategy that can be utilised to address legacy systems, cybersecurity, compliance, consumer expectations, and cultural shifts. Through the use of digital channels, the approach aims to provide financial services that are individualised, convenient, and secure. It places a strong emphasis on investments in high-tech areas such as artificial intelligence, blockchain, cloud computing, and workforce expansion. Successful digital transformation requires both a commitment to change over the long term and a flexibility to adapt to new circumstances.

Subramanyam (2024a) studied digitalization in India. He mentioned in the study that the process of transferring documents and storage from a conventional paper-based system to an electronic format is referred to as digitalisation. Errors and processing times are cut down, and transparency is increased as a result. An organisation may also become more competitive as a result of this. In layman's terms, the term digitalisation of administration refers to the implementation of reforms in the administration, such as electronic filing and paperwork, as well as the promotion of information sharing or delivery through information networks. There are many different kinds of communications that will need to be accommodated by digitalisation. Some of these communications are between government offices, while others are between government offices and individuals.

Malkappa (2024a) studied the potential opportunities and challenges for digital banking in India. It is mentioned that because of the proliferation of mobile phones and the internet in recent years, digitalisation has experienced a meteoric rise in popularity. The significant development in the use of digital payment methods is being fuelled by a number of factors,

including the growing prevalence of mobile and internet usage, as well as initiatives undertaken by the government, such as "Digital India." electronic devices Consumer transactions for goods and services that are conducted through the use of a smart phone, internet banking, or mobile banking are referred to as digital payments. Credit card payments are also included in this category. By enabling clients to carry out their day-to-day banking activities whenever it is most convenient for them, digital banking has opened the door to a wider range of banking options being made available to them. As a result of the widespread availability of mobile phones and the internet, the digital banking systems in emerging nations such as India are in the process of quickly expanding. The transaction environment in banking has rapidly shifted from traditional banking to convenience banking, which presents a tremendous potential to advance towards a society that will have less cash and more cashless transactions. A number of measures have been taken by the government of India in order to improve and strengthen the digital banking system in order to advance the concept of "Digital India." A "digitally empowered" economy that is "Faceless, Paperless, and Cashless" is something that the Government of India plans to accomplish as part of the project. A number of various phases of digital transformation have occurred inside the financial industry over the course of the past few decades. The increasing competition among public sector, private sector, and foreign banks, which was efficient and also accessible to all of the country's residents, was a driving force behind this development. Within this framework, the current paper makes an effort to investigate the theoretical elements of digital banking in India, to gain an understanding of the potential presented by the digital banking system in India, and to identify the obstacles that are associated with digital banking in India.

Chaddha (2024a) studied the evolution, issues and challenges due to the digital transformation of financial sector in India. As per study, a number of factors, including government initiatives, technical advancements, and shifting customer behaviours, have contributed to the remarkable progress that the Indian financial sector has made in its digital journey. Because of this transition, not only has access to financial services been expanded, but also the efficiency and transparency of those services have been increased. For the purpose of fostering financial inclusion, convenience, transparency, and economic progress, the implementation of digital financial transactions in India is absolutely necessary. In addition to empowering individuals, lowering expenses, and improving security, it is also in line with the government's objective to promote digitalisation and financial literacy

throughout the nation. When it comes to India's efforts to modernise its financial system and promote economic development, it is probable that encouraging digital usage will continue to be a priority. There are a number of factors that have contributed to the expansion of UPI transactions in India. These factors include its ease of use, interoperability, government support, security features, low transaction costs, and general adoption. In addition to bringing about a change in the manner in which Indians conduct business, it has also served as a driving force behind the expansion of digitalisation and financial inclusion in the nation. In order to ensure the continued expansion of digital financial payments in India, it is essential to continue educating, implement stringent security measures, and make changes to the infrastructure. Furthermore, the introduction of the COVID-19 pandemic significantly accelerated the speed at which digital financial transactions were conducted in a number of nations, including India. This further highlights the significance of digital payment systems in the contemporary economy of the world. However, despite the tremendous growth of digital transactions in India, there are a number of challenges that pose a significant threat to the growth of digital financial transactions in India. These challenges include internet connectivity, cyber frauds, technological disruptions, language barriers, limited computer literacy, and so on. These challenges have the potential to create disparities between those who have and those who do not have in the society.

CHAPTER-3

RESEARCH METHODOLOGY

3.1 Statement of the Problem:

The mortgage lending process in India has traditionally been slow, cumbersome, and paper-intensive, leading to inefficiencies that affect both lenders and borrowers. The complexity involved in processing mortgage applications, including extensive documentation, manual verification, and delayed approvals, has created barriers for potential homeowners, particularly in underserved and rural areas. Additionally, the reliance on traditional methods has contributed to higher operational costs for financial institutions, limiting their ability to offer competitive interest rates and services. In light of these challenges, digitalization has emerged as a potential solution to streamline and modernize the mortgage lending process. However, questions remain regarding the effectiveness of digital tools in addressing the existing bottlenecks, the role of technology in improving accessibility and transparency, and the impact of digital transformation on financial inclusion in India.

Gupta et al. (2012) also studied innovation challenges in Indian mortgage industry though their study was specific to ICICI Bank Ltd. R. K. Gupta (2023) also studied that several significant changes have taken place within the realm of financial institutions. Nevertheless, after years of operating in a conventional manner, the mortgage business is in dire need of digitisation from a technological standpoint.

This study explored the determinants of mortgage digitalization acceptance in India. This study holds significant value as it contributes to understanding how digitalization can transform mortgage lending in India. By identifying the behavioral determinants influencing the acceptance of digital mortgage services, the findings could help financial institutions optimize their strategies to enhance customer experience and streamline operations.

In this study, the focus will be on the following:

- What are the determinants of bank mortgage clients' behavioral intention to accept digital mortgage services in India?
- To what extent do the four constructs of the UTAUT model such as performance expectancy, effort expectancy, social influence, and facilitating conditions influence bank mortgage clients' behavioral intentions to accept digital mortgage services in

India?

- What is the impact of moderating variables (gender, age, and technology experience) on the three determinants (performance expectancy, effort expectancy, and social influence)?

3.2 Research Gaps

Several studies were conducted on the digitalization of banking and lending, but the primary focus had been either on banking in general or small ticket-size loans. There is an insufficient study performed on the digitalization of mortgage loan processing in India, while mortgage loans hold a 31% stake in the overall retail lending industry of India.

A similar study is done by Morales et al. (2019) for mortgage lending digitalization for the Philippines mortgage industry.

Gupta et al. (2012) also studied the innovation challenges in Indian mortgage industry though their study was specific to ICICI Bank Ltd. They further researched the innovations and existing practices followed by ICICI Bank Ltd for their mortgage business. In the research conclusion, Gupta et al. (2012) further concluded in the study that banks like ICICI should emphasize on the parameters valued by the customers. Their study did not focus more on the exact parameters which can be considered as critical factors for digitalization across mortgage industry in India.

According to the study done by Riyaz et al. (2024) lengthy approval processes are the critical hindrance for timely loan disbursements, impacting customers satisfaction. They further studied the challenges related to documentation process which directly impacts loan approval cycle. However, overall factors impacting the adoption of mortgage loans digitalization was studied specific to a sub set of processes.

As per study by Jackson (2024), demographic factors were studied related to the credit decisioning of the home loan applicants, but this behavior study was specific to South Indian Bank; Ollur branch; and did not study the digitalization aspect of the mortgage loans, which can be standardized across Indian banking sectors.

As studied by Zi Jun (2024), though digital transformation of banks has introduced transformative convenience but these digital transformations also raised hurdles in users

adopting these digital transformations. This research paper studied the improvements for the understanding of digital bank credit assessment.

R. K. Gupta (2023) also studied that several significant changes have taken place within the realm of financial institutions. Nevertheless, after years of operating in a conventional manner, the mortgage business is in dire need of digitalization from a technological standpoint.

The existing body of knowledge exhibit that there are many studies performed related to the digitial transformation of banking or digtialization of specific process steps of mortgage. There are also studies done for other countries, emphasizing on the factors related to the effectiveness of mortgage digitalization. But from Indian mortgage industry perspective, there is a gap in indentifying the determenants for effectiveness of mortgage industry digitalization. This present study aims to explore the determenants for effective usage of diigtal mortgage platforms.

For significant return on lenders' investment, It is crucial to analyze customer acceptance of the digitalization of mortgage lending in India.

3.3 Rationale for deciding UTAUT as the research model

UTAUT (Unified Theory of Acceptance and Use of Technology) is considered a comprehensive and widely accepted model for understanding technology acceptance and usage. Here are some reasons why UTAUT is often preferred over other models:

Integration of Existing Theories: UTAUT integrates elements from multiple existing theories, such as the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), and the Theory of Planned Behavior (TPB). By combining these theories, UTAUT benefits from their strengths and provides a more comprehensive and robust framework.

Wide Applicability: UTAUT has been validated and applied in various contexts and domains, including healthcare, education, e-commerce, and information systems. Its broad applicability makes it suitable for studying technology acceptance and usage across different industries and user groups.

Inclusion of Social Influence and Facilitating Conditions: UTAUT extends the TAM by incorporating the constructs of Social Influence and Facilitating Conditions. Social

Influence considers the impact of social norms, subjective norms, and social factors on technology acceptance, while Facilitating Conditions examine the role of environmental factors, resources, and support in technology usage. These additions enhance the explanatory power of the model.

Focus on Behavioral Intention and Actual Use: UTAUT emphasizes the importance of understanding users' behavioral intentions to use technology and their subsequent actual use. By examining both intention and behavior, UTAUT provides insights into the factors that drive technology adoption and usage, offering a more comprehensive understanding of user behavior.

Modifiability and Adaptability: UTAUT is not a rigid model but allows for modifications and adaptations to suit specific research contexts. Researchers can include additional variables or modify the model to better fit the technology or user group under study, making it flexible and customizable.

Empirical Support: UTAUT has been extensively tested and validated through empirical studies, contributing to its credibility and reliability. Its theoretical foundations and strong empirical support make it a trusted model for studying technology acceptance and usage.

It's important to note that while UTAUT is a widely used and well-regarded model, no single model can fully capture all aspects of technology acceptance and usage. Researchers should consider the specific research objectives, context, and characteristics of their target population when choosing a model. Other models, such as the Technology Adoption Model (TAM), the Innovation Diffusion Theory, or the Theory of Planned Behavior (TPB), may also be appropriate depending on the research focus and requirements.

3.4 Hypotheses

As we are planning to use UTAUT theory, provided by, Venkatesh et al. (2003), following hypotheses are adopted from his research work. This theory is particularly suited to exploring digital mortgage adoption in India, where socio-economic and cultural contexts significantly shape user attitudes.

UTAUT identifies performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) as predictors of User intention (UI) or behavioral

intentions.

Performance Expectancy (PE):

Null Hypotheses (Ha0): PE has no significant impact on UI. In this case, the coefficient B_{PE} should be 0.

Alternate Hypotheses (Ha1): PE will positively affect the behavioral intention of the respondents to accept digital mortgage services. In this case, the coefficient B_{PE} should be > 0.

Justification: Mortgage lending customers are more likely to adopt a digital platform if they believe that the platform will improve their turnaround time for submitting loan applications and reduce the errors, that they may make through manual submission.

As mentioned by Sumak et al. (2010), performance expectancy is the strongest predictor of intention to adopt a technology. Rahi et al. (2018) also found in the study that performance expectancy will significantly influence the user intention to adopt internet banking platforms.

Effort Expectancy (PE):

Null Hypotheses (Ha0): EE has no significant impact on UI. In this case, the coefficient B_{EE} should be 0.

Alternate Hypotheses (Ha2): EE will positively affect the behavioral intention of the respondents to accept digital mortgage services. In this case, the coefficient B_{EE} should be > 0.

Justification: Mortgage lending customers are more likely to adopt a digital platform if they feel that the digital platforms user interfaces are easy to use and intuitive enough to guide them during loan submitting process. Even if the digital platforms can automate some data filling process based on identity details (like Aadhar card) etc. they will more like use the digital platforms. Other example could be digital platform access on smartphones as mobile penetration is increasing in India and customers are more likely use digital platforms using their mobile.

Bouteraa et al. (2023) found in the study that personal innovativeness (effort expectancy) will significantly influence the user expectations to use the green banking technology in the

UAE.

Social Influence (SI):

Null Hypotheses (Ha0): SI has no significant impact on UI. In this case, the coefficient B_{SI} should be 0.

Alternate Hypotheses (Ha3): SI will positively affect the behavioral intention of the respondents to accept digital mortgage services. In this case, the coefficient B_{SI} should be > 0.

Justification: Mortgage lending customers are more likely to adopt a digital platform if they are aware of the digital mortgage platforms and either friends or family members share their positive experiences about the platform. Even to increase awareness, mortgage agents or bank officials may also promote the digital platform, which will increase utilization.

IVANOVA et al. (2022) found in the study that social influence will significantly influence the use of mobile banking in the central Asia. Bouteraa et al. (2023) found in the study that customer awareness (social influence) will significantly influence the user expectations to use green banking technology in the UAE.

Facilitation Conditions (FC):

Null Hypotheses (Ha0): FC has no significant impact on UI. In this case, the coefficient B_{FC} should be 0.

Alternate Hypotheses (Ha4): FC will positively affect the behavioral intention of the respondents to accept digital mortgage services. In this case, the coefficient B_{FC} should be > 0.

Justification: This hypothesis is extremely critical if mortgage customers gain confidence that they can get adequate support during the digital lending application process. For new-to-technology users, this support could be in the form of call center or agent availability, while for more advanced users, this could be a chatbot or inline intuitive guidelines.

Jena (2022) concluded in the study that facilitating condition was significantly influencing the user intention to use blockchain technology in the banking industry.

According to Venkatesh et al. (2003), they studied user acceptance of performance technology and performed an empirical test to validate UTAUT construct and related hypotheses.

According to Dwivedi et al. (2015), researchers performed a systematic review of 174 existing articles on the UTAUT model and could observe that survey methods and structural equation modeling analysis techniques were the most explored research methodology.

According to Williams et al. (2019) , critical review of UTAUT model was performed for explaining the acceptance and use of information system and information technology.

3.5 Objectives

As studied by Morales et al. (2019) for mortgage banking digitalization in Philippines,
The primary goal of this study is to develop a model based on the Unified Theory of Acceptance (UTAUT) to examine the acceptance of the digitalization of mortgage process in India.

This research is to assess the impact that digital technologies like blockchain, artificial intelligence, and big data analytics have had on the digitalization of the mortgage lending process in India. Examining how digital mortgage platforms in India stack up against international norms for digital banking and financial services, will help researchers gauge how user-friendly, open, and efficient these systems are. Examining the positive aspects of digitalization, such as operational efficiency gains, faster loan disbursements, and improved customer experiences, as well as the negative aspects, such as cybersecurity risks, data privacy concerns, and regulatory compliance, is another objective of the study.

The study will investigate the impact of digitalization on the mortgage lending process in India. The objectives of the study are:

1. To analyze the key components of the digital mortgage lending process, such as digital loan applications, online credit evaluation, automated document verification, and loan disbursement, and to identify the strengths and weaknesses of digital platforms in streamlining these processes.
2. To assess the role of digital mortgage platforms in improving accessibility to home

loans for underserved populations in rural and urban regions of India, and how this contributes to financial inclusion.

3. To outline a conceptual framework for assessing the effectiveness of the digitalization of mortgage lending in India.

The results of this study will be valuable to financial institutions, policymakers, and technology providers to better understand the effectiveness of digital mortgage platforms and how they can further improve operational efficiencies, customer satisfaction, and financial inclusion in the Indian mortgage sector.

3.6 Methodology

Research Design: This study uses a quantitative research approach to methodically look at the elements affecting digitalization of mortgage loans in India. The quantitative method makes it possible to gather and statistically examine numerical data, therefore helping to identify links among the variables of interest. Using this strategy, the study intends to guarantee objective and replicable results by testing hypotheses generated from the UTAUT model.

Data Collection: Using a semi-structured questionnaire meant to gather respondents' impressions and opinions toward digitalization of mortgage loans in India, primary data was gathered. Online distribution of the questionnaire guarantees participants' convenience and broad reach. This approach was selected since it allows some flexibility in responses while gathering consistent data. Closed-ended questions in the structured parts of the questionnaire guaranteed consistency and simplicity of analysis by quantifying replies.

Sample: 450 respondents made up the sample for this study, chosen by means of a purposive sampling method to guarantee the inclusion of people with different degrees of knowledge and experience with digitalization of mortgage loans in India. This non-probability sampling technique was judged suitable considering the particular emphasis on possible and current consumers digitalization of mortgage loans in India.

To ensure that data is not biased to a particular geographical region, questionnaire responses were targeted from multiple states (like Delhi, Maharashtra, Uttar Pradesh, Haryana,

Uttarakhand, etc.). These states' names are indicative and may change in the actual data set as responded by participants.

Instrument Development: Based on the UTAUT model's constructs—performance expectancy, effort expectancy, social influence, facilitating conditions—the questionnaire was constructed. Furthermore, included were conceptions of trust and anxiety to offer a whole picture of the elements affecting acceptance. Every concept was scored on a Likert scale between strongly disagree and strongly agree using several items. Reliance and validity of the measuring scales helped to validate the questionnaire.

Data Analysis:

Following statistical techniques will be used for data analysis:

Reliability Analysis: As we are collecting data from respondents by survey on a 5-likert scale, it is critical to evaluate the measurement scales dependability. We shall use Cronbach's Alpha analysis for the same. Cronbach's Alpha threshold value is 0.7. If results output exceeds the threshold, it will be considered that model demonstrates strong internal consistency.

Descriptive Statistics: We shall perform frequency analysis on the demographic data and other data sets to understand the sampling distribution of the respondents. We shall also perform some dependent variables analysis (like mortgage banks and respondents feedback on the manual process) to understand the distribution of the manual touchpoints at those mortgage banks level.

Correlation Analysis: There is total 5 constructs of UTAUT model. We shall use Pearson correlation coefficient to measure the linear relationship between any two constructs. This analysis should help us to understand whether constructs are in positive correlation or negative correlation or have no correlation at all.

Regression Analysis: To analyse the combined impact of independent variables (FC, EE, PE and SI) on dependent variable (UI), we shall perform linear regression analysis. In this regression analysis, we shall analyse following statistical outputs:

- **Model Summary:** Model summary will be used to analyse whether regression model is fit or not. We shall refer to following key metrics:
    - **Correlation Coefficient (R):** This represents the strength and direction of the relationship between dependent variable (UI) and independent predictors (PE, EE, SI and FC). Value of R , closure to 0 indicates weak relationship, closure to 1 indicates strong positive relationship, while closure to -1 indicates strong positive relationship.
    - **R- Square:** This represents the proportion of variance in the predictors (PE, EE, SI and FC) explained by the dependent variable UI. This may range from 0-1. If R^2 value is 0, means there is no variability, while value towards 1 indicates a strong variability.
    - **Standard Error of the Estimate:** It helps to measure the average distance between the dependent variable (UI) and the predictors (PE, EE, SI and FC). If this value is smaller, means model is a better fit.
- **Analysis of Variance (ANOVA):** ANOVA helps to evaluate whether the model is statistically significant in predicting the dependent variable (UI) using the predictors ((PE, EE, SI and FC). Following key metrics will be used in this study:
    - **Sum of Squares (SS):**
        - **Regression SS:** Represents variation in the dependent variable explained by the independent variables.
        - **Residual SS:** Represents variation in the dependent variable not explained by the independent variables.
    - **Degree of Freedom (df):**
        - **Regression df:** Represents number of predictors (independent variables) in the model.
        - **Residual df:** Calculated as df = Total number of observations – number of predictors – 1
        - **Total df:** Calculated as df = Total number of observations – 1
    - **Mean Square:** Calculated as MS = SS / df
    - **F-Statistic:** Represents whether predictors (independent variables) significantly explain the variation in the dependent variable. Calculated as F-Statistic = Regression MS / Residual MS

- **Significance (p-value):** Indicates whether predictors will have significant impact on dependent variable (UI) or not.

- **Coefficient Table Analysis:** From coefficient table, following key metrics will be used for this study:
  - **Unstandardized Coefficient (B):** This indicates the change in dependent variable (UI) for one unit change in one independent variable by keeping other independent variables as constant.
  - **Standardized Coefficient (B)**: This indicates the relative importance of each predictor.
  - **t-statistic:** Helps to measure that how many standard errors the coefficient is away from zero.
  - **Significance (p-Value):** This represents the probability that the coefficient is not significant. If p-Value < 0.05, coefficient of that predictor should be considered as significant.
  - **Confidence Interval:** Will provide a confidence range of coefficient value.

Variance Influence Factor (VIF): If predictors are highly correlated, they may affect the stability of model. To test the multicollinearity of predictors, VIF analysis will be performed. If VIF =1, we shall interpret that there is no multicollinearity. However if VIF > 5, we shall interpret that there is high multicollinearity.

3.7 Research Questions Analysis Approach

3.7.1 Determinants of Bank Mortgage Clients' Behavioral Intention to Accept Digital Mortgage Services in India

Research Method

To examine the determinants of bank mortgage clients' behavioral intention to accept digital mortgage services in India, a quantitative research approach will be employed. This involves the development and administration of a structured survey questionnaire based on validated scales from prior studies.

Theoretical Framework

The study will utilize the Unified Theory of Acceptance and Use of Technology (UTAUT) as the guiding framework. UTAUT's constructs—performance expectancy, effort

expectancy, social influence, and facilitating conditions—will be analyzed to identify their relevance and contribution to behavioral intention.

Sample Selection Criteria

The target population consists of bank mortgage clients in India who have experience or interest in digital mortgage services. Participants will be selected using purposive sampling to ensure representation from various age groups, genders, and levels of technological experience. The sample size will be determined using power analysis to achieve statistical validity.

3.7.2 Influence of UTAUT Constructs on Behavioral Intention

Research Method

This section will use regression analysis and variance influence factor (VIF) to quantify the impact of the four UTAUT constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) on the behavioral intentions of bank mortgage clients.

Theoretical Framework

The study's reliance on UTAUT underscores the importance of analyzing how each construct independently and collectively influences user acceptance. Measurement scales for the constructs will be adopted from Venkatesh et al. (2003) and tailored to the digital mortgage context in India.

Sample Selection Criteria

Data will be collected from the same sample pool as in the first research question. Care will be taken to ensure a diverse respondent demographic to facilitate a robust analysis of all UTAUT constructs.

3.8 Limitations of the Study

This study has certain limitations which may impact the findings of the study. First, Geographically, India is a vast country and it is challenging to cover all provinces and regions in the study. Though we tried to get the responses from multiple regions, still all are not covered in this study.

Additionally, the survey data was collected in English language only, so study may not accurately capture the sentiments on non-English speaking customers.

Due to the limited scope, this study aims to focus on digitalization of mortgage process in India, hence may not be generalizable to other countries, though this can be used a reference in other markets as well.

Also important to note that this study was performed in a non-crisis period and with a stable political condition in India. Even India is a continuous stage of evolution. Hence change in policies, political stability or crisis period may impact the response of the survey questions.

Feedback

The Research Methodology chapter provides a well-structured overview of the approach taken for the study on the digitalization of the mortgage lending process in India. The selection of a quantitative research method is appropriate for addressing the research questions and testing the hypotheses. However, the chapter can benefit from more clarity and depth in some areas, such as the explanation of why quantitative methods are best suited for this research and how they align with the specific research questions. While the hypotheses and objectives are well-stated, their connection to the constructs of the UTAUT model could be elaborated further. Additionally, the sample size range of 250-500 respondents needs more justification, particularly in terms of ensuring representativeness across multiple states. The statistical techniques chosen, such as ANOVA and factor analysis, are appropriate, but their relevance to the hypotheses and research questions should be made more explicit. The inclusion of practical limitations, such as digital literacy and data privacy concerns, is commendable but could be expanded to cover potential biases in data collection. In terms of writing, there is some repetition in the description of the research method that could be streamlined to improve clarity. Overall, the chapter is thorough and demonstrates a clear focus, but enhancing its academic rigor through stronger theoretical backing and clearer justifications would significantly strengthen its impact.

CHAPTER 4

DATA ANALYSIS

4.1 Introduction

The goal of data analysis is to find insights, make conclusions, and aid in decision-making via the examination, cleansing, transformation, and modelling of data. It incorporates a plethora of data exploration and analysis tools, such as machine learning, data visualisation, and statistical analysis. Finding trends and patterns, making forecasts, and getting insights that may guide choices and motivate action are the primary aims of data analysis. It entails testing hypotheses, discovering correlations and dependencies, and answering certain questions using data. To analyse data effectively, one needs technological know-how, subject-matter knowledge, and analytical thinking. It requires proficiently handling complicated and huge datasets, selecting appropriate methods and tools, and successfully conveying results.

4.2 Conceptual Model

UTAUT Constructs:

Theoretically, this work is grounded in the "Unified Theory of Acceptance and Use of Technology (UTAUT) model". Several important constructions in the UTAUT paradigm affect user acceptance and technological usage. Performance Expectancy (PE) is the degree to which people think intention to adopt digitalization of mortgage loans in India. Effort Expectancy (EE) is the degree of simplicity connected with intention to adopt digitalization of mortgage loans in India. Social Influence (SI) gauges how much people agree important others should use intention to adopt digitalization of mortgage loans in India. Facilitating Conditions (FC) are tools and resources meant for people to digitalization of mortgage loans in India.

Proposed Model:

The conceptual model shows the expected links between the UTAUT constructs. We propose that the intention to adopt digitalization of mortgage loans in India is directly benefits from performance expectations, effort expectations, social influence, facilitating conditions. This model seeks to give a whole awareness of the several elements influencing the acceptance

of digitalization of mortgage loans in India. Correlation analysis, ANOVA, linear regression analysis and multicollinearity analysis will be used to empirically assess the interactions between these constructions in order to validate the suggested hypotheses and offer understanding of the relative relevance of every factor.

4.3 Results

Data was collected from 450 respondents using survey forms (google forms and manual feedback) in a structed questionnaire format.

Reliability Analysis:

In the survey, we had asked respondents to 15 questions related to the Performance Expectancy (PE), Effort Expectancy (EE),Social Influence (SI), Facilitation Condition (FC) and User Intention(UI). Each of the question was responded on a 5-likert scale. Hence, we used Cronbach's Alpha to evaluate the measurement scales dependability.

Table-1

Case Processing Summary			
		N	%
Cases	Valid	450	100.0
	Excluded	0	.0
	Total	450	100.0
Reliability Statistics			
Cronbach's Alpha		N of Items	
.836		15	

As presented in table-1, scores for every construct exceeded the advised threshold of 0.7, therefore demonstrating strong internal consistency.

4.4 Descriptive Statistics

There were 450 respondents in total for this study, and their representation ranged from several demographic points of view.

Table-2

Group	Variables	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	362	80.40	80.40	80.40
	Female	88	19.60	19.60	100.00
Age Group	18-25	52	11.56	11.56	11.56
	26-35	66	14.67	14.67	26.22
	36-45	200	44.44	44.44	70.67
	46-55	119	26.44	26.44	97.11
	56 and Above	13	2.89	2.89	100.00
Education Level	High school	44	9.78	9.78	9.78
	Bachelor's degree	150	33.33	33.33	43.11
	Master's degree	240	53.33	53.33	96.44
	PhD	5	1.11	1.11	97.56
	Other	11	2.44	2.44	100.00
State	Andhra Pradesh	5	1.11	1.11	1.11
	Bihar	2	0.44	0.44	1.56
	Delhi	48	10.67	10.67	12.22
	Haryana	51	11.33	11.33	23.56
	Karnataka	7	1.56	1.56	25.11
	Kerala	7	1.56	1.56	26.67
	Maharashtra	52	11.56	11.56	38.22
	Madhya Pradesh	12	2.67	2.67	40.89
	Punjab	21	4.67	4.67	45.56
	Rajasthan	15	3.33	3.33	48.89
	Tamil Nadu	50	11.11	11.11	60.00
	Telangana	6	1.33	1.33	61.33
	Uttar Pradesh	158	35.11	35.11	96.44
	Uttarakhand	10	2.22	2.22	98.67
	Others	6	1.33	1.33	100.00
Technology Awareness	None	2	0.44	0.44	0.44
	Basic	140	31.11	31.11	31.56
	Advance	166	36.89	36.89	68.44
	Expert	142	31.56	31.56	100.00

As presented in table-2, Gender distribution revealed that 362 respondents (80.40%) were male and 88 respondents (19.6%) were female.

The age distribution of the respondents covered a broad spectrum, providing insights across different life stages. Specifically, 52 respondents (11.56%) were 18 to 25 years old, 66 respondents (14.67%) were between 26-35 years old, 200 respondents (44.44%) were in the

36-45 age bracket, 119 respondents (26.44%) were 46 to 55 years old, and 13 respondents (2.89%) were 56 years and above.

In terms of educational level, the responses showed quite variation. Among them, 44 respondents (9.78%) had completed high school or had a lower level of education; 150 respondents (33.33%) held a bachelor's degree; 240 respondents (53.33%) had a master's degree; 5 respondents (1.1%) had obtained a doctorate; 11 respondents (2.44%) had other kinds of educational qualifications.

Geographical distribution of the respondents covered more than 15 states, while in data strategy, we had planned to cover at least 5 states. This distribution further helped to achieve geographic unbiasedness of the sample data. 5 respondents (1.11%) were from Andra Pradesh; 2 respondents (0.44%) were from Bihar; 48 respondents (10.67%) were from Delhi; 51 respondents (11.33%) were from Haryana; 7 respondents (1.56%) were from Karnataka and Kerala; 52 respondents (11.56%) were from Maharashtra; 12 respondents (2.67%) were from Madhya Pradesh; 21 respondents (4.67%) were from Punjab; 15 respondents (3.33%) were from Rajasthan; 50 respondents (11.11%) were from Tamil Nadu; 6 respondents (1.33%) were from Telangana; 158 respondents (35.11%) were from Uttar Pradesh; 10 respondents (2.22%) were from Uttarakhand; and 6 respondents (1.33%) represented other states.

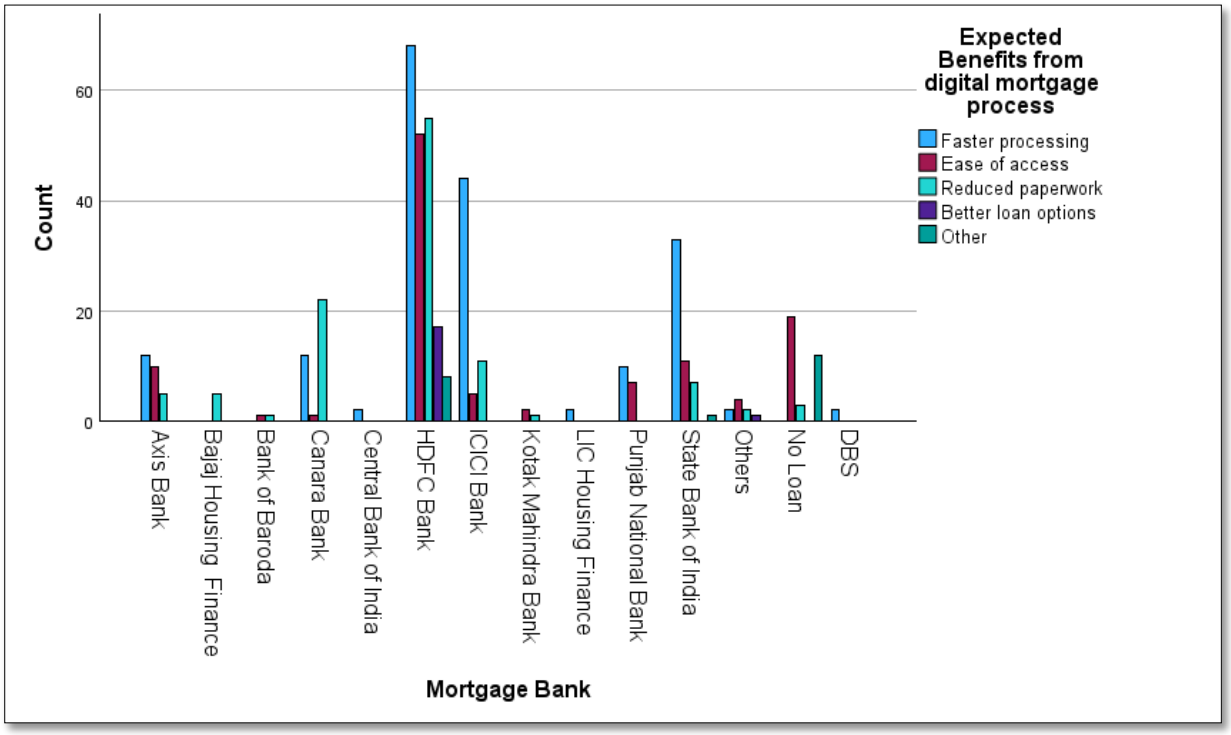
For digitalization adoption, another key demographic variable was technology awareness of the respondent. Responses to this question revealed quite variation. 2 respondents (0.44%) had not technology awareness; 140 respondents (31.11%) had basic awareness; 166 respondents (36.89%) had advance level of technology awareness; and 142 respondents (31.56%) had expert level of technology awareness.

Table -3

Mortgage Bank	Expected Benefits from digital mortgage process					Total
	Faster processing	Ease of access	Reduced paperwork	Better loan options	Other	
Axis Bank	12	10	5	0	0	27
Bajaj Housing Finance	0	0	5	0	0	5

Bank of Baroda	0	1	1	0	0	2
Canara Bank	12	1	22	0	0	35
Central Bank of India	2	0	0	0	0	2
HDFC Bank	68	52	55	17	8	200
ICICI Bank	44	5	11	0	0	60
Kotak Mahindra Bank	0	2	1	0	0	3
LIC Housing Finance	2	0	0	0	0	2
Punjab National Bank	10	7	0	0	0	17
State Bank of India	33	11	7	0	1	52
Others	2	4	2	1	0	9
No Loan	0	19	3	0	12	34
DBS	2	0	0	0	0	2
	187	**112**	**112**	**18**	**21**	**450**

Graph-1

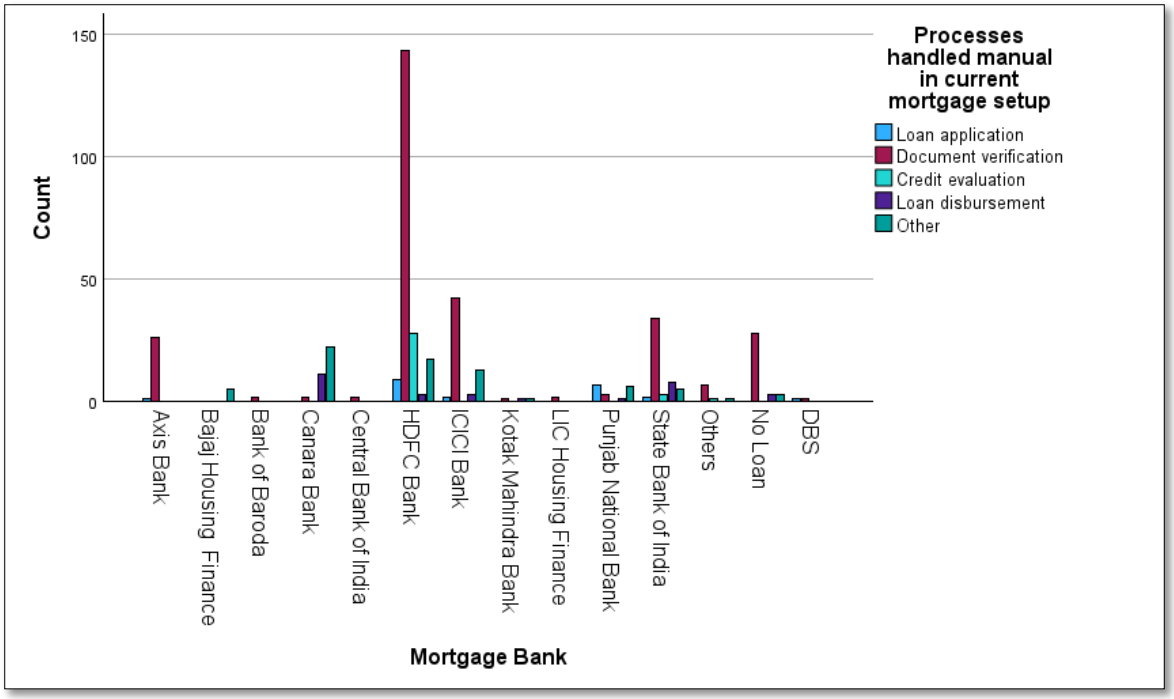


During survey, we also collected information about the mortgage bank of respondents and the benefits respondents expect from the digitalization of the mortgage process. We generated a descriptive analysis of these two variables and the results are presented in table-3 and graph-1. As revealed in table-3, 187 respondents (41.56%) expressed that digitalization will help in faster processing; 112 respondents (24.89%) believed that the digitalization will help in ease of access of mortgage loans; 112 respondents (24.89%) believed that the digitalization will help in reducing the required paperwork; 18 respondents (4.00%) believed that the digitalization will help them to get better loan options from various banks / HFCs; and 21 respondents (4.67%) believed that they will get other benefits from digitalization of mortgage loans.

Table -4

Mortgage Bank	Processes handled manual in current mortgage setup					Total
	Loan application	Document verification	Credit evaluation	Loan disbursement	Other	
Axis Bank	1	26	0	0	0	27
Bajaj Housing Finance	0	0	0	0	5	5
Bank of Baroda	0	2	0	0	0	2
Canara Bank	0	2	0	11	22	35
Central Bank of India	0	2	0	0	0	2
HDFC Bank	9	143	28	3	17	200
ICICI Bank	2	42	0	3	13	60
Kotak Mahindra Bank	0	1	0	1	1	3
LIC Housing Finance	0	2	0	0	0	2
Punjab National Bank	7	3	0	1	6	17
State Bank of India	2	34	3	8	5	52
Others	0	7	1	0	1	9
No Loan	0	28	0	3	3	34
DBS	1	1	0	0	0	2
	22	**293**	**32**	**30**	**73**	**450**

Graph-2

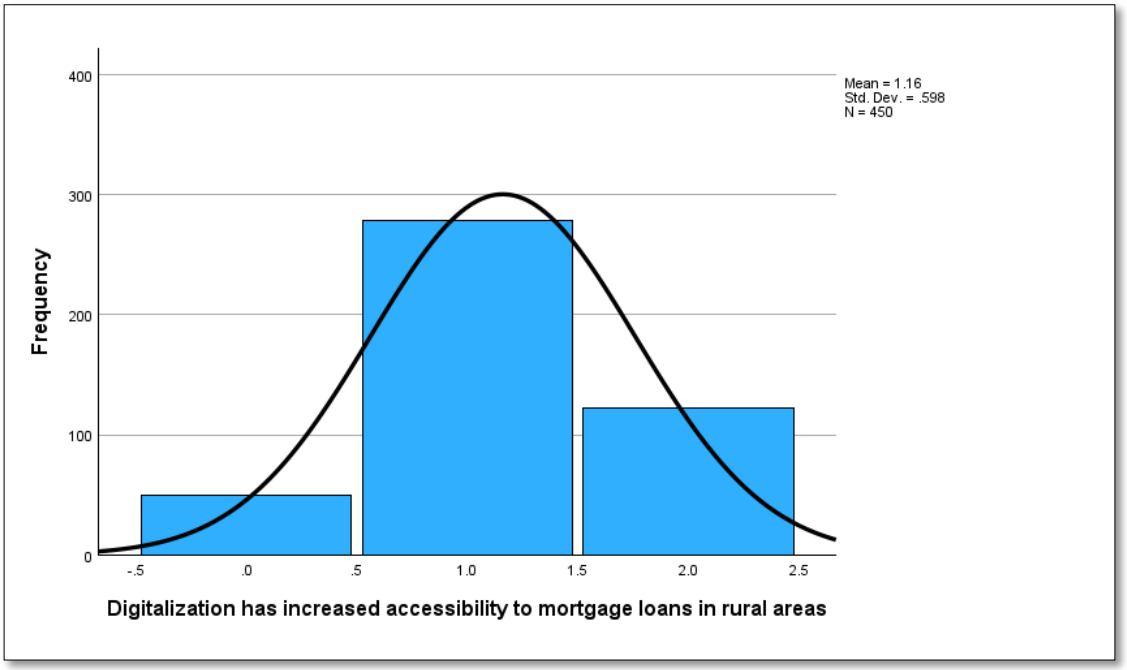


During survey, we also collected information about the processes handled manually by their banks currently. We also collected information about their mortgage bank. We generated a descriptive analysis of these two variables and results are presented in table-4 / graph -2. As revealed in table-3, 22 respondents (4.89%) expressed that loan application process itself is manual; 293 respondents (65.11%) expressed that document verification process is manual; 32 respondents (7.11%) expressed that credit evaluation process is manual; 30 respondents (6.67%) expressed that loan disbursement process is manual; and 73 respondents (16.22%) mentioned other process as manual in current mortgage loan processing ecosystem.

Table -5

Question:	Digitalization has increased accessibility to mortgage loans in rural areas			
Response	Frequency	Percent	Valid Percent	Cumulative Percent
No	50	11.1	11.1	11.1
Yes	278	61.8	61.8	72.9
Not Sure	122	27.1	27.1	100.0
Total	**450**	**100.0**	**100.0**	

Graph -3



During survey, we also studied whether digitalization has increased the mortgage loans accessibility in rural areas . This descriptive statistic is represented in table-5 / graph-3. It is evident from analysis that 50 respondents (11.1%) feel that digitalization has not enabled villages to access mortgage loans; 278 respondents (61.8%) feel that digitalization is enabling villages to access mortgage loans; and 122 respondents (27.1%) are not sure whether digitalization has really enabled villages to access the mortgage loans.

Table -6

Cyber Security Confidence	Response	Frequency	Percent	Valid Percent	Cumulative Percent
Confidence of data privacy and security in digital mortgage processing	Strongly disagree	9	2.0	2.0	2.0
	Disagree	30	6.7	6.7	8.7
	Neutral	100	22.2	22.2	30.9
	Agree	210	46.7	46.7	77.6
	Strongly agree	101	22.4	22.4	100.0
Confidence of the security measures of digital mortgage platforms	Strongly disagree	2	0.4	0.4	0.4
	Disagree	56	12.4	12.4	12.9
	Neutral	81	18.0	18.0	30.9
	Agree	202	44.9	44.9	75.8
	Strongly agree	109	24.2	24.2	100.0

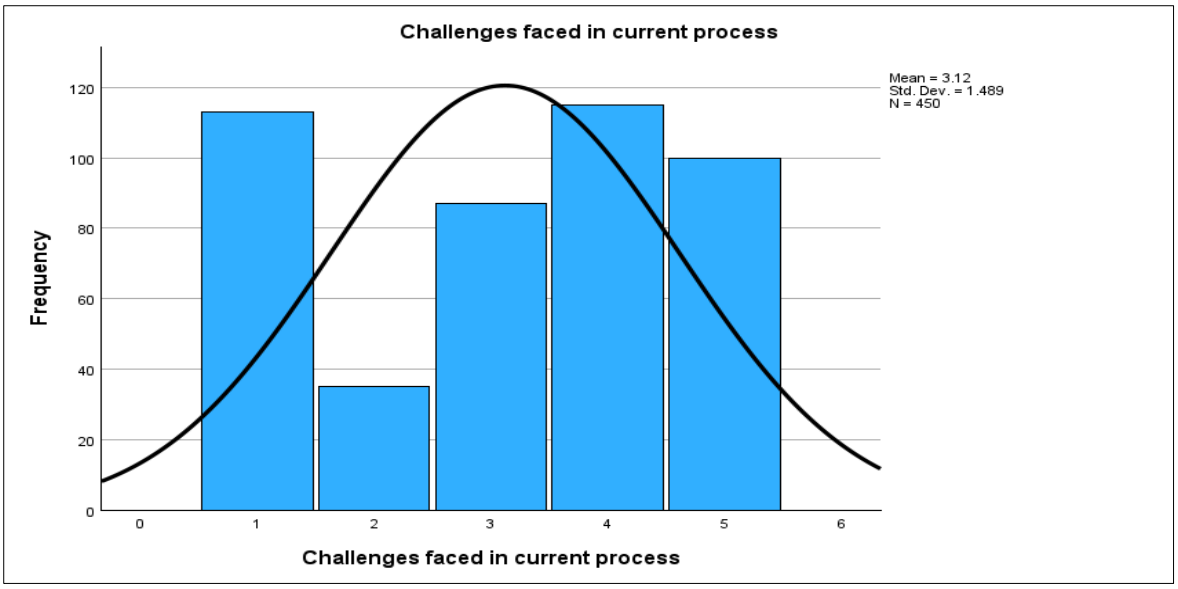
As cyber security is critical for digitalization, we also collected data related to respondent's confidence. Descriptive analysis is represented in table-6. We can infer from this frequency distribution that for data privacy, approximately 30% respondents are not confident about the proper privacy management of their personal data; while approximately 70% of respondents were confident for data privacy. Similarly, for platform cyber security, approximately 31% respondents are not confident about the security measures taken by the banks / HFCs; while approximately 69% of respondents were confident for secure platforms provided by banks / HFCs.

These descriptive analyses are helpful in providing more insights about the demographic variation of collected sample. There are more analyses done in this section related to digitalization, which could be of great assistance to the banks to define their strategy and realize more effectiveness of their digital mortgage platforms.

Table -7

Question:	**Challenges faced in current process**			
Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Technical issues	113	25.1	25.1	25.1
Lack of transparency	35	7.8	7.8	32.9
Complicated process	87	19.3	19.3	52.2
Poor customer support	115	25.6	25.6	77.8
Other	100	22.2	22.2	100.0
Total	**450**	**100.0**	**100.0**	

Graph- 4

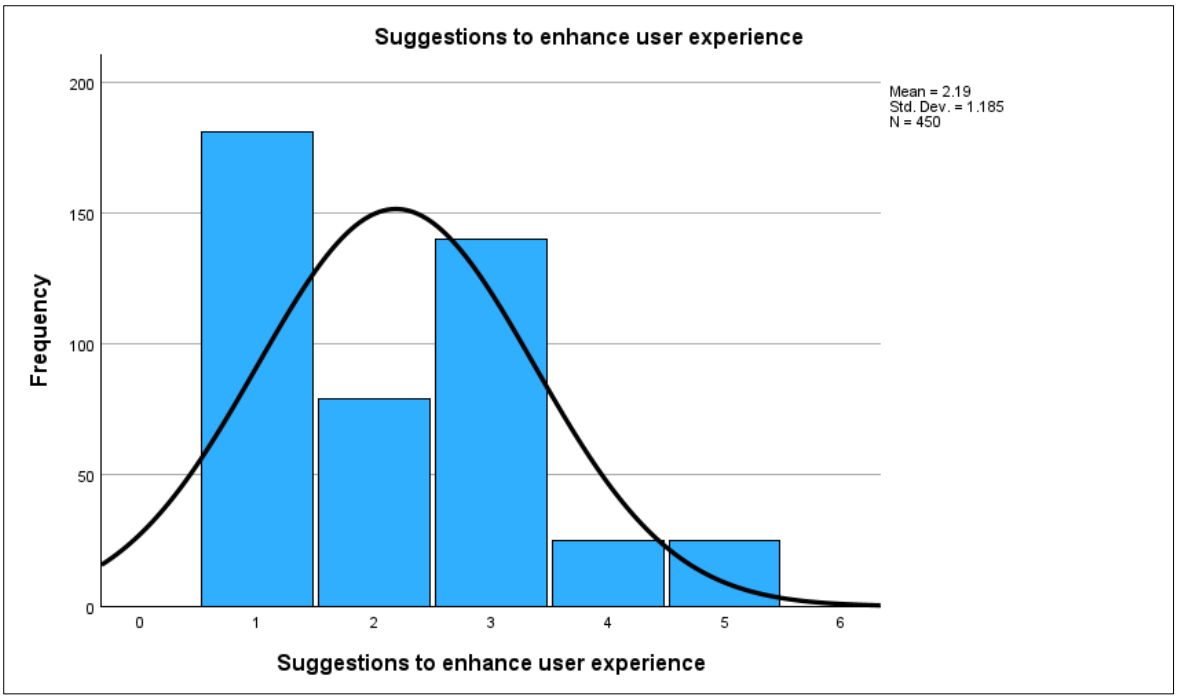


During survey, we also studied the challenges faced in current digital mortgage process . This descriptive statistic is represented in table-7 / graph-4. It is evident from analysis that 113 respondents (25.1%) expressed that they faced technical issues; 35 respondents (7.8%) felt the lack of transparency; and 97 respondents (19.3%) found that the processes are complicated; 115 respondents (25.6%) expressed the concerns related to poor customer support; and 100 respondents (22.2%) expressed that they had other issues.

Table -8

Question:	**Suggestions to enhance user experience**			
Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Simplify the process	181	40.2	40.2	40.2
Improve security	79	17.6	17.6	57.8
Provide better support	140	31.1	31.1	88.9
Increase transparency	25	5.6	5.6	94.4
Other	25	5.6	5.6	100.0
Total	450	100.0	100.0	

Graph- 5



During survey, we also studied suggestions to enhance user experience in digital mortgage process . This descriptive statistic is represented in table-8 / graph- 5. It is evident from analysis that 181 respondents (40.2%) suggested to simplify the process; 79 respondents (17.6%) suggested to improve security; 140 respondents (31.1%) suggested to provide better support; 25 respondents (5.6%) suggested to improve transparency; and 25 respondents (5.6%) had other ideas for improvement.

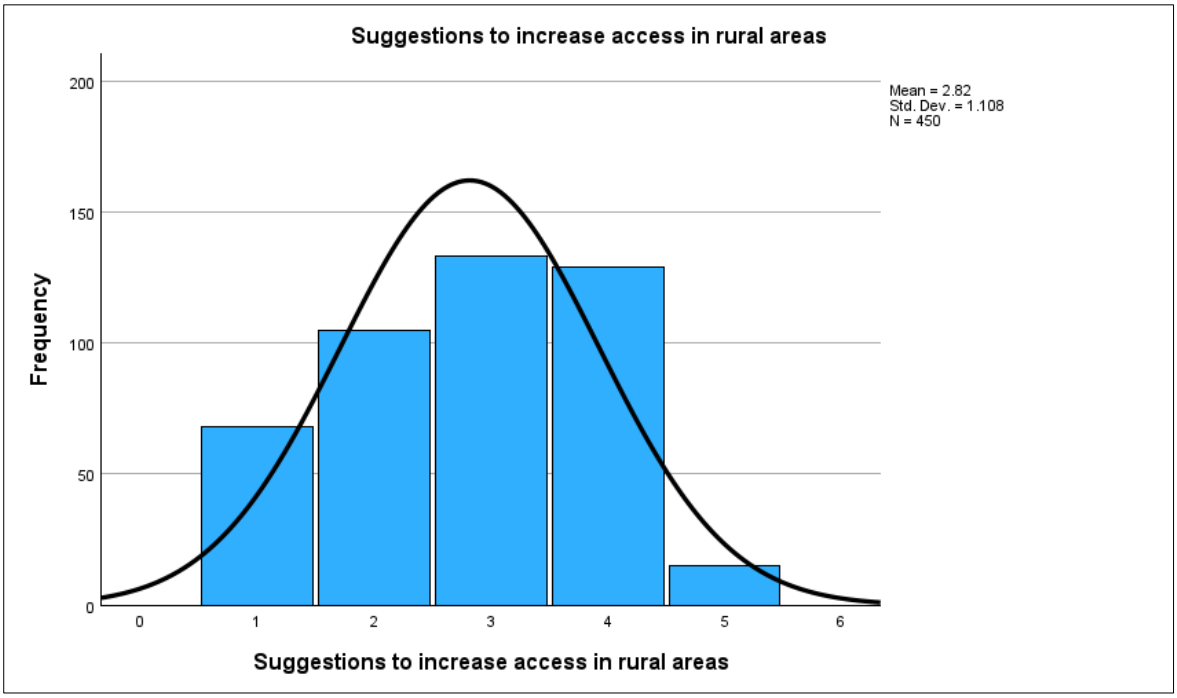
Interestingly, a closure study of table- 7 (representing challenges) and table- 8 (representing improvements) on client support and processes simplification. This should give a good glimpse to the banks / HFCs / NBFCs to find out the improvement areas. We also have banks data. If required, we can overlay bank data on these challenges and improvements to bring better insights at bank's level.

Table -9

Question:	**Suggestions to increase access in rural areas**			
Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Better internet infrastructure	68	15.1	15.1	15.1
More local language support	105	23.3	23.3	38.4
Simplified application processes	133	29.6	29.6	68.0
More customer support	129	28.7	28.7	96.7

Other	15	3.3	3.3	100.0
Total	450	100.0	100.0	

Graph- 6



During survey, we also collected suggestions to increase digital mortgage access in rural area. This descriptive statistic is represented in table-9 / graph- 6. This data is significant as major population of India is in villages and if banks / HFCs / NBFCs really want to bring efficiency in the digital mortgage process, they should get better insights on this aspect of their digital journeys.

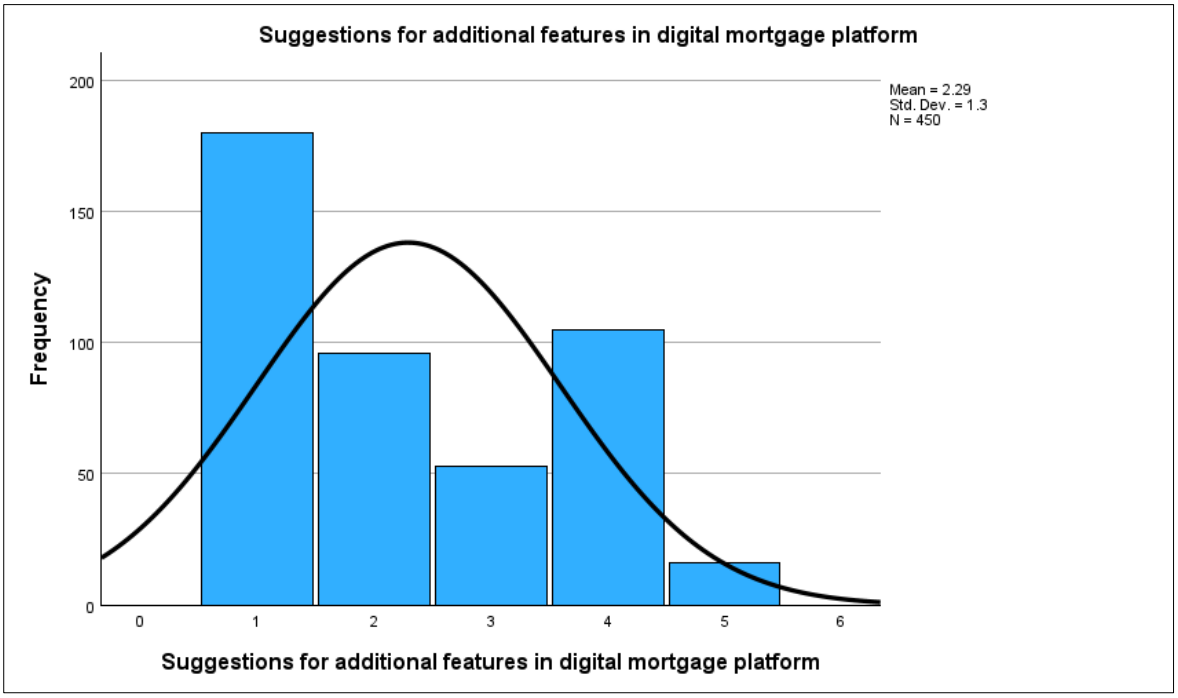
As per frequency analysis, 68 respondents (15.1%) feels that villages should have better internet infrastructure; 105 respondents (23.3%) suggested to provide digital platforms in local languages; 133 respondents (29.6%) suggested to simplify application processes for villages; 129 respondents (28.7%) suggested to plan more customer support; and 15 respondents (3.3%) had other ideas for improvement.

Table -10

Question:	**Suggestions for additional features in digital mortgage platform**

Responses	Frequency	Percent	Valid Percent	Cumulative Percent
Real-time tracking	180	40.0	40.0	40.0
Automated customer support	96	21.3	21.3	61.3
More loan options	53	11.8	11.8	73.1
Simplified document uploads	105	23.3	23.3	96.4
Other	16	3.6	3.6	100.0
Total	450	100.0	100.0	

Graph- 7



During survey, we also collected suggestions for additional features in digital mortgage platform. This descriptive statistic is represented in table-10 / graph- 7. This data analysis will help banks / HFCs / NBFCs to align their digital mortgage platform roadmap to the user expectations.

As per frequency analysis, 180 respondents (40.0%) suggested to provide real tracking as a key features; 96 respondents (21.3%) expressed that automated customer support like chatbot will be of better use; 53 respondents (11.8%) suggested to provide more loan options; 105 respondents (23.3%) suggested to simplify document upload process; and 16 respondents (3.6%) had other suggestions to enhance digital platform functional aspects.

4.5 Quantitative Analysis

As mentioned in the conceptual model we are expecting to test the relationship between UTAUT constructs and perform a regression analysis to empirically assess the validity of hypotheses.

Related to the UTAUT constructs: Performance Expectancy (PE), Effort Expectancy (EE),Social Influence (SI), Facilitation Condition (FC) and User Intention(UI); we had asked 15 different questions on a 5-likert scale. These questions were further grouped as per these constructs. We transformed this sample data set to generate the predictor variables from that. Outcome of these generated variables was used in empirical assessment of the model.

Correlation Analysis

We used Pearson correlation coefficient (r) to measure the linear relationship between the two variables.

Table-11

Correlations						
		PE	EE	SI	FC	UI
PE	Pearson Correlation (r)	1	0.366	0.305	0.304	0.364
	Sig. (2-tailed) (p)		<.001	<.001	<.001	<.001
	N	450	450	450	450	450
EE	Pearson Correlation (r)	0.366	1	0.385	0.277	0.553
	Sig. (2-tailed) (p)	<.001		<.001	<.001	<.001
	N	450	450	450	450	450
SI	Pearson Correlation (r)	0.305	0.385	1	0.394	0.609
	Sig. (2-tailed) (p)	<.001	<.001		<.001	<.001
	N	450	450	450	450	450
FC	Pearson Correlation (r)	0.304	0.277	0.394	1	0.434
	Sig. (2-tailed) (p)	<.001	<.001	<.001		<.001
	N	450	450	450	450	450
UI	Pearson Correlation	0.364	0.553	0.609	0.434	1
	Sig. (2-tailed) (p)	<.001	<.001	<.001	<.001	
	N	450	450	450	450	450

Interpretation:

Table-11 represents the correlation between predictors: PE, EE, SI, FC and UI. Interpretation of this output suggests that for PE ←→ EE; r=0.366 and p<0.001; indicating that both of these predictors are in moderately positive correlation. For PE ←→ SI; r=0.305 and p<0.001; indicating that both of these predictors are in moderately positive correlation. For PE ←→ FC; r=0.304 and p<0.001; indicating that both of these predictors are in moderately positive correlation. For PE ←→ UI; r=0.364 and p<0.001; indicating that both of these predictors are in moderately positive correlation.

Similarly, for EE ←→ SI; r=0.385 and p<0.001; indicating that both of these predictors are in moderately positive correlation. For EE ←→ FC; r=0.277 and p<0.001; indicating that both of these predictors are in weak positive correlation. For EE ←→ UI; r=0.533 and p<0.001; indicating that both of these predictors are in strong positive correlation.

Similarly, for SI ←→ FC; r=0.394 and p<0.001; indicating that both of these predictors are in moderately positive correlation. For SI ←→ UI; r=0.0.609 and p<0.001; indicating that both of these predictors are in strong positive correlation.

Similarly, for FC ←→ UI; r=0.434 and p<0.001; indicating that both of these predictors are in moderately positive correlation.

Implications:

If we infer the conclusion based on just correlation analysis, we can interpret that that SI and EE are the strongest positive predictor of UI, hence banks / HFCs should leverage more on social influence and easy of use to get the effectiveness of mortgage loans digitalization in India.

FC is also a moderately positive predictor of UI, hence banks / HFCs should ensure that the plan support model sufficiently to improve effectiveness of mortgage loan digitalization.

Though PE is a weakly positive predictor of UI, still banks / HFCs can have some focus on system usefulness to improve effectiveness of mortgage loan digitalization.

Regression Analysis:

Linear regression analysis was performed on predictors and following output was generated:

Table -12

Variables Entered/Removed [a]			
Model	Variables Entered	Variables Removed	Method
1	FC, EE, PE, SI [b]		Enter
a. Dependent Variable: UI			
b. All requested variables entered.			

As presented in table-12, regression analysis is analysing the combined impact of independent variables (FC, EE, PE and SI) on dependent variable (UI). In this regression analysis, none of the variable was removed.

Table -13

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	0.520	0.516	0.46169
a. Predictors: (Constant), FC, EE, PE, SI				

Table-13 represents the output of model summary. We can see that correlation coefficient (R) is 0.721, which indicates a strong positive correlation. This can also be interpreted as predictors collectively have a strong association with UI.

R Square will is 0.520, which indicates that the 52% variance in the dependent variable (UI) is explained by the predictors.

Std. Error of the estimate is just 0.46; a smaller value; which indicates that model is a better fit and predictors are closer to the actual data.

Table -14

ANOVA [a]						
Model		Sum of Squares (SS)	df	Mean Square	F	Sig.(p)
1	Regression	102.829	4	25.707	120.603	<.001 [b]
	Residual	94.855	445	0.213		
	Total	197.684	449			
a. Dependent Variable: UI						
b. Predictors: (Constant), FC, EE, PE, SI						

Table-14 represents the output of ANOVA (Analysis of variance), that helps to evaluate whether the model is statistically significant in predicting the dependent variable using predictors.

As presented in table-10, regression sum of squares (SS) has a value of 102.829. A higher value indicates that predictors (FC, EE, PE and SI) will cause significant variation in dependent variable.

Residual sum of square has a value of 94.855. A lower value indicates that the model is a good fit for data.

Regression degree of freedom (df:4) indicates that there are 4 predictors in the model.

Total degree of freedom (df: 449) indicates that there are 449 observations (N-1) in this data set.

F-Statistic value (F=120.603) is higher, which suggests that the model explains much more variance in UI, than is left unexplained by the residual error. This can also be interpreted as a strong evidence against the null hypothesis that the predictors have no effect.

Significance (p-value) is very small (< 0.001) and far below the threshold of 0.05, which clearly indicates that the predictors have a statistically significant impact on behavioral intention (BI) which is user intention (UI) in this case.

Table-15

Coefficients [a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig. (p-values)	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-0.360	0.215		-1.671	0.095	-0.782	0.063
	PE	0.065	0.033	0.073	2.003	0.046	0.001	0.129
	EE	0.381	0.043	0.328	8.813	0.000	0.296	0.466
	SI	0.512	0.049	0.395	10.420	0.000	0.415	0.608
	FC	0.198	0.044	0.164	4.480	0.000	0.111	0.285
a. Dependent Variable: UI								

Interpretation:

Intercept (Constant) represents the predicated value of UI when all independent predictors are having 0 value. This is not practically possible in this case as all responses are collected on a 5-likert scale, hence independent variables will never zero value. So, intercept is not having a meaningful impact in this model analysis.

PE is having unstandardized coefficient (B=0.065) and standardized coefficient (Beta = 0.073), indicating that PE will have marginally positive impact on UI. As 95% confidence Interval value [LB: 0.001, UB: 0.129] does not include 0, this reaffirms that the PE will have positive impact on UI.

EE is having unstandardized coefficient (B=0.381) and standardized coefficient (Beta = 0.328), indicating that EE will have moderately positive impact on UI. As 95% confidence Interval value [LB: 0.296, UB: 0.466] does not include 0, this reaffirms that the EE will have positive impact on UI.

SI is having unstandardized coefficient (B=0.512) and standardized coefficient (Beta = 0.395), indicating that EE will have strong positive impact on UI. As 95% confidence Interval value [LB: 0.415, UB: 0.608] does not include 0, this reaffirms that the SI will have positive impact on UI.

FC is having unstandardized coefficient (B=0.192) and standardized coefficient (Beta = 0.164), indicating that FC will have moderate positive impact on UI. As 95% confidence Interval value [LB: 0.111, UB: 0.285] does not include 0, this reaffirms that the FC will have positive impact on UI.

Implication:

Regression analysis suggests that the user's intention to use digitalized mortgage system in the context of Indian banks / HFCs, will be heavily influenced by SI and EE. Though FC and PE represent moderate to marginal positive influence, still these can be leveraged in addition to other predictors to generate more positive outcome of UI.

Multicollinearity Analysis:

To identify the multicollinearity in this regression analysis, we derived variance influence factor (VIF).

Table-16

Coefficients [a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig. (p-values)	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-0.360	0.215		-1.671	0.095		
	PE	0.065	0.033	0.073	2.003	0.046	0.808	1.237
	EE	0.381	0.043	0.328	8.813	0.000	0.776	1.288
	SI	0.512	0.049	0.395	10.420	0.000	0.750	1.334
	FC	0.198	0.044	0.164	4.480	0.000	0.800	1.250
a. Dependent Variable: UI								

Variance Influence factor (VIF) and tolerance factor were generated to analyse the multicollinearity in the model. It is critical to analyse the multicollinearity, as it helps to identify whether independent variables in the model are highly correlated or not. If multicollinearity condition is present, it may impact unstandardized coefficients and p-values.

Interpretation:

For all predicators, VIF value was in the range of 1-2, which is much lower than the threshold of 5. These values of VIF indicates that predicators SI, EE, FC and PE have no concern of multicollinearity on behavioral intention, which is UI in this case. Hence, these predicators will not generate significant issue in this model.

A low tolerance (tolerance = 1 / VIF) value (threshold < 0.1) indicates high multicollinearity. In this output, tolerance value for all predicators is >0.1, hence these predicators SI, EE, FC and PE have no concern of multicollinearity.

Similar multicollinearity tests were also performed in the previous studies. Rahi et al. (2018) also used variance influence factor (VIF) as the technique to test the multicollinearity of the regression model. Morales and Trinidad, (2015) also used VIF as the stastical methodology to test the multiocollinerity of the predictors in the regression model.

4.6 Hypotheses Validation

We have performed a linear regression analysis to generate the predictors coefficients and collinearity statistics. Outputs are presented in table-17. This output will be used to validate the hypotheses.

Table-17

Coefficients [a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig. (p-values)	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-0.360	0.215		-1.671	0.095		
	PE	0.065	0.033	0.073	2.003	0.046	0.808	1.237
	EE	0.381	0.043	0.328	8.813	0.000	0.776	1.288
	SI	0.512	0.049	0.395	10.420	0.000	0.750	1.334
	FC	0.198	0.044	0.164	4.480	0.000	0.800	1.250
a. Dependent Variable: UI								

Performance Expectancy (PE):

Null Hypotheses (Ha0): PE has no significant impact on UI. In this case, B_{PE} should be 0.

Alternate Hypotheses (Ha1): PE will positively affect the behavioral intention of the respondents to accept digital mortgage services. In this case, B_{PE} should be > 0.

Test Results: As per data presented in table- 17,

B_{PE} = 0.065, p= 0.095

Validation: as B_{PE} is not equal to 0, Ha0 is rejected and Ha1 is accepted.

Implication: PE will positively affect UI. Tolerance (0.808), and VIF (1.237) also indicate that the relationship is reliable and there are no multicollinearity-related concerns.

This hypothesis validation was also supported by previous studies. Rahi et al. (2019) validated performance expectancy hypotheses using the similar technique of B and p analysis. AbuShanab et al. (2007) also validated performance expectancy hypothesis based on unstandardized coefficient (B) and significance (p) value analysis.

Effort Expectancy (PE):

Null Hypotheses (Ha0): EE has no significant impact on UI. In this case, B_{EE} should be 0.

Alternate Hypotheses (Ha2): EE will positively affect behavioral intention of the respondents to accept digital mortgage service. In this case, B_{EE} should be > 0.

Test Results: As per data presented in table- 17,

B_{EE} = 0.381, p= 0.00

Validation: as B_{EE} is not equal to 0, Ha0 is rejected and Ha2 is accepted.

Implication: EE will have will moderate positive affect on UI. Tolerance (0.776), and VIF (1.288) also indicate that the relationship is reliable and there are no multicollinearity-related concerns.

This hypothesis validation was also supported by previous studies. AbuShanab et al. (2007) validated effort efficiency hypothesis based on unstandardized coefficient (B) and significance (p) value analysis. Rahi et al. (2018) also validated effort efficiency hypotheses using similar statistical techniques.

Social Influence (SI):

Null Hypotheses (Ha0): SI has no significant impact on UI. In this case, B_{SI} should be 0.

Alternate Hypotheses (Ha3): SI will positively affect behavioral intention of the respondents to accept digital mortgage service. In this case, B_{SI} should be > 0.

Test Results: As per data presented in table- 17,

B_{SI} = 0.521, p= 0.00

Validation: as B_{SI} is not equal to 0, Ha0 is rejected and Ha3 is accepted.

Implication: SI is the strongest predictor of UI. Tolerance (0.750), VIF (1.334) also indicates that the relationship is reliable and there are no multicollinearity related concerns.

This hypothesis validation was also supported by previous studies. Morales et al. (n.d.) validated social influence hypotheses based on B and p values. Rahi et al. (2018) also validated social influence hypotheses using similar statistical techniques.

Facilitation Conditions (FC):

Null Hypotheses (Ha0): FC has no significant impact on UI. In this case, B_{FC} should be 0.

Alternate Hypotheses (Ha4): FC will positively affect behavioral intention of the respondents to accept digital mortgage service. In this case, B_{FC} should be > 0.

Test Results: As per data presented in table- 17,

B_{FC} = 0.198, p= 0.00

Validation: as B_{FC} is not equal to 0, Ha0 is rejected and Ha4 is accepted.

Implication: FC will have will moderate positive affect on UI. Tolerance (0.800), VIF (1.250) also indicates that the relationship is reliable and there are no multicollinearity related concerns.

This hypothesis validation was also supported by previous studies. Morales and Trinidad, (2015)validated facilitating condition hypotheses based on B and p values. Rahi et al. (2018) also validated facilitating condition hypotheses using similar statistical techniques.

CHAPTER 5

CONCLUSION

5.1 Summary

This study systematically examined the factors influencing the adoption of digitalization in mortgage loans in India using the Unified Theory of Acceptance and Use of Technology (UTAUT) model, augmented with trust and anxiety constructs. The findings revealed that performance expectancy, effort expectancy, social influence, and facilitating conditions significantly contribute to users' intention to adopt digitalized mortgage solutions. Among these, social influence and effort expectancy emerged as the most influential factors, underscoring the importance of perceived benefits in motivating users to embrace digital platforms for mortgage processing.

The integration of trust and anxiety into the UTAUT framework provided a deeper understanding of user behavior. Trust played a critical role in alleviating user concerns, thereby enhancing adoption intentions, while anxiety was identified as a barrier that could deter acceptance. These insights highlight the necessity of fostering trust through secure and transparent digital systems to ensure user confidence.

The study also employed the ANOVA model and regression to perform the quantitative analysis. The robust model fit indices affirmed the reliability and validity of the measurement and structural models. Additionally, the demographic diversity of respondents offered a comprehensive perspective, emphasizing the importance of tailoring digitalization strategies to meet the varied needs of users across age, gender, and educational backgrounds in India.

The results of this study also concur with the similar study done by Morales et al. (2019) who examined the digitization of mortgage banking among selected universal banks in the Philippines. In that study, PE and FC were the strongest factor, while SI and EE were having moderate impact on the user intention to use digitized journeys for mortgage in Philippines. In this study, as Indian demography is different, and India is on the path of evolving digital footprint, SI and EE were the strongest factor to have impact of UI.

As social influence is the strongest factor, this study recommends to the banks / NBFCs / HFCs in India, that they should bring more awareness of digital mortgage platforms, and influence customers by leveraging their other social groups and bank officers. Strong effort expectancy factor also suggests them to look for simplification of user interfaces, processes and other client interactions. They should ensure that they provide a robust support model either via chatbot or helpline as facilitating condition (FC) also has moderate value. In this study, though performance expectancy is marginally positive, still, recommendation to banks / NBFCs / HFCs is to focus on this aspect as well and validate the importance again via future studies.

The findings of this study suggest that digitalization has the potential to revolutionize the mortgage lending ecosystem by improving operational efficiency, reducing costs, and elevating customer satisfaction. The benefits extend beyond economic gains to fostering trust, transparency, and inclusivity in the financial system. Stakeholder collaboration, including policymakers, banks, and technology providers, is essential to overcome challenges and promote widespread adoption.

Despite the technological advancements, challenges remain. A significant digital divide persists, characterized by limited internet access and low digital literacy, particularly in rural areas. Concerns about data security, privacy, and regulatory compliance also pose obstacles. Financial institutions must prioritize investments in infrastructure, enhance digital literacy campaigns, and implement robust cybersecurity measures to address these barriers effectively.

5.2 Contributions

This research contributes to the existing literature on technology acceptance by applying the UTAUT model in the context of mortgage loan digitalization, a relatively underexplored domain in India. The findings have practical implications for financial institutions, highlighting the need to prioritize user-centric features, build trust, and address anxiety to facilitate widespread adoption. Future studies could expand on this work by exploring longitudinal data and incorporating additional constructs such as cost considerations and

regulatory influences to offer a more holistic understanding of the digital transformation in financial services.

5.3 Recommendations for future studies

The digitalization of the mortgage lending process in India presents significant potential, yet several areas require further exploration to address existing gaps and foster innovation. Future research should expand the user base with rural background and use other non-English languages to collect the data as that will improve the sample size in Indian context. Additionally, longitudinal studies assessing the socio-economic impact of digital mortgage solutions on various demographics will provide deeper insights into their transformative potential.

Additionally future studies should focus on the adoption of emerging technologies such as quantum computing and advanced predictive analytics, which could enhance efficiency and accuracy, particularly in risk assessment and credit scoring. Blockchain integration also warrants deeper investigation to evaluate its ability to improve transparency, security, and efficiency in the mortgage lifecycle, especially in property verification and contract management.

Another critical area for further research is the socio-economic impact of digital mortgage platforms. Longitudinal studies could assess how these platforms contribute to financial inclusion, particularly for underserved populations in rural and semi-urban areas. Further exploration is needed to understand their impact on reducing gender and income disparities in accessing mortgage services. Additionally, examining cultural factors, such as trust in technology and societal norms, will provide insights into how they influence user acceptance of digital solutions. Similarly, addressing the challenges faced by older and less technologically literate populations will highlight strategies to enhance their participation in the digital mortgage ecosystem.

This study concludes that digitalization is not merely an enhancement but a necessity for the evolution of the mortgage lending process, contributing to India’s broader goals of economic growth and social equity. By addressing existing bottlenecks and embracing innovation, the Indian mortgage industry can position itself as a leader in global financial transformation.

5.4 Implications of study

The findings of this study on the digitalization of the mortgage lending process in India have several important implications for stakeholders, including financial institutions, policymakers, technology providers, and end-users. For financial institutions, the study highlights the critical role digitalization plays in enhancing operational efficiency. Automating key processes such as credit evaluation, document verification, and loan disbursement not only reduces turnaround times but also minimizes human errors, leading to significant cost savings and improved scalability. By adopting advanced technologies like AI, blockchain, and big data analytics, financial institutions can optimize workflows, deliver personalized services, and improve customer retention, positioning themselves competitively in the evolving market.

Policymakers and regulators can draw valuable insights from this research to strengthen the regulatory framework governing digital mortgage platforms. Policymakers can refine these programs to expand access to mortgage services for underserved populations and align with broader economic and social goals.

For technology providers, the study offers actionable insights to develop more user-friendly and secure digital mortgage solutions. By understanding customer preferences and addressing barriers such as digital literacy gaps, technology providers can design intuitive platforms with features like multilingual interfaces, real-time assistance, and seamless accessibility.

End-users, particularly borrowers in rural and semi-urban areas, stand to benefit significantly from digital mortgage solutions. To maximize these benefits, the research underscores the need for digital literacy programs to empower users with the skills required to navigate digital platforms effectively.

The study also has broader implications for the mortgage lending ecosystem, showcasing the transformative potential of digitalization in achieving financial inclusion and driving economic growth. Finally, by addressing existing gaps and proposing targeted interventions, the study contributes to the continuous evolution of the mortgage industry in India and

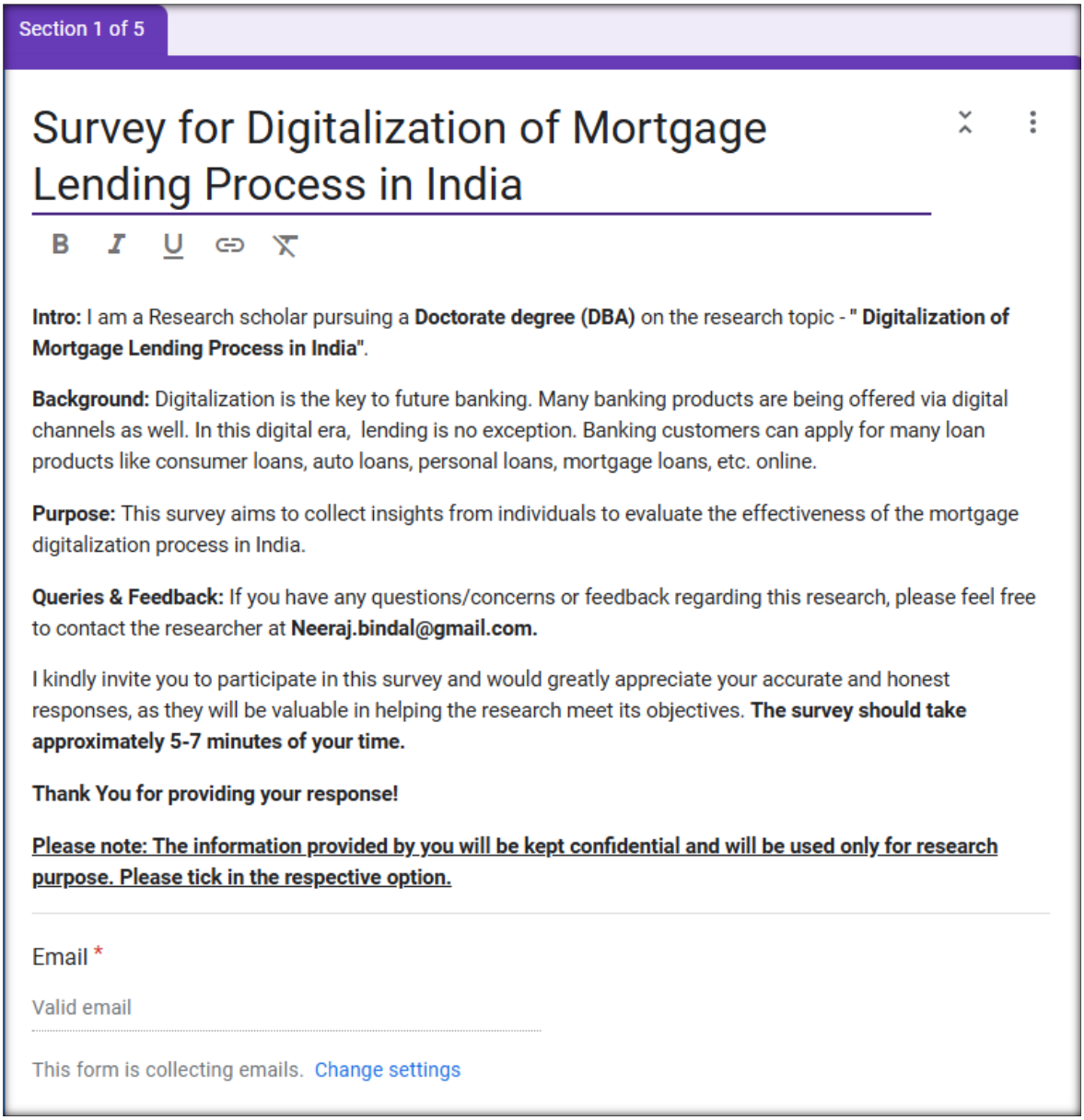
beyond. Digitalization is positioned not only as a tool for operational improvement but as a strategic enabler of innovation, inclusivity, and economic growth.

APPENDICES

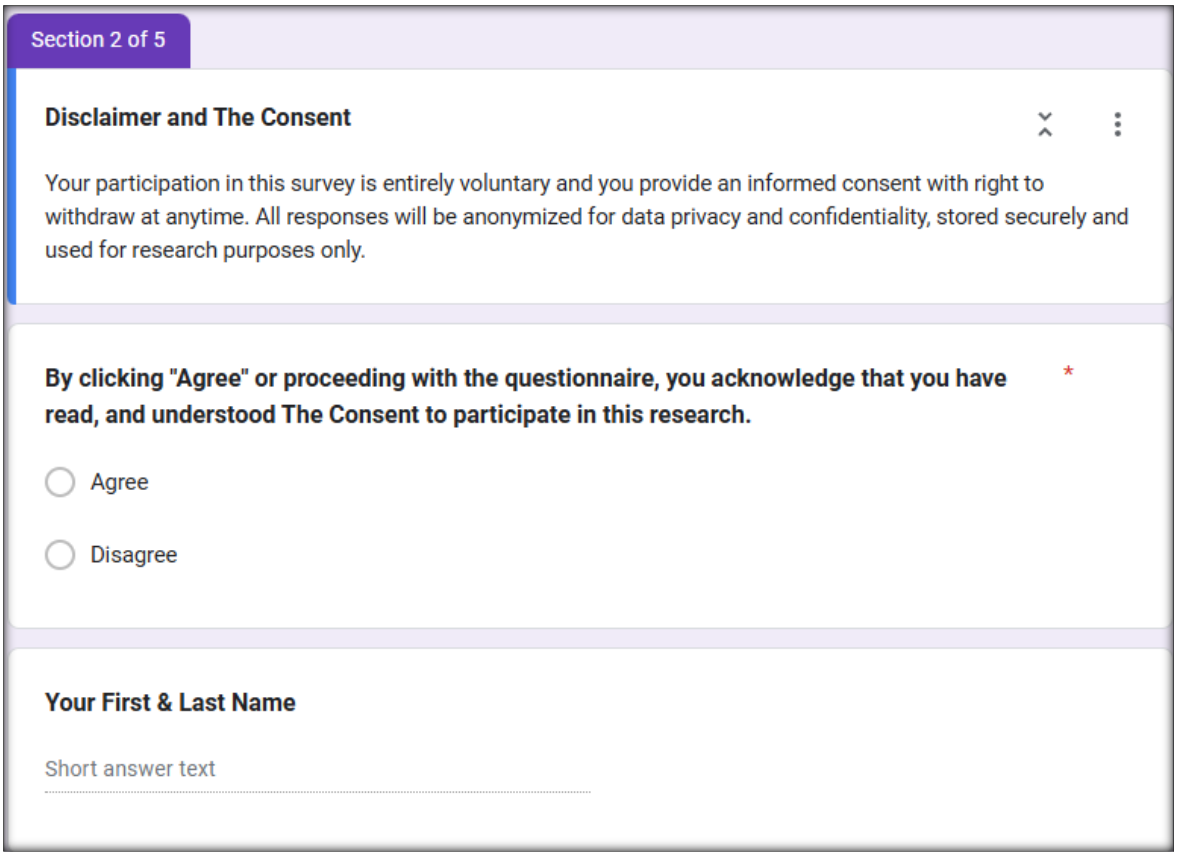
APPENDIX A:

RESEARCH QUESTIONNAIRE

Section 1: Introduction and email details

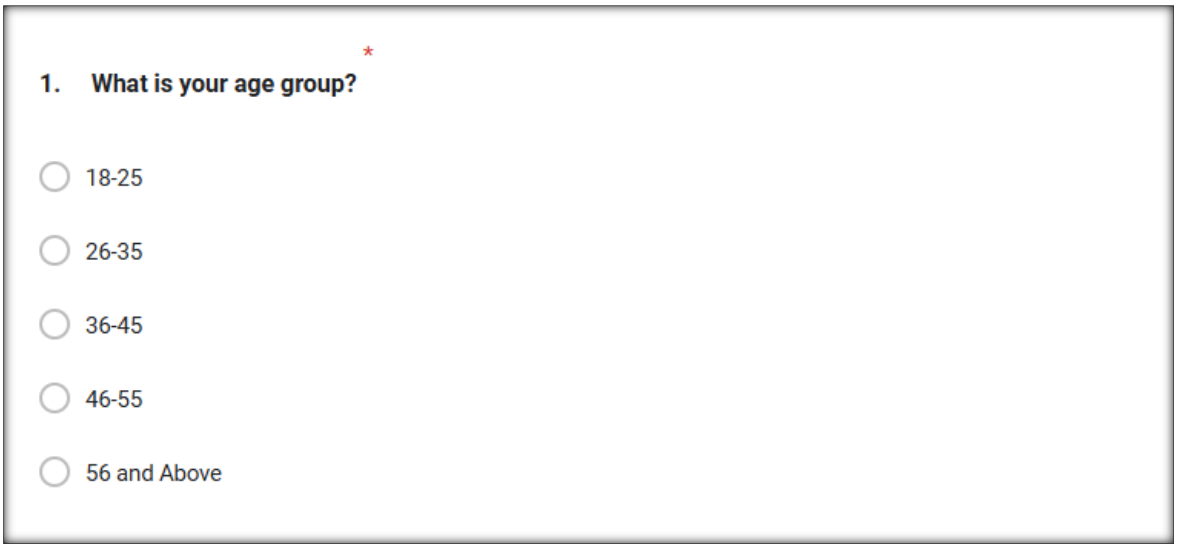


Section 2: Disclaimer and the Consent



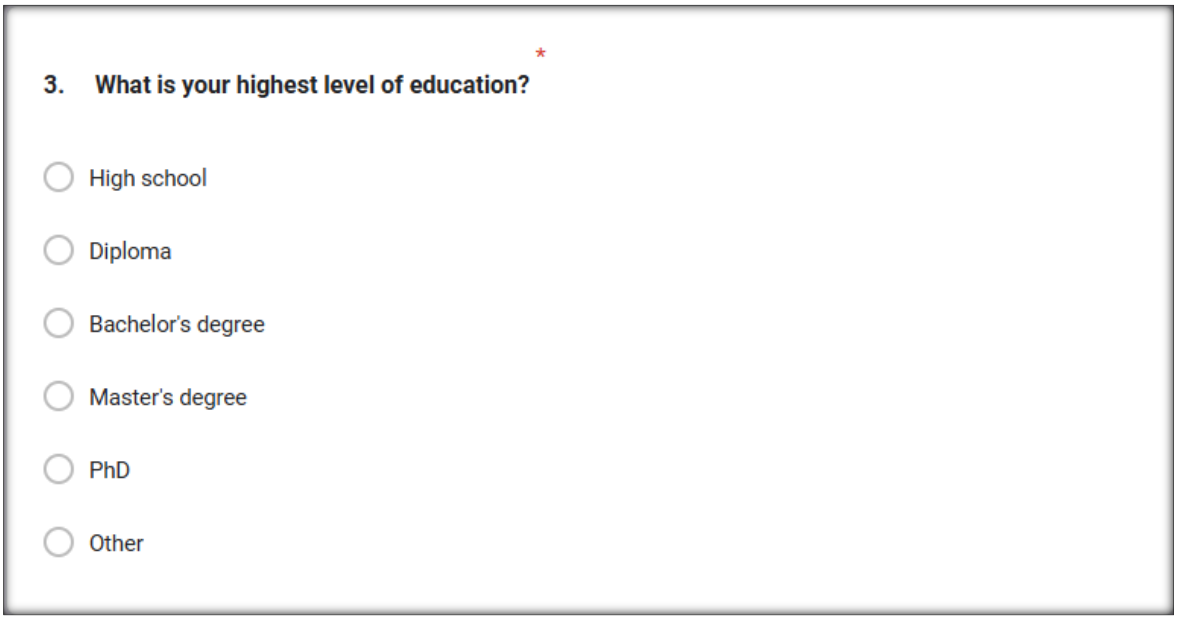
Section 3: Demographics

Age Question

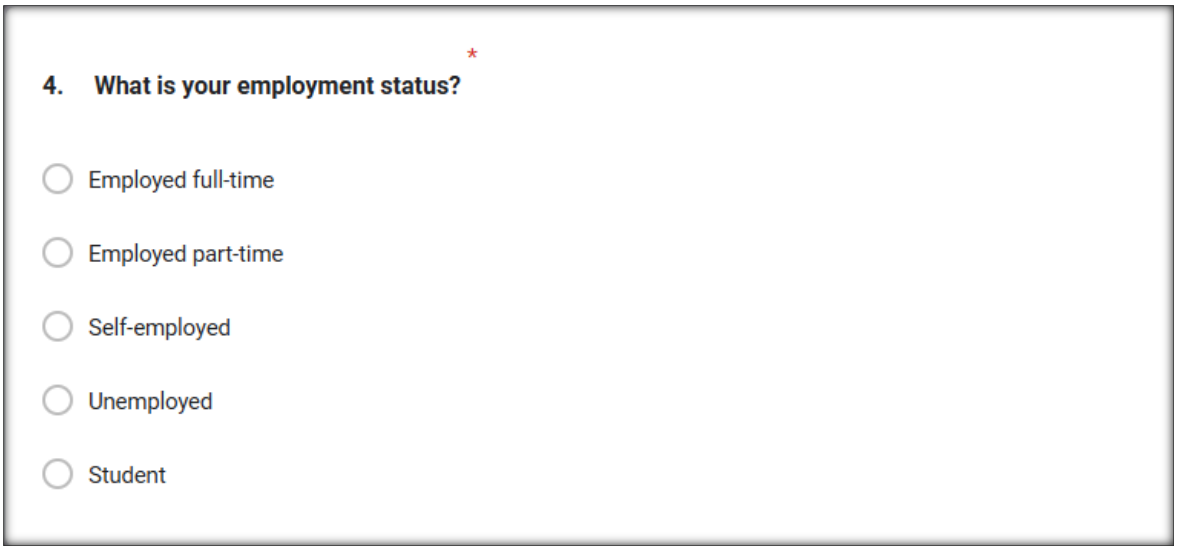


Gender Question

Education Question



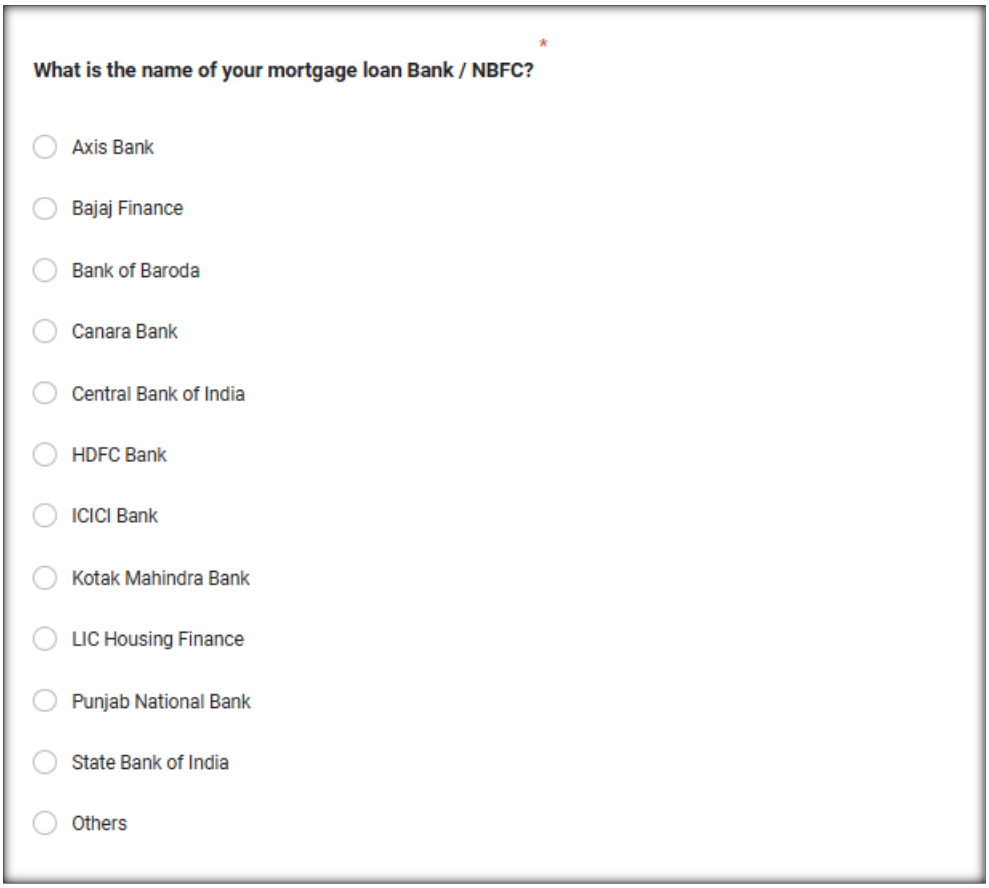
Employment Question



Income Question

State Question

Mortgage Bank Question

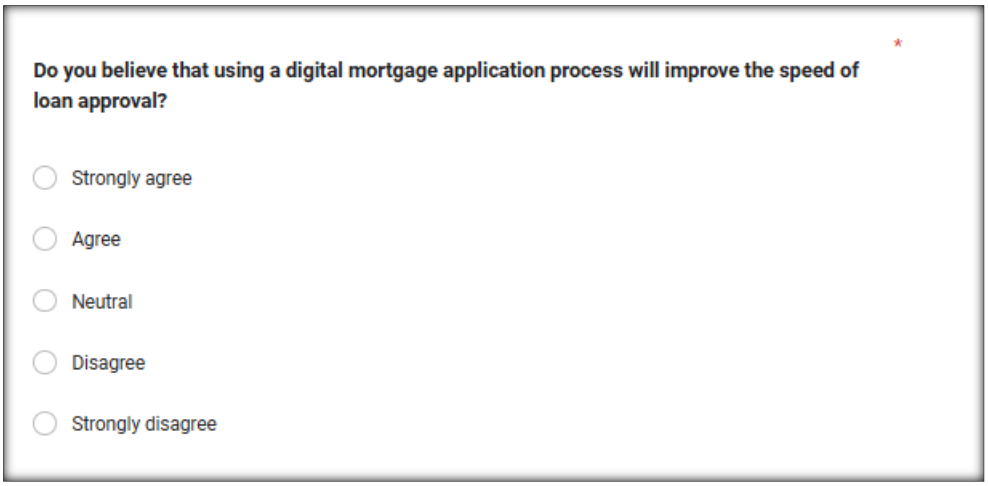


Technology Awareness Question

Section 4: Behavioural Intention Analysis

Performance Expectancy (PE) Questions

PE Question1



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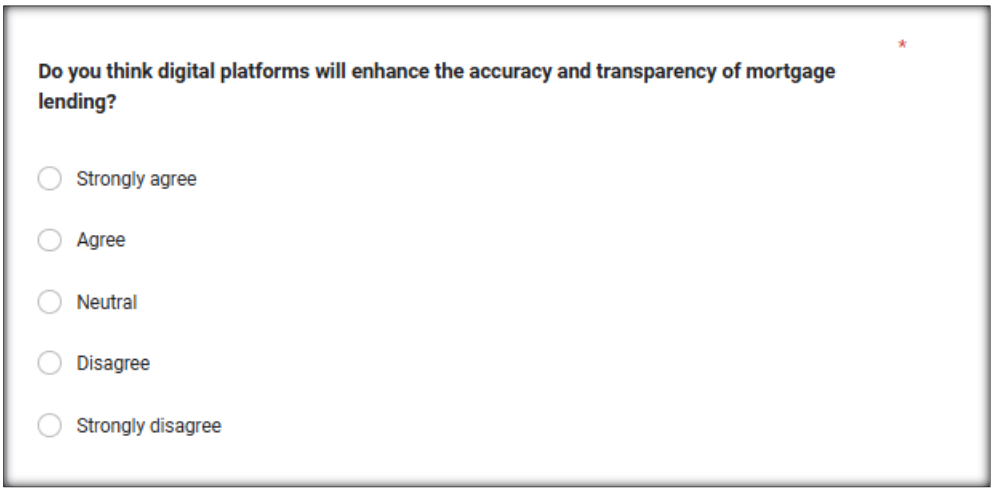
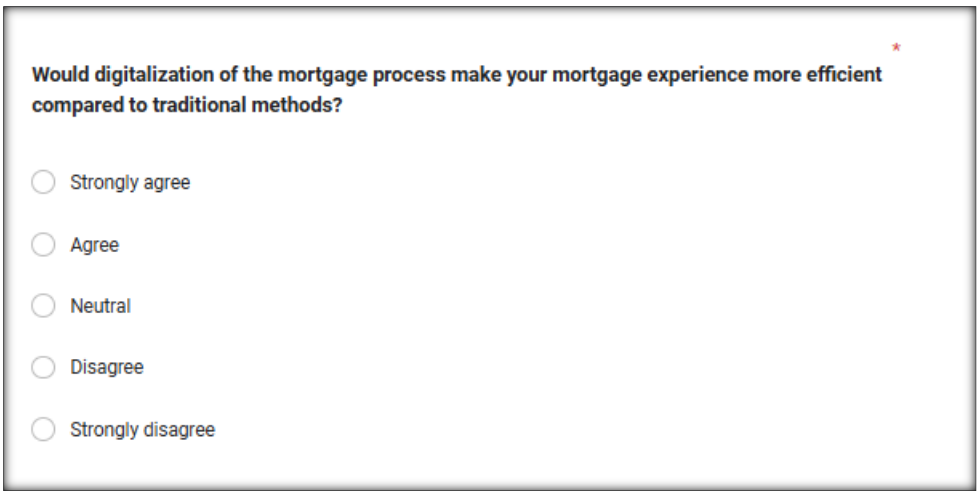
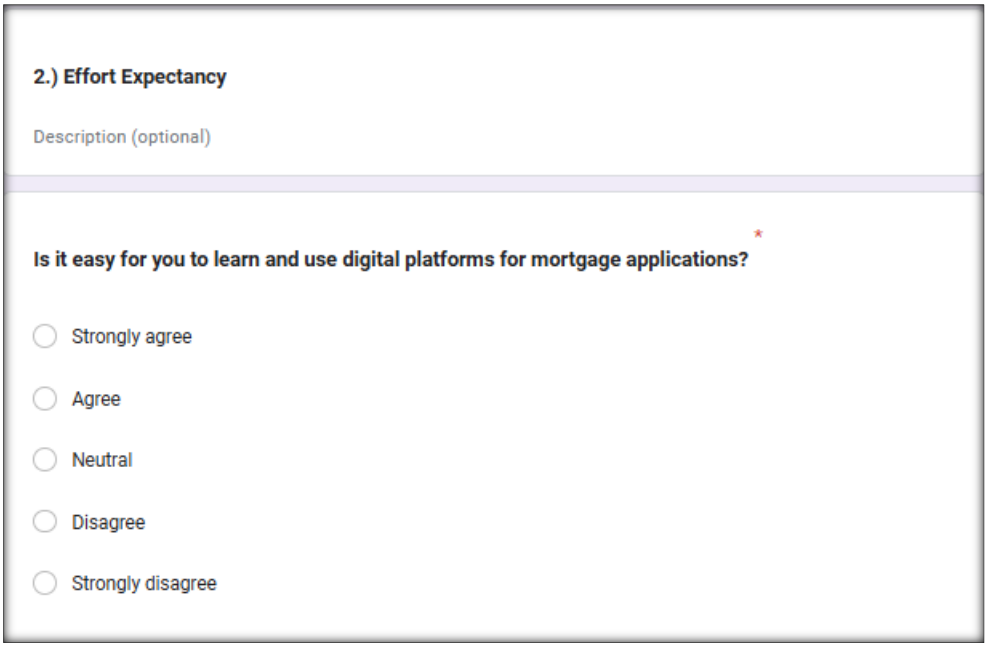


PE Question3



Effort Expectancy (EE) Questions

EE Question1



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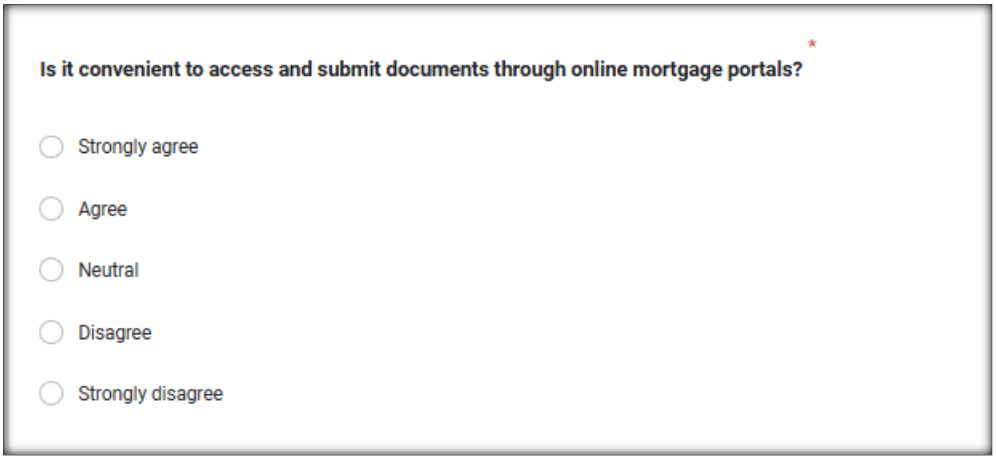
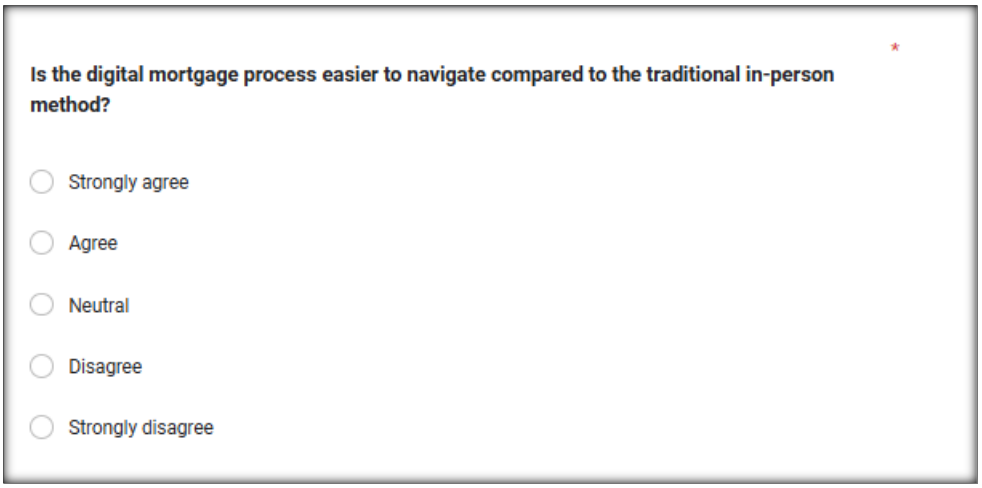
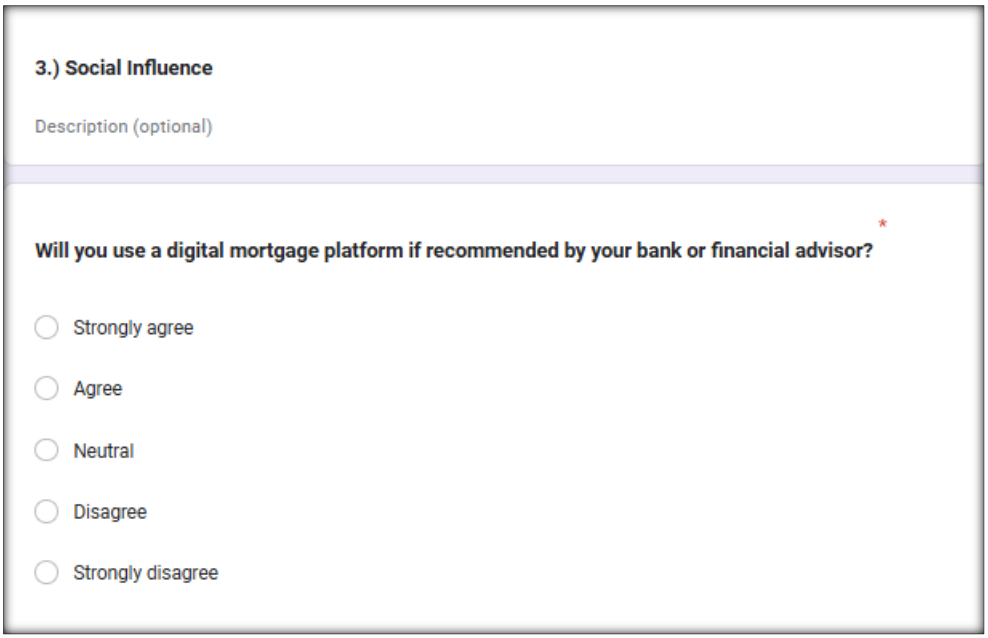


EE Question3

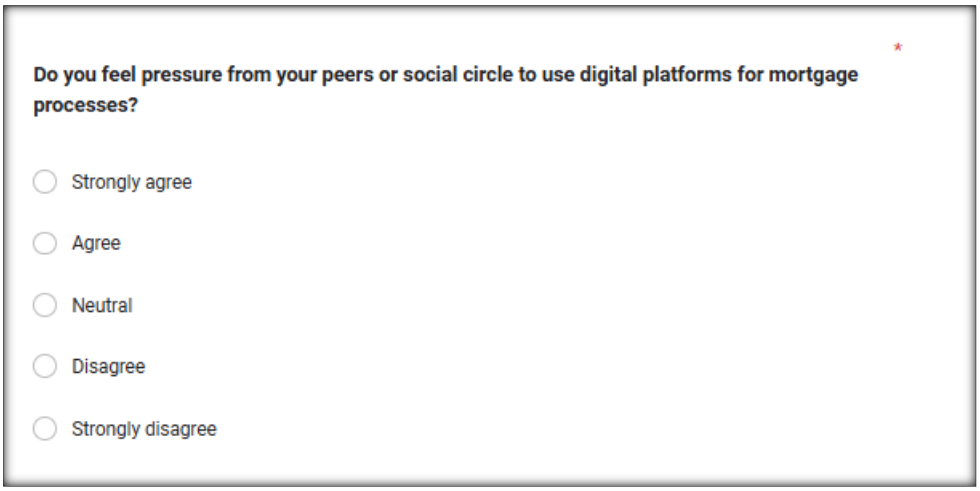


Social Influence (SI) Questions

SI Question1



SI Question2



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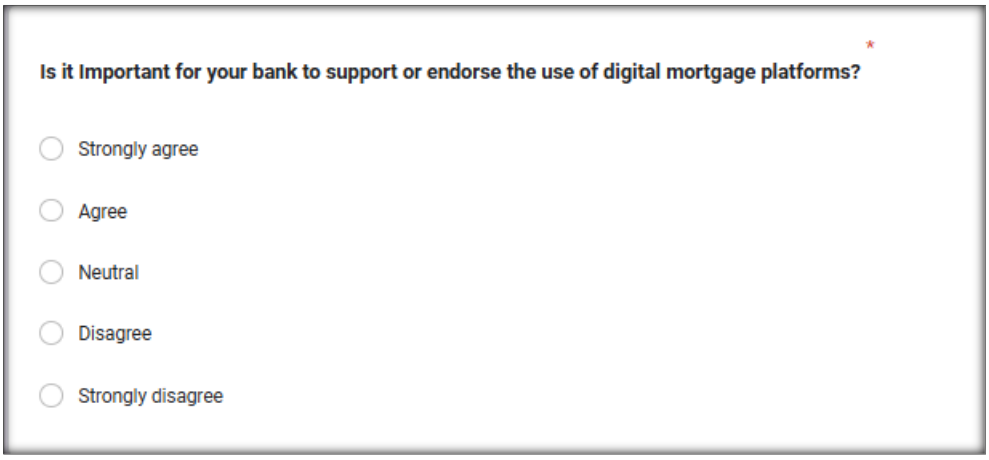
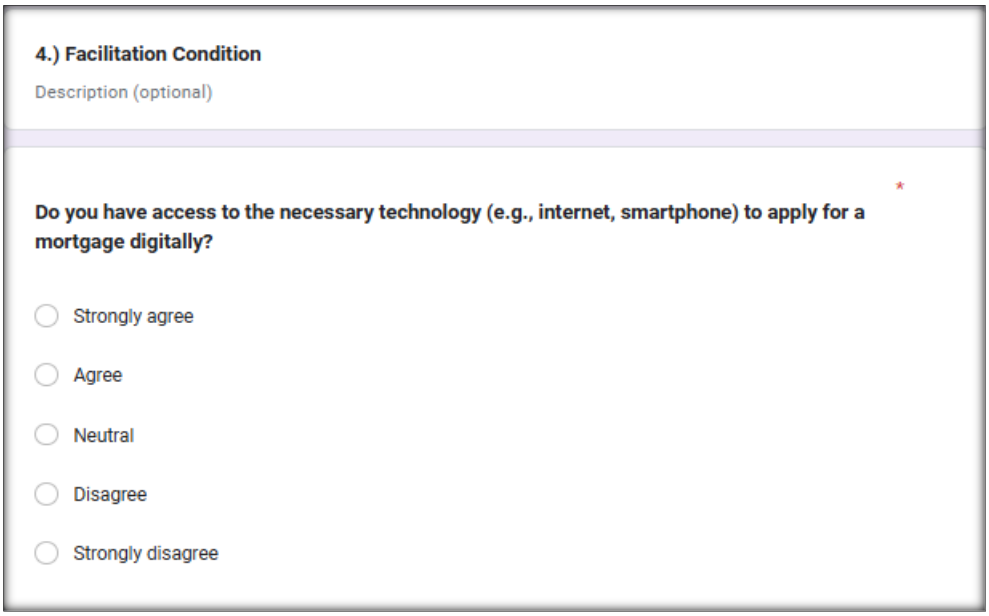


Facilitation Condition (FC) Questions

FC Question1



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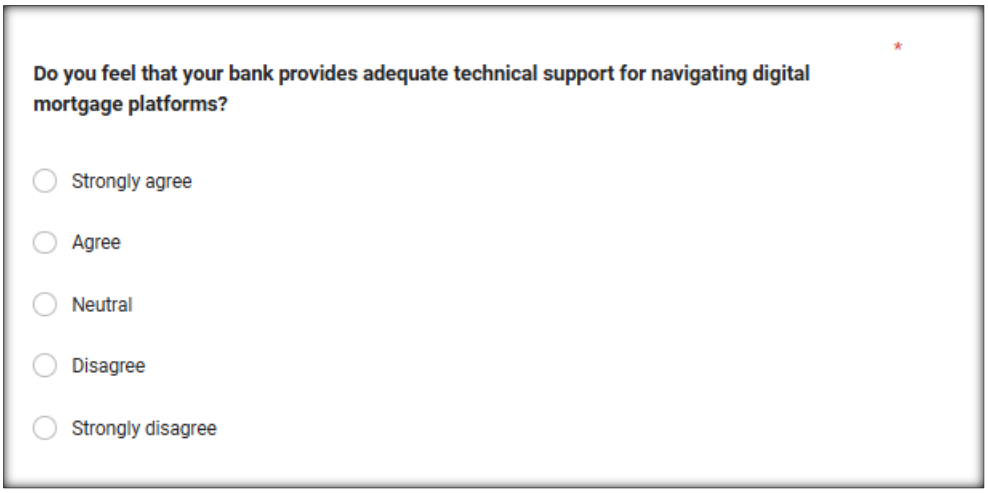

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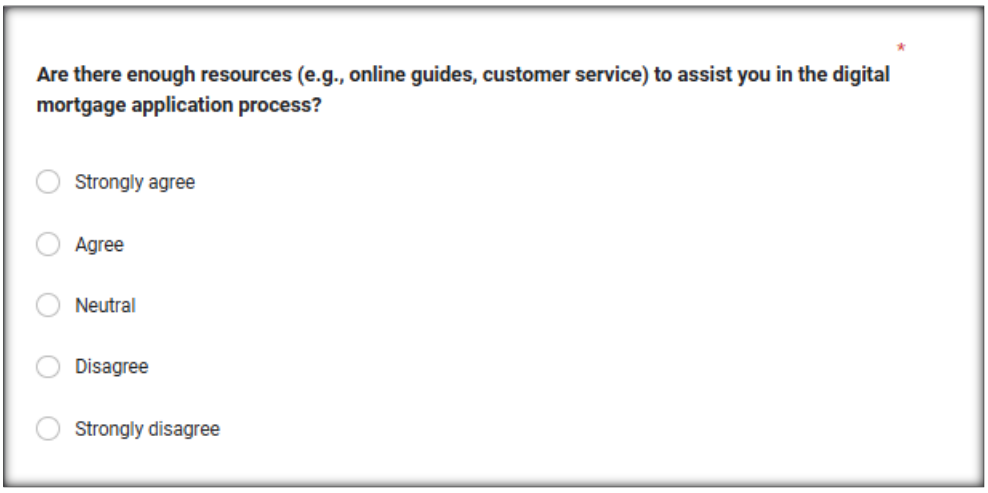
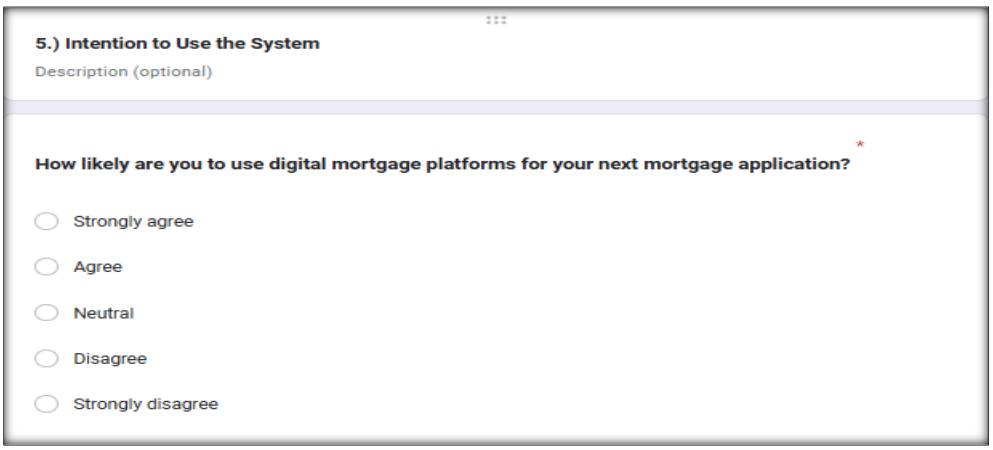
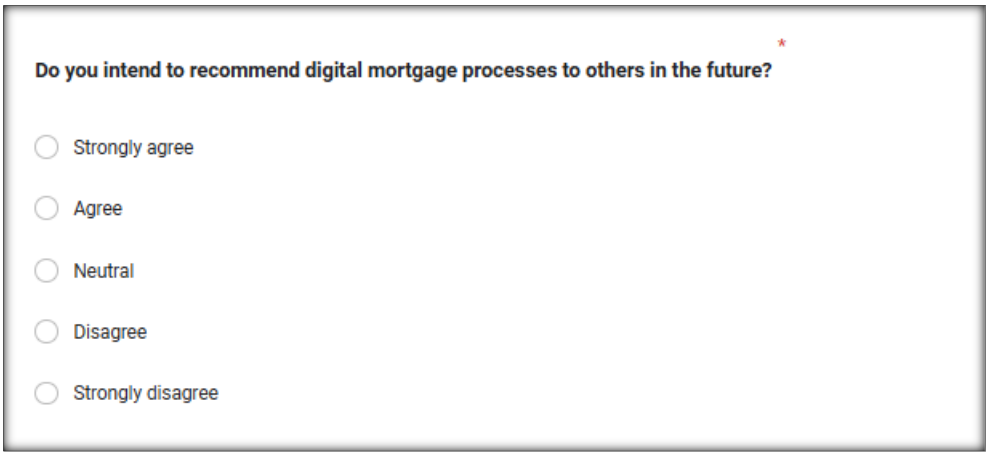


Intention to Use the System (UI) Questions

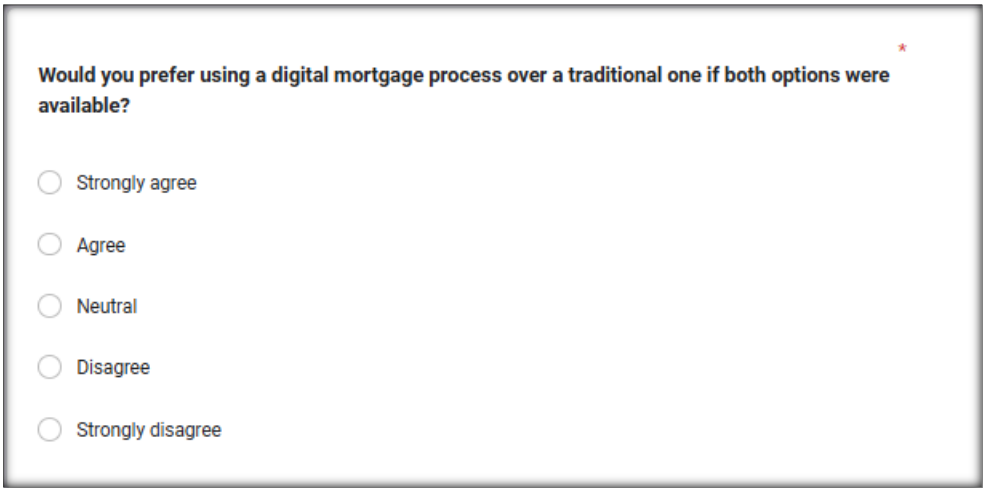
UI Question1



UI Question2

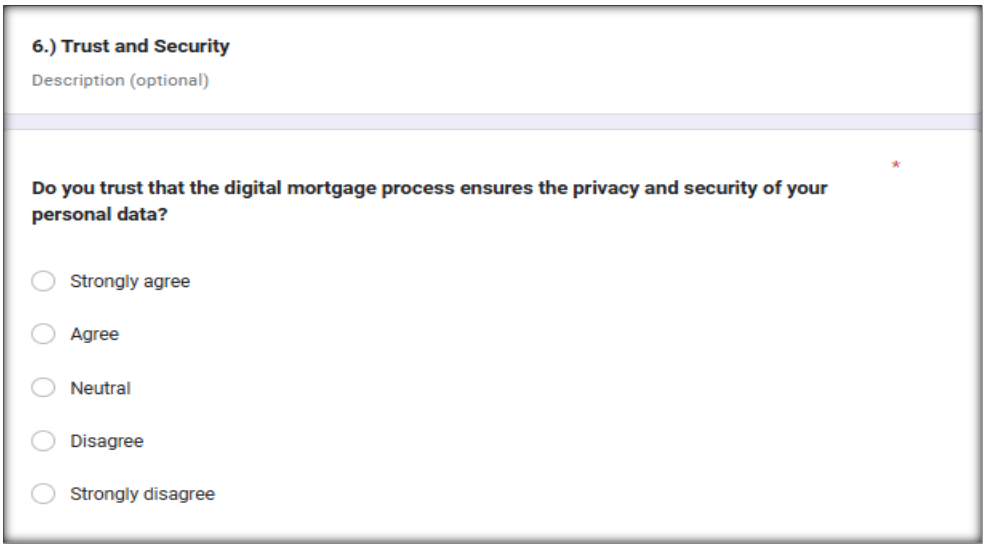


UI Question3

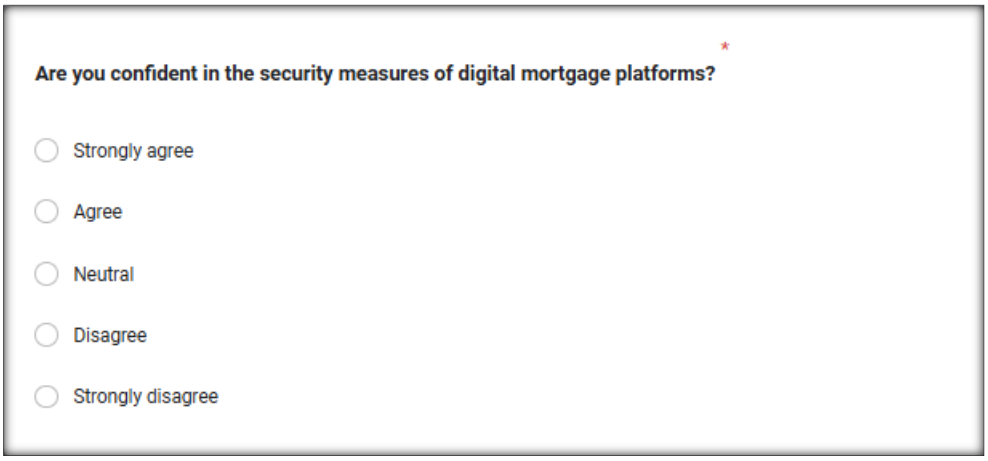


Trust and Security (TS) Questions

TS Question1

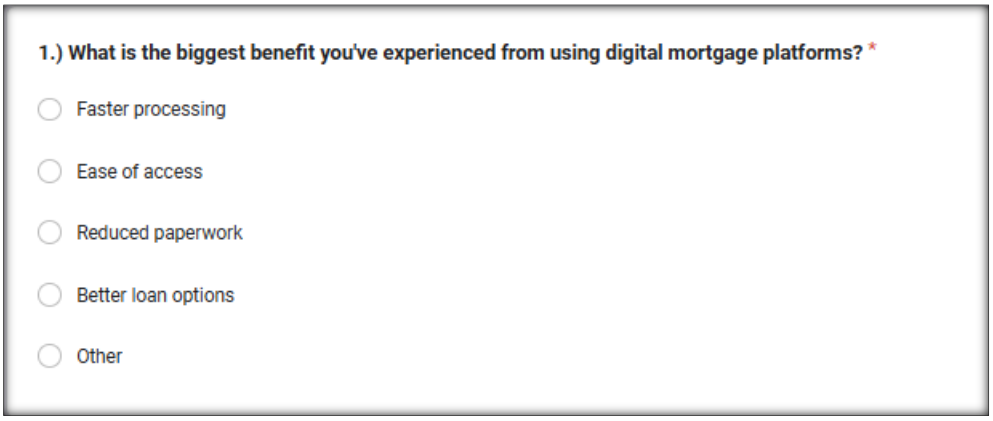


TS Question2

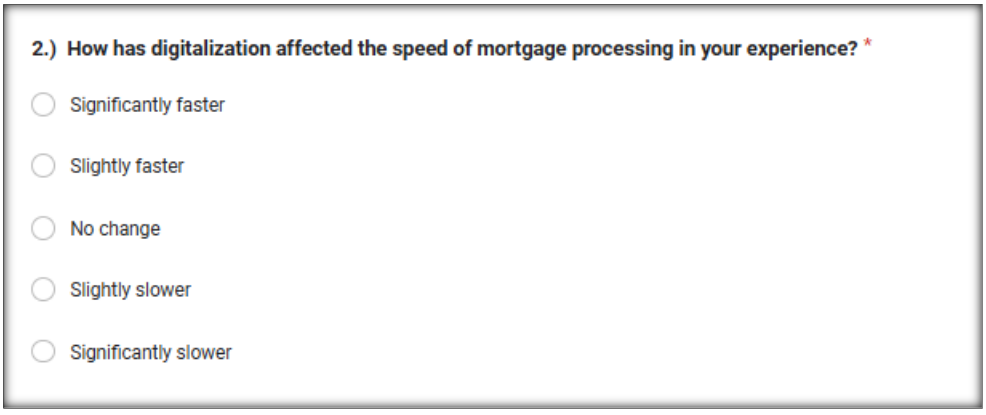


Section 5: Share Your Experience

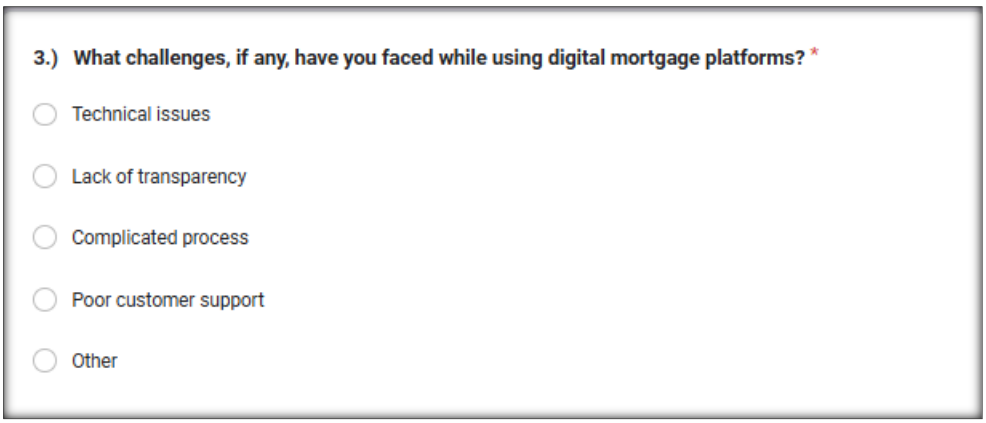
Benefit question:



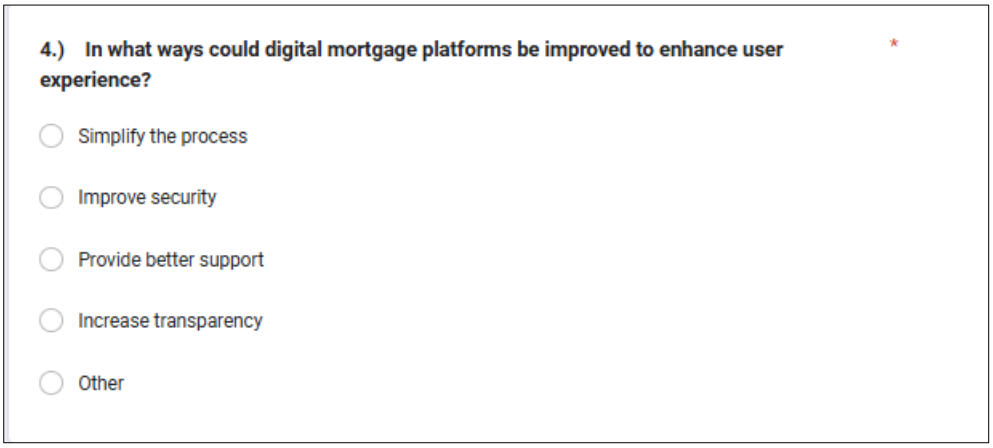
Process impact question



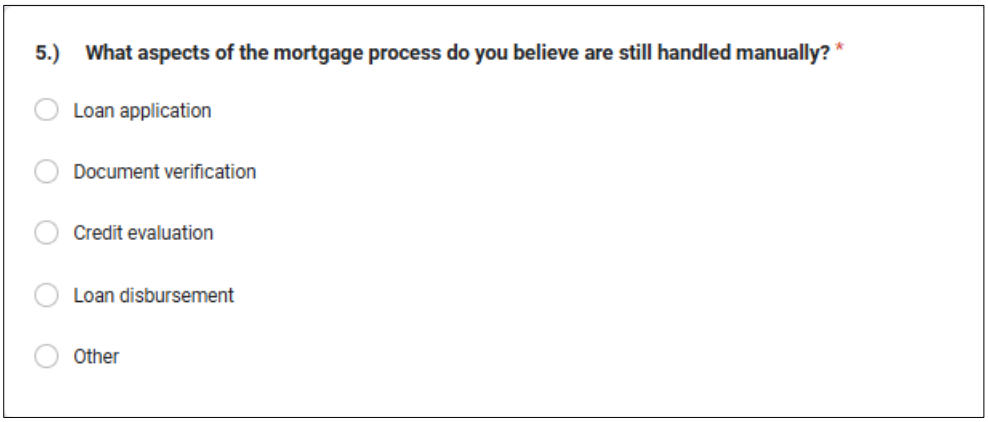
Current challenges question



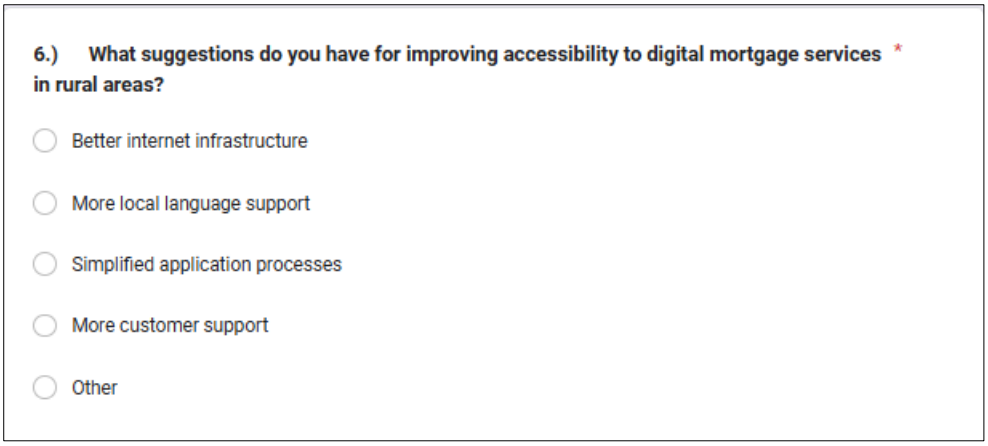
Improvement opportunities question



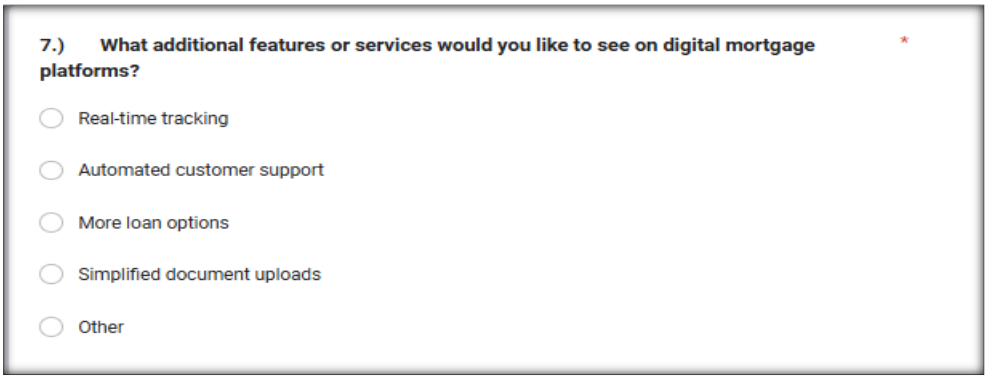
Current manual process question



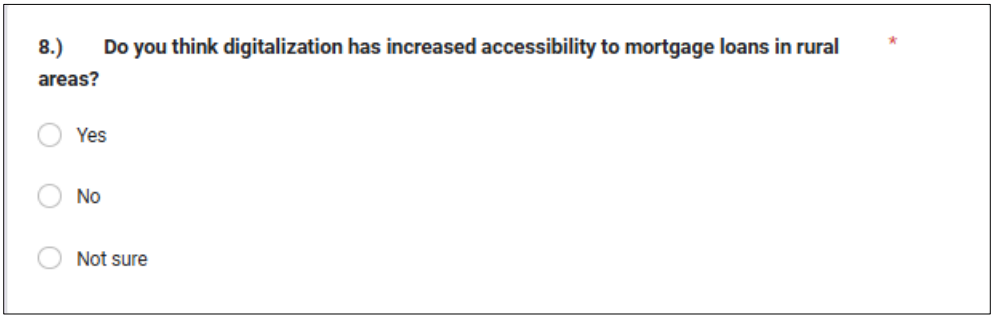
Accessibility Question



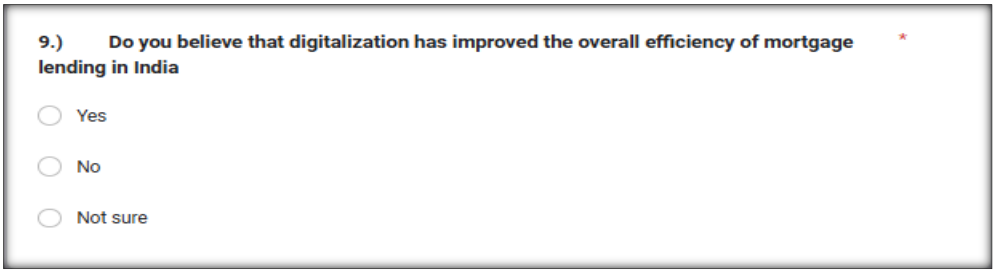
Additional features questions



Rural area impact question



Efficiency question



APPENDIX B:

INTERVIEW CONSENT FORM

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Anon. 2020. Please cite this article as : Schuetz , S . W . and Venkatesh , V . " Blockchain , Adoption , and Financial Inclusion in India : Research Opportunities ," International Journal of Information Management (52), 2020 , Blockchain , Adoption , and Financial Inclusion in India : Research Opportunities Sebastian Schuetz University of Arkansas USA Viswanath Venkatesh University of Arkansas 1 . INTRODUCTION " All the scientists and technologists should work in appropriate region , specifically the rural technologies , to transform Indian rural sector " - A . P . J . Abdul Kalam , former President of India. (52).

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