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A Conceptual Model of Digital Literacy and Customer Service Accessibility in the Banking Sector

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***Abstract*-- The rapid digital transformation of the banking sector has made digital literacy a critical prerequisite for effective customer service utilisation. This conceptual study examines how digital literacy shapes customers' ability to access and benefit from digital banking services. The proposed framework identifies three core components of digital literacyskills and awareness, confidence level, and cyber safety knowledgeand explains how these variables influence service accessibility through app usability, navigation efficiency, independent transactions, and online query handling. The study further analyses how accessibility affects key customer outcomes, including satisfaction, trust, reduced effort, and perceived inclusiveness, while considering the moderating effects of age, education, device availability, app usability, and customer support. Findings reveal that digital literacy is both a primary determinant of efficient digital service use and a driver of financial inclusion. The study concludes that enhancing digital literacy, strengthening interface design, and improving support mechanisms are essential for promoting equitable and inclusive digital adoption in the banking sector.**

***Keywords*-- Digital Literacy; Accessibility; Customer Satisfaction; Trust; Financial Inclusion; App Usability; Cyber Safety; Digital Banking; User Experience; Digital Inclusion.**

I. INTRODUCTION

Banking systems worldwide have undergone significant digitalisation, resulting in the replacement of conventional, manual operations with automated platforms, mobile applications, self-service kiosks, and AI-enabled communication channels. Today, customers can perform a wide range of activities such as opening accounts, transferring funds, monitoring transactions, and lodging service requests without visiting physical branches.

However, the growing dependence on digital channels has made digital literacy a fundamental requirement. Customers must possess the skills, confidence, and awareness needed to use digital platforms effectively. Digital literacy thus becomes a crucial determinant of service accessibility, influencing how customers navigate interfaces, interpret instructions, and complete digital transactions.

Despite increasing digital adoption, several gaps persistparticularly among rural populations, senior citizens, low-income groups, and first-time digital users. Limited digital literacy often restricts customers' access to essential services, results in frequent errors, increases dependency on branch support, and widens the digital divide. As banks continue to promote digital channels, understanding the influence of digital literacy on customer service accessibility becomes essential. This study develops a conceptual framework explaining how digital literacy affects service access and shapes customer experience in the banking sector.

II. RESEARCH PROBLEM

Although banks have made significant investments in digital infrastructure, ensuring equitable access to digital banking services remains a challenge. Variations in customers' digital literacy levels influence their ability to use online and mobile banking platforms effectively. Customers with low digital literacy often struggle with app navigation, transaction accuracy, and the interpretation of digital security procedures, making them more vulnerable to errors, delays, and cyber risks. These difficulties influence their satisfaction, trust, and willingness to adopt digital channels.

Banks frequently assume that customers will independently adapt to digital systems; however, many lack the necessary skills and confidence. This mismatch between technological advancement and customer capability leads to reduced service accessibility. Therefore, the study seeks to systematically analyse how digital literacy shapes customer access, satisfaction, and trust, and how banks can support low-literacy users through targeted interventions.

III. RESEARCH QUESTIONS

The following research questions are formulated to explore the influence of digital literacy on customers' access, experience, and satisfaction with digital banking services.

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1. How does digital literacy influence customer access to digital banking services?
2. What challenges do customers with low digital literacy face when using digital banking channels?
3. How does digital literacy affect customer satisfaction, trust, and overall service experience?
4. What strategies can banks adopt to enhance digital literacy and improve service accessibility?

IV. Research Objectives

Based on these questions, the study outlines the following objectives to systematically examine the role of digital literacy in shaping inclusive and effective digital banking practices.

1. To examine the relationship between digital literacy and customer accessibility to digital banking services.
2. To identify the major challenges faced by low-literacy customers when accessing digital banking channels.
3. To analyse how digital literacy influences customer satisfaction, trust, and perceived service quality.
4. To propose practical strategies to enhance digital literacy and promote inclusive digital banking.

V. Literature Review

The following review synthesizes previous studies that explore the impact of digital literacy on digital banking adoption, customer satisfaction, and inclusive access to financial services.

Prior studies highlight how digital transformation has reshaped banking services through improved accessibility, faster transactions, and enhanced service quality (Rupesh, 2023). Digital tools such as mobile apps, AI-driven chatbots, and automated customer support systems have improved efficiency but also increased concerns regarding cybersecurity, technological readiness, and digital literacy gaps.

Sundaralakshmi and Rajamannar (2025) emphasise convenience and ease of use as primary drivers of customer satisfaction in digital banking. However, technological readiness varies significantly among demographic groups, with lower digital literacy associated with higher anxiety and lower adoption.

The Australian Banking Association (2023) stresses accessibility and inclusion as essential components of digital service delivery. Inclusive design, universal access, and multiple communication formats are recommended to support customers with disabilities or limited digital skills.

Studies also highlight the persistent digital divide in rural contexts (Ranavade, 2019). Limited awareness, weak internet access, and low digital literacy restrict rural customers from adopting online banking, despite improvements under government initiatives such as Digital India.

Poornima and Sridharan (2024) find that higher digital literacy enhances customers' trust, ease of use, and satisfaction when using e-banking platforms. Digital literacy supports better navigation, greater service comprehension, and more effective interaction with digital interfaces.

Together, these studies show that while digital banking continues to expand, digital literacy remains a central determinant of adoption, satisfaction, and inclusiveness.

VI. Research Gap

Existing research primarily examines technology adoption, customer satisfaction, and service quality. However, limited studies position digital literacy as the central driver of service accessibility in the banking sector. Research is scattered across themes such as cyber awareness, mobile banking adoption, and digital inclusion, but lacks an integrated model linking digital literacy with accessibility, outcomes, and moderating factors.

Furthermore, studies focusing on low-literacy populations in the Indian context remain scarce. This paper addresses these gaps by proposing a conceptual model demonstrating how digital literacy influences customer service accessibility.

VII. Research Methodology

This study employs a conceptual and qualitative research methodology to develop a theoretical understanding of how digital literacy influences customer service accessibility in the banking sector. To ensure academic relevance and rigour, scholarly literature was sourced from reputable databases such as Scopus, Web of Science, SpringerLink, ScienceDirect, Emerald Insight, and Google Scholar. In addition, authoritative institutional publications from the Reserve Bank of India (RBI), World Bank, and the Australian Banking Association were reviewed to incorporate policy-level and industry-level insights. The literature search incorporated key terms including "digital literacy," "digital banking accessibility," "customer satisfaction," "cyber safety," "financial inclusion," "banking technology adoption," and "moderating factors in digital banking."

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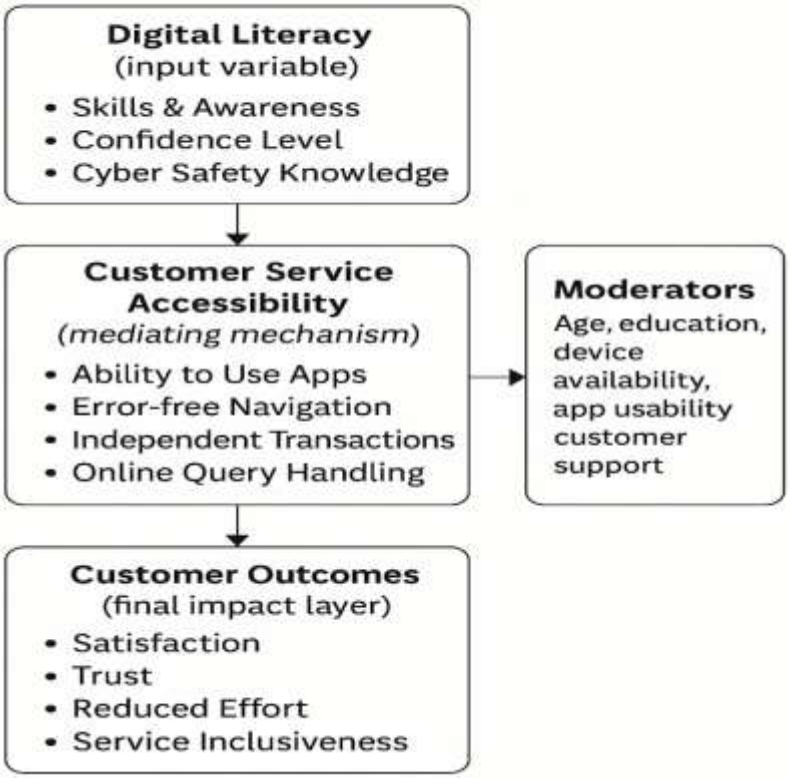
To maintain methodological quality, strict inclusion and exclusion criteria were adopted. The review considered peer-reviewed journal articles published between 2015 and 2025, studies focusing on digital literacy, digital finance, customer experience, and accessibility, and literature available in English. Non-peer-reviewed materials, highly technical IT-focused papers without behavioural relevance, and studies not directly related to digital banking accessibility were excluded. This ensured that the conceptual synthesis was grounded in credible and thematically relevant academic work.

A thematic content analysis approach was used to identify recurring constructs and patterns across the selected literature. These themes were systematically organised and synthesised to formulate a conceptual model linking digital literacy with accessibility dimensions, customer outcome variables, and moderating factors. A conceptual research design was deemed appropriate because empirical studies placing digital literacy at the centre of digital banking accessibility remain limited. This approach supports theoretical development and offers a foundation for future empirical validation in diverse banking contexts.

VIII. Conceptual Model

The following conceptual model explains how digital literacy affects customer access to digital banking services and how this, in turn, influences their overall experience. It also shows the factors that can strengthen or weaken these relationships.

FIGURE 1 · Conceptual Model



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Digital Literacy – Input Variables

Variable	*Explanation*
Skills & Awareness	This variable refers to the customer's fundamental ability to operate digital devices and navigate online banking platforms. It includes basic operational skills such as using smartphones, installing apps, handling internet settings, and updating software. It also covers navigation skills, like moving across banking app menus, filling online forms, and completing common banking tasks such as checking balances, transferring funds, paying bills, or viewing account statements. Additionally, awareness of digital servicessuch as UPI, mobile banking features, SMS alerts, digital passbooks, and chatbotsplays a crucial role in enabling customers to fully utilize digital banking. Higher skills and awareness allow customers to perform banking activities independently, reducing errors, saving time, and minimizing their reliance on bank staff.
Confidence Level	Confidence level represents the customer's psychological comfort and self-assurance when using digital banking services. Even if skills are present, customers with low confidence may hesitate due to fear of selecting the wrong option, making mistakes, or facing transaction failures. Their confidence is influenced by previous experiences with digital systems successful experiences build trust, while failed or confusing attempts reduce confidence. When confidence is high, customers are more willing to explore new digital features, attempt transactions without assistance, and adopt digital banking as a preferred mode of service. Thus, confidence strongly affects digital channel usage, independence, and overall customer satisfaction.
Cyber Safety Knowledge	This variable refers to the customer's understanding of digital risks and their ability to apply safe practices while using online banking services. It includes awareness of common threats such as phishing messages, fraudulent calls, fake apps, suspicious links, and scam websites. Customers must also know secure online behavior using strong passwords, keeping PINs and OTPs confidential, enabling two-factor authentication, logging out after transactions, and avoiding risky environments like public Wi-Fi. Additionally, the ability to identify red flags such as unexpected requests for personal details or unfamiliar numbers asking for financial informationhelps prevent fraud. When customers possess strong cyber safety knowledge, they develop trust in digital banking and feel secure while performing online transactions, thereby increasing adoption and reducing vulnerability to cybercrime.

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Accessibility – Variables

Variable	*Explanation*
Ability to Use Apps	This variable refers to how easily customers can interact with the primary digital service application, such as a mobile banking app or online portal. It focuses on the simplicity, clarity, and user-friendliness of the app interface. When apps have intuitive designswith clear icons, simple layouts, and minimal steps customers require less time and effort to learn how to use them. A high ability to use apps means that customers can quickly understand where features are located, how to initiate transactions, and how to access information without confusion. This ease of use significantly enhances the customer experience and encourages repeated use of digital services.
Error-free Navigation	Error-free navigation indicates the smoothness and correctness of the flow within the digital platform. This includes the absence of broken links, confusing menus, unclear instructions, or misleading prompts. When customers move through the app or website, each step should logically and efficiently guide them toward completing their task. Poor navigation results in repeated attempts, frustration, and abandonment of digital channels. Conversely, seamless navigation minimizes user errors, reduces the need for customer support, and ensures that customers can achieve their goals such as checking account information or making paymentsquickly and accurately.
Independent Transactions	Independent transactions measure the customer's ability to perform complete digital tasks without external help. This includes executing complex services such as fund transfers, bill payments, ticket booking, updating personal details, or applying for financial products. When customers can complete these activities independently, it indicates that the digital platform is both functional and user-friendly. High independence reduces the need for physical branch visits or calls to customer care, ultimately saving time for both the customer and the organization. It also reflects the platform's clarity, reliability, and ability to support end-to-end transactions smoothly.
Online Query Handling	This variable refers to how efficiently digital support channelssuch as chatbots, FAQs, in-app help centers, or messaging systemscan resolve customer questions or problems. Effective query handling means that customers receive quick, accurate, and relevant responses without waiting for human intervention. When digital support is strong, customers feel more confident using online services because they know that help is instantly available. This reduces frustration, enhances satisfaction, and increases reliance on digital platforms as a primary service mode. Good online query handling directly contributes to higher digital adoption and better customer experience.

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Customer Outcomes – Variables

Variable	*Explanation*
Satisfaction	Satisfaction refers to the customer's overall positive emotional response after using a digital service. It reflects whether the service experience met, exceeded, or fell short of their expectations. When digital platforms function smoothly, provide clear instructions, and allow customers to complete tasks easily, satisfaction naturally increases. A high level of satisfaction indicates that the customer perceives the service as valuable, efficient, and user-friendly. This is crucial because satisfied customers are more likely to continue using digital channels, recommend the service to others, and maintain long-term engagement with the organization.
Trust	Trust represents the customer's belief that the service provider is reliable, secure, and transparent. In digital environmentsespecially in financial or sensitive sectorstrust is a foundational outcome. Customers must feel confident that their data is protected, transactions are handled correctly, and the platform operates with integrity. Trust grows when the system consistently performs without errors, communicates clearly, and offers strong cyber safety measures. When trust is high, customers feel safe using digital services, leading to sustained adoption and loyalty to the organization.
Reduced Effort	Reduced effort refers to how easily and efficiently customers can complete their digital tasks with minimal time, stress, or confusion. This outcome focuses on the overall simplicity of the interaction from logging in to completing the final transaction. When platforms are well-designed, with fewer steps, clear navigation, and quick responses, customers experience less mental and physical effort. A reduction in effort is one of the strongest indicators of digital service quality because customers prefer solutions that save time and minimize frustration. This outcome directly contributes to higher satisfaction and repeat usage.
Service Inclusiveness	Service inclusiveness reflects how well the digital platform accommodates users from diverse backgrounds, age groups, literacy levels, and abilities. It ensures that no category of userssuch as senior citizens, rural customers, people with disabilities, or individuals with limited educationis excluded from accessing digital services. Inclusive design includes features like simple language, multilingual support, accessible layouts, alternative input options, and compatibility with assistive technologies. When services are inclusive, customers feel respected, valued, and empowered to participate fully in the digital ecosystem, regardless of their limitations. This outcome strengthens the organization's commitment to equal access and broadens digital adoption across varied populations.

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Moderators – Variables

Variable	*Explanation*
Age	Age acts as an important moderating factor because it influences the comfort, familiarity, and adaptability of customers toward digital technology. While younger users typically adopt new digital tools quickly, older customers may face difficulties due to lower exposure or slower adaptation to rapid technological changes. Even if older users possess education or experience, they may still prefer simplified layouts, larger icons, or clearer instructions to feel comfortable. Age does not directly determine outcomes like satisfaction or trust, but it affects how effectively accessibility translates into positive experiences. Thus, digital platforms need age-friendly designs to ensure equal usability across all age groups.
Education	Education level moderates the relationship between accessibility and outcomes by affecting how well customers understand technical instructions, digital terminology, and online financial workflows. Customers with higher educational backgrounds often find it easier to interpret app interfaces, follow step-by-step procedures, and handle complex financial tasks. In contrast, customers with limited education may struggle with technical language or unfamiliar digital processes, even if the platform is accessible. Education does not directly cause satisfaction, but it shapes how effectively users can benefit from a well-designed digital system.
Device Availability	Device availability refers to whether customers possess a reliable, functional devicesuch as a smartphone, laptop, or tabletrequired for consistent digital service usage. Even if a digital service is highly accessible and the customer is digitally literate, poor or limited access to devices can weaken the overall experience. For example, customers with outdated phones, slow internet, or shared devices may face hurdles in completing transactions smoothly. Thus, device availability acts as a moderating variable that determines whether accessibility can fully translate into positive outcomes like satisfaction and trust.
App Usability	App usability measures the actual quality, intuitiveness, design, and responsiveness of the application. Even if customers have strong digital literacy and high accessibility, a poorly designed appwith frequent errors, slow loading times, confusing menus, or unstable performancecan disrupt the user experience. App usability strengthens or weakens the connection between accessibility and outcomes. A user-friendly, stable app enhances satisfaction and trust, while a faulty or complicated app discourages usage and reduces digital adoption. Therefore, app usability is a critical moderator that shapes the effectiveness of online service delivery.
Customer Support	Customer support acts as a safety net when digital accessibility fails. It includes human assistance provided through call centers, branch staff, live chat agents, or support lines. When customers encounter difficulties or errors, quick and reliable support helps them regain confidence and trust in the service. Strong customer support reduces frustration and prevents digital abandonment, especially for vulnerable segments like elderly or low-literate users. Although support does not directly create satisfaction, it moderates the relationship by ensuring that any breakdown in accessibility does not negatively impact final outcomes.

IX. Findings Of The Study

The conceptual framework brings out several important insights into how digital literacy, accessibility, and moderating factors collectively influence customer outcomes in banking sector. The findings are summarised below:

1. Digital Literacy is the Foundation of Effective Digital Service Use

The analysis confirms that digital literacy comprising skills and awareness, confidence level, and cyber safety knowledge is the most powerful predictor of a customer's ability to use digital banking services effectively.

Customers with strong digital literacy navigate applications smoothly, understand platform features, complete online transactions independently, and require minimal staff intervention. In contrast, those lacking digital skills experience hesitation, confusion, and difficulty interacting with digital interfaces, proving that literacy forms the essential base for digital inclusion.

2. Limited Digital Literacy Creates Practical and Psychological Barriers

Low digital literacy is found to be a major barrier to digital service utilisation. Customers with limited skills struggle with basic app operations, face login and password errors, and take longer to understand on-screen instructions.

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Psychological barriers such as fear of making mistakes, mistrust of digital systems, and anxiety about cyber fraud further discourage usage. These customers often abandon digital attempts and revert to physical banking channels, leading to digital exclusion.

3. Accessibility Serves as the Key Mediator between Literacy and Outcomes

The findings show that accessibility variables ability to use apps, error-free navigation, independent transactions, and effective online query handling mediate the relationship between digital literacy and customer outcomes like satisfaction, trust, reduced effort, and inclusiveness. Even highly literate customers face poor outcomes if the app is complex or error-prone. Conversely, well-designed, user-friendly platforms significantly enhance satisfaction even for moderately literate users. Thus, accessibility acts as the bridge connecting literacy to positive service experiences.

4. Customer Outcomes Depend on Both Literacy and Accessibility Quality

The final outcomes satisfaction, trust, reduced effort, and perceived inclusiveness are shaped by how effectively the customer is able to access and use digital services. Digitally skilled customers who experience smooth navigation and reliable apps report higher satisfaction and trust. They perceive digital banking as fast, efficient, and empowering. On the other hand, customers with low literacy or who face poor app usability show frustration, reduced trust, and a sense of exclusion. Therefore, customer outcomes are the result of both personal capabilities and system design quality.

5. Digital Literacy Directly Affects Financial and Service Inclusion

A notable insight is that digital literacy determines whether customers can participate in digital finance. In rural, low-income, and elderly segments, literacy gaps lead to unequal access to digital payments, online banking, and financial information. This reinforces the digital divide. Improving literacy is therefore not only a technology issue but also a social inclusion and equity concern.

X. Suggestions & Recommendations

The following recommendations are proposed to strengthen digital literacy adoption and enhance customer experience:

1. Implement Comprehensive Digital Literacy Initiatives

Banks should organise structured digital literacy programs through workshops, village-level outreach camps, community centres, and online learning modules. These initiatives must specifically target vulnerable groups such as rural populations, senior citizens, and first-time digital users. Regular awareness drives will help build foundational digital skills and reduce fear or hesitation among low-literate customers.

2. Develop Simple and User-friendly Digital Interfaces

Mobile banking applications and online portals should be redesigned to prioritise simplicity and accessibility. Key features may include large and visually clear icons, voice-based navigation for low-literate users, multilingual options covering major regional languages, and step-by-step guided instructions. Such design improvements significantly enhance ease of use and reduce navigation-related errors.

3. Establish Assisted Digital Service Counters in Branches

Branches should introduce dedicated "Digital Help Counters" where trained staff assist customers in performing digital transactions. These counters can guide users through tasks such as UPI registration, app installation, fund transfers, and online form submission. This hybrid support model encourages digital adoption while ensuring that no customer is left behind.

4. Enhance Cybersecurity Awareness for All User Segments

Banks must strengthen cybersecurity education by offering clear, simple, and actionable guidelines on safe digital practices. Customers should be trained to identify fraudulent messages, avoid sharing passwords or OTPs, recognise scam links, and understand secure transaction behaviour. Continuous awareness campaigns through SMS alerts, posters, videos, and app notifications can build long-term digital trust.

5. Leverage AI-based Support Tools for Low-literacy Users

The adoption of AI-driven tools—such as conversational chatbots, voice-enabled banking assistants, and video banking services—can significantly support customers with limited reading or typing abilities. These tools can offer real-time help, simplify complex instructions, and guide users through transactions in an interactive and user-friendly manner.

6. Strengthen Partnerships with Government Digital Inclusion Programs

Banks should collaborate actively with government initiatives such as Digital India, Pradhan Mantri Jan DhanYojana (PMJDY), financial literacy missions, and community digital training schemes. Such partnerships can extend the reach of digital education, promote inclusive financial access, and accelerate digital empowerment across underserved regions.

XI. CONCLUSION

Digital literacy has emerged as a fundamental prerequisite for meaningful participation in modern banking systems. Customers possessing strong digital competencies are able to access services with ease, perform transactions independently, and report higher levels of satisfaction and trust. In contrast, individuals with limited digital literacy encounter significant barriersranging from navigation difficulties to heightened fear of fraudwhich can lead to partial or complete exclusion from digital financial services.

This conceptual study highlights that digital literacy not only has a direct impact on service accessibility but also indirectly shapes key customer outcomes such as trust, satisfaction, reduced effort, and perceived inclusiveness. The proposed model provides a comprehensive framework explaining how literacy, accessibility, outcomes, and moderating factors interact to influence the overall customer experience.

By offering a structured pathway, the model equips banks with actionable insights to support digitally vulnerable populations. Strengthening digital literacy is therefore essential for achieving equitable, inclusive, and accessible banking services in the digital era. Ensuring that every customerregardless of age, education, or backgroundcan confidently use digital platforms is a critical step toward a more financially empowered society.

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