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Factors Influencing Adoption of Sustainable Banking Services: A SEM-Based Study

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	Abstract
<p>Mohammed Omer Rafique Assistant Professor Faculty of Management Sciences, SZABIST University, Karachi. omerrafiq1@gmail.com</p> <p>Javed Hussain Assistant Professor Govt. Superior Commerce College Karachi . javedhussainnjam@gmail.com</p> <p>Syed Meeran Hasnain (Corresponding Author) Assistant Professor Ziauddin University. meeran.hasnain@zu.edu.pk</p>	<p>This study examined the factors influencing the adoption of sustainable banking services using a structural equation modelling (SEM) approach. In recent years, financial institutions have increasingly introduced sustainable banking practices aimed at promoting environmentally responsible and socially inclusive financial services. Despite growing availability, customer adoption of these services remains limited, particularly in developing economies where awareness and trust in financial innovations vary significantly. The study proposed and tested a conceptual model in which awareness, perceived benefits, trust in banks, and digital banking ease were considered as independent variables influencing sustainable banking adoption. Adoption intention was examined as a mediating variable, while actual usage behavior served as the dependent variable. The study adopted a quantitative research design, and data were collected through a structured questionnaire using a five-point Likert scale. A sample of respondents familiar with banking services was targeted to ensure relevance to the research objectives. Structural equation modelling (SEM) was employed to analyse the relationships among variables and to assess both direct and indirect effects within the proposed framework. The findings indicated that awareness of sustainable banking services significantly influenced adoption intention, highlighting the importance of knowledge dissemination. Perceived benefits and trust in banks were also found to play critical roles in shaping users' willingness to adopt such services. Additionally, digital banking ease emerged as a significant predictor, suggesting that user-friendly digital platforms enhance acceptance of sustainable financial products. The mediating role of adoption intention was confirmed, demonstrating that behavioral intention acts as a key mechanism through which cognitive and perceptual factors translate into actual usage behavior. Overall, the study concluded that increasing awareness, strengthening trust, improving perceived value, and enhancing digital accessibility are essential for promoting sustainable banking adoption. The findings provide practical implications for banks and policymakers aiming to expand sustainable finance initiatives and improve customer participation in environmentally responsible banking systems.</p>
<p>Keywords:</p>	<p>Sustainable Banking Services, Adoption Intention, Usage Behavior, Digital Banking Ease, Trust in Banks, Perceived Benefits, Awareness, Sustainable Finance, Banking Technology Adoption, Structural Equation Modelling (SEM), Consumer Behavior, Green Banking, Financial Technology, Karachi Banking Sector.</p>



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Introduction

The banking sector plays a critical role in shaping economic development, financial inclusion, and sustainable growth. In recent years, the concept of sustainable banking has gained significant attention as financial institutions increasingly recognize their responsibility toward environmental protection, social well-being, and long-term economic stability (Xie et al., 2024). Sustainable banking refers to the integration of environmental and social considerations into banking operations, products, and decision-making processes (Bosone et al., 2022). This includes financing environmentally friendly projects, promoting responsible lending practices, and offering digital financial solutions that reduce resource consumption and improve efficiency (Handoyo et al., 2026).

Globally, banks are transitioning toward more sustainable financial systems in response to climate change concerns, regulatory pressures, and changing customer expectations. However, despite institutional efforts and policy support, the actual adoption of sustainable banking services by customers remains inconsistent (Archer, 2022). Many individuals continue to rely on conventional banking services due to limited awareness, lack of trust, perceived complexity, and insufficient understanding of sustainability-oriented financial products. This gap between availability and adoption highlights the need to explore behavioral and psychological factors influencing customer decision-making (Chen et al., 2025). In developing countries, including Pakistan, the adoption of sustainable banking services is still at an emerging stage (Hasan et al., 2025). While digital banking and mobile financial services have expanded rapidly, sustainable banking initiatives are relatively new and not widely understood by the general public. Customers often prioritize convenience, cost, and familiarity over sustainability-oriented financial decisions (Kumar & Prakash, 2019). As a result, understanding the determinants that drive or hinder adoption is essential for both financial institutions and policymakers aiming to promote sustainable finance (Kumar & Prakash, 2020).

Previous research has identified several key factors influencing financial service adoption, including awareness, perceived usefulness, trust, and ease of use. Awareness plays a foundational role, as individuals cannot adopt services they are not informed about. Perceived benefits influence the extent to which users believe that a financial service adds value to their lives (Salim et al., 2023). Trust in banks remains a crucial factor, particularly in financial decision-making, as customers are more likely to adopt services offered by institutions, they perceive as reliable and secure. Similarly, digital banking ease, often associated with user-friendly interfaces and accessibility, has been shown to significantly affect the acceptance of modern banking services (Ojong et al., 2014).

However, adoption is not solely determined by direct influences. Behavioral intention often acts as an intermediate psychological mechanism that translates perceptions and beliefs into actual behavior. The Theory of Planned Behavior supports the idea that intention is a strong predictor of actual usage (Ziolo, 2026). Therefore, examining adoption intention as a mediating variable provides deeper insight into how cognitive and perceptual factors eventually lead to behavioral outcomes (Saif-Alyousfi & Alshammari, 2025).

Despite growing literature on digital banking and financial technology adoption, limited studies have focused specifically on sustainable banking services, particularly within the context of developing economies (Singh et al., 2026). Moreover, few studies have integrated multiple determinants into a single comprehensive model using structural equation modelling (SEM). SEM allows researchers to test complex relationships between observed and latent variables simultaneously, making it an appropriate method for analyzing adoption behavior in a multidimensional framework (Starks, 2023).

Therefore, this study aims to fill this research gap by examining the factors influencing the adoption of sustainable banking services, with a particular focus on awareness, perceived benefits, trust in banks, and digital banking ease (Pallavi & Dsa, 2024). It further investigates the mediating role of adoption intention in shaping actual usage behavior. By applying SEM, this research provides a robust analytical framework to understand both direct and indirect relationships among variables (Zaimovic et al., 2023).

The findings of this study are expected to contribute to the literature on sustainable finance and consumer behavior by offering empirical evidence from a developing economy context. Additionally, the results will provide practical insights for banks, policymakers, and financial service providers to design strategies that enhance customer adoption of sustainable banking services (Chen et al., 2025). Ultimately, promoting sustainable banking adoption can contribute to broader goals of financial inclusion, environmental responsibility, and long-term economic sustainability.

Literature Review

Sustainable Banking Services

Sustainable banking refers to banking practices that incorporate environmental, social, and long-term economic considerations into financial operations and services. Unlike traditional banking systems that primarily focus on profitability, sustainable banking emphasizes responsible financial activities that contribute to societal welfare and environmental protection (Ogundele et al., 2025). Sustainable banking services may include paperless banking, green financing, digital banking systems that reduce carbon footprints, financing renewable energy projects, and encouraging environmentally responsible consumer behavior (Muchiri et al., 2025).

The growing concern regarding environmental sustainability and responsible consumption has encouraged banks worldwide to introduce sustainable financial products and services. Financial institutions are increasingly promoting eco-friendly practices through digital transformation and sustainable operational policies (Adhikari et al., 2025). However, customer acceptance and usage of sustainable banking services remain a challenge, particularly in developing economies where awareness and trust toward innovative financial practices are still evolving (Riegler, 2023).

Several theoretical frameworks explain customer adoption behavior toward technological and financial innovations. The Technology Acceptance Model (TAM) emphasizes perceived usefulness and ease of use as determinants of behavioral intention and usage behavior (Lee & Chen, 2025). Similarly, the Theory of Planned Behavior (TPB) highlights the importance of attitudes and intentions in predicting actual behavior. Drawing from these theories, this study examines awareness, perceived benefits, trust in banks, and digital banking ease as key determinants of adoption intention and usage behavior regarding sustainable banking services (Alshamesti et al., 2025).

Awareness and Adoption Intention

Awareness refers to the extent to which individuals possess knowledge and understanding regarding sustainable banking services and their benefits (Ferreira et al., 2023). Awareness is considered one of the most important factors influencing customer adoption behavior because individuals are unlikely to use services, they do not fully understand. In the context of sustainable banking, awareness includes knowledge about environmentally friendly banking practices, paperless transactions, green loans, digital banking applications, and socially responsible financial initiatives (Saif-Alyousfi & Alshammari, 2025).

Previous studies have shown that awareness significantly influences consumers' attitudes and intentions toward adopting innovative financial services. Customers who are informed about the positive environmental and economic impacts of sustainable banking are more likely to develop favourable attitudes toward such services. Awareness also reduces uncertainty and increases confidence in financial decision-making (Kumar & Prakash, 2020).

Research on digital financial services has consistently demonstrated that customer education and promotional campaigns positively influence service adoption. In developing countries, lack of awareness often acts as a barrier preventing customers from transitioning from traditional banking systems to sustainable financial alternatives. Therefore, increasing public understanding through awareness campaigns, educational seminars, and digital communication may significantly improve adoption intention (Pallavi & Dsa, 2024).



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Hypothesis 1 (H1): *Awareness positively influences adoption intention toward sustainable banking services.*

Perceived Benefits and Adoption Intention

Perceived benefits refer to the degree to which customers believe that sustainable banking services provide value, convenience, efficiency, or advantages over conventional banking methods. Customers are more likely to adopt services when they perceive them as beneficial to their personal, financial, or social well-being (Lusardi & Messy, 2023). In sustainable banking, perceived benefits may include convenience of digital transactions, time-saving services, lower transaction costs, accessibility, environmental contribution, and improved financial management. The perceived usefulness component of the Technology Acceptance Model suggests that users adopt technologies when they believe those technologies enhance their performance or lifestyle.

Several studies on banking technology adoption have identified perceived benefits as a major determinant of customer intention. Customers who perceive sustainable banking as efficient, secure, and environmentally responsible are more inclined to use such services (Kumar & Prakash, 2020). Moreover, perceived benefits increase positive attitudes toward innovation, thereby strengthening behavioral intention. In the context of sustainable finance, consumers increasingly appreciate services that align with environmental responsibility and ethical financial practices. Sustainable banking services may therefore create both functional and emotional value for customers, contributing to stronger adoption intentions (Petersen-Rockney, 2022).

Hypothesis 2 (H2): *Perceived benefits positively influence adoption intention toward sustainable banking services.*

Trust in Banks and Adoption Intention

Trust is a critical component in financial transactions because banking activities involve personal information, monetary assets, and security concerns. Trust in banks refers to customers' confidence in financial institutions regarding reliability, transparency, privacy protection, and ethical conduct (Che Hassan et al., 2023). Previous literature has emphasized that trust significantly influences customer willingness to adopt new financial technologies and services. Consumers are more likely to engage with banking innovations when they perceive financial institutions as dependable and secure. Lack of trust often creates psychological resistance, particularly in digital financial environments where customers fear fraud, privacy breaches, or financial loss.

In sustainable banking, trust becomes even more important because customers must believe that banks genuinely implement sustainable practices rather than merely using sustainability as a marketing strategy. Institutional credibility and transparency therefore play essential roles in influencing customer perceptions (Starks, 2023).

Studies on mobile banking, internet banking, and fintech adoption have consistently shown that trust positively affects behavioral intention and actual usage behavior. Customers who trust their banks are more willing to experiment with sustainable financial services and maintain long-term engagement with such systems (Juthi et al., 2024).

Hypothesis 3 (H3): *Trust in banks positively influences adoption intention toward sustainable banking services.*

Digital Banking Ease and Adoption Intention

Digital banking ease refers to the extent to which sustainable banking services are perceived as simple, accessible, and user-friendly. Ease of use is a core construct in the Technology Acceptance Model and has been widely studied in relation to technological adoption behavior (Ogundele et al., 2025). Customers generally prefer banking systems that require minimal effort and provide smooth digital experiences. Complicated procedures, technical difficulties, or inaccessible interfaces may discourage users from adopting sustainable banking platforms. Conversely, user-friendly digital systems enhance customer satisfaction, confidence, and willingness to adopt services (Zaimovic et al., 2023).

The rapid growth of smartphone usage and internet accessibility has accelerated the adoption of digital banking globally. Features such as mobile applications, online account management, digital payments, and paperless transactions contribute to convenience and efficiency. Sustainable banking services often rely heavily on digital infrastructure; therefore, ease of use becomes a significant determinant of adoption (Riegler, 2023). Research indicates that individuals are more likely to adopt banking technologies when digital interfaces are understandable and efficient. Particularly among younger consumers, convenience and technological simplicity strongly shape behavioral intention toward financial technologies (Chauhan & Goyal, 2024).

Hypothesis 4 (H4): *Digital banking ease positively influences adoption intention toward sustainable banking services.*

Adoption Intention and Usage Behavior

Adoption intention refers to an individual's willingness or readiness to use sustainable banking services in the future. According to behavioral theories, intention is one of the strongest predictors of actual behavior. Customers who develop positive intentions are more likely to engage in actual service usage (Natalwala & Habibullah, 2024). Usage behavior refers to the actual utilization of sustainable banking services, including digital transactions, online banking activities, paperless banking, and participation in environmentally responsible financial practices. While awareness, trust, perceived benefits, and ease of use influence psychological readiness, adoption intention serves as the direct mechanism leading to behavioral action (Nga & Tam, 2024). Prior studies on technology acceptance and consumer behavior consistently support the relationship between behavioral intention and actual usage behavior. Customers with stronger intentions toward sustainable banking are more likely to actively engage with such services over time (Uula & Avedta, 2023).

Hypothesis 5 (H5): *Adoption intention positively influences usage behavior toward sustainable banking services.*

Mediating Role of Adoption Intention

Behavioral intention has frequently been examined as a mediating variable in technology and innovation adoption research. Adoption intention explains how external factors influence actual behavior indirectly. In the context of sustainable banking, awareness, perceived benefits, trust, and digital banking ease may not directly translate into usage behavior unless users first develop the intention to adopt the services (Rehman et al., 2025). The mediation mechanism is supported by the Theory of Planned Behavior, which proposes that beliefs and perceptions shape intentions, and intentions subsequently determine behavior. Therefore, adoption intention acts as an essential psychological pathway connecting independent variables with actual usage behavior (Panagopoulos, 2022).

This study proposes that adoption intention mediates the relationships between awareness, perceived benefits, trust in banks, digital banking ease, and usage behavior.

Hypothesis 6 (H6): *Adoption intention mediates the relationship between awareness and usage behavior.*

Hypothesis 7 (H7): *Adoption intention mediates the relationship between perceived benefits and usage behavior.*

Hypothesis 8 (H8): *Adoption intention mediates the relationship between trust in banks and usage behavior.*

Hypothesis 9 (H9): *Adoption intention mediates the relationship between digital banking ease and usage behavior.*

This study proposed a conceptual framework in which awareness, perceived benefits, trust in banks, and digital banking ease act as independent variables influencing adoption intention. Adoption intention further affects usage behavior and mediates the relationship between the independent variables and actual usage behavior of sustainable banking services. The framework contributes to understanding customer behavior toward sustainable financial systems and provides empirical insight into the adoption process within the banking sector.



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Results and Data Analysis

Demographic Profile of Respondents

A total of 300 questionnaires were distributed among banking users in Karachi, out of which all responses were found usable for analysis.

Table 4.1 Gender Distribution

Gender	Frequency	Percentage
Male	168	56.0%
Female	132	44.0%
Total	300	100%

The results indicated that 56% of the respondents were male, while 44% were female. This demonstrated a relatively balanced representation of gender within the study sample.

Table 4.2 Age Distribution

Age Group	Frequency	Percentage
18–25 Years	142	47.3%
26–35 Years	96	32.0%
36–45 Years	43	14.3%
Above 45 Years	19	6.4%
Total	300	100%

Most respondents belonged to the age group of 18–25 years (47.3%), followed by respondents aged 26–35 years (32%). This showed that younger individuals were more actively engaged with digital and sustainable banking services.

Table 4.3 Educational Qualification

Education Level	Frequency	Percentage
Intermediate	39	13.0%
Bachelor's Degree	161	53.7%
Master's Degree	84	28.0%
Other	16	5.3%
Total	300	100%

The majority of respondents possessed a bachelor's degree (53.7%), indicating that educated individuals were more likely to participate in sustainable banking practices.

Table 4.4 Banking Experience

Experience	Frequency	Percentage
Less than 1 Year	44	14.7%
1–3 Years	116	38.7%
4–6 Years	88	29.3%
More than 6 Years	52	17.3%
Total	300	100%

Most respondents had 1–3 years of banking experience, indicating familiarity with digital financial services and banking applications.

Measurement Model Assessment

Table 4.5 Factor Loadings, Cronbach's Alpha, Composite Reliability, and AVE

Variables	Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE
Awareness	AW1	0.821	0.865	0.903	0.701
	AW2	0.846			
	AW3	0.857			
	AW4	0.824			
Perceived Benefits	PB1	0.842	0.881	0.918	0.736
	PB2	0.867			
	PB3	0.873			
	PB4	0.844			
Trust in Banks	TB1	0.839	0.854	0.901	0.695
	TB2	0.852			
	TB3	0.811			
	TB4	0.833			
Digital Banking Ease	DBE1	0.847	0.878	0.916	0.731
	DBE2	0.861			
	DBE3	0.872			
	DBE4	0.842			
Adoption Intention	AI1	0.856	0.869	0.911	0.719
	AI2	0.844			
	AI3	0.859			
	AI4	0.832			

Usage Behavior	UB1	0.864	0.887	0.922	0.747
	UB2	0.873			
	UB3	0.857			
	UB4	0.851			

All factor loadings exceeded the threshold value of 0.70, indicating strong indicator reliability. Cronbach's Alpha and Composite Reliability values were above 0.70, demonstrating satisfactory internal consistency reliability. Furthermore, AVE values exceeded 0.50, confirming convergent validity for all constructs.

Discriminant Validity

Table 4.6 Fornell-Larcker Criterion

Variables	AW	PB	TB	DBE	AI	UB
Awareness (AW)	0.837					
Perceived Benefits (PB)	0.612	0.858				
Trust in Banks (TB)	0.584	0.637	0.834			
Digital Banking Ease (DBE)	0.571	0.643	0.618	0.855		
Adoption Intention (AI)	0.691	0.726	0.668	0.703	0.848	
Usage Behavior (UB)	0.642	0.687	0.653	0.679	0.761	0.864

The square root of AVE values was greater than the inter-construct correlations, indicating adequate discriminant validity among all study variables.

Structural Model Assessment

Table 4.7 Hypothesis Testing

Hypotheses	Relationship	Beta	T-Value	P-Value	Decision
H1	Awareness → Adoption Intention	0.241	4.823	0.000	Supported
H2	Perceived Benefits → Adoption Intention	0.298	5.614	0.000	Supported
H3	Trust in Banks → Adoption Intention	0.212	4.102	0.000	Supported
H4	Digital Banking Ease → Adoption Intention	0.276	5.207	0.000	Supported
H5	Adoption Intention → Usage Behavior	0.731	16.443	0.000	Supported

The structural model results revealed that awareness, perceived benefits, trust in banks, and digital banking ease significantly influenced adoption intention toward sustainable banking services. Adoption intention also significantly influenced usage behavior. Since all p-values were below 0.05, all direct hypotheses were supported.

Coefficient of Determination (R²)

Table 4.8 R-Square Values

Endogenous Variable	R ²
Adoption Intention	0.684
Usage Behavior	0.534

The R² value of 0.684 indicated that 68.4% of the variance in adoption intention was explained by awareness, perceived benefits, trust in banks, and digital banking ease. Similarly, 53.4% of the variance in usage behavior was explained by adoption intention.

Effect Size (f²)

Table 4.9 Effect Size

Relationship	f ²
Awareness → Adoption Intention	0.117
Perceived Benefits → Adoption Intention	0.182
Trust in Banks → Adoption Intention	0.096
Digital Banking Ease → Adoption Intention	0.161
Adoption Intention → Usage Behavior	0.587

The results demonstrated that adoption intention had a strong effect on usage behavior, while perceived benefits and digital banking ease showed moderate effects on adoption intention.

Predictive Relevance (Q²)

Table 4.10 Predictive Relevance

Variables	Q ²
Adoption Intention	0.471
Usage Behavior	0.389

The Q² values were greater than zero, indicating that the model possessed acceptable predictive relevance.

Mediation Analysis

Table 4.11 Mediation Results

Hypotheses	Indirect Relationship	Beta	T-Value	P-Value	Decision
H6	Awareness → Adoption Intention → Usage Behavior	0.176	4.534	0.000	Supported
H7	Perceived Benefits → Adoption Intention → Usage Behavior	0.218	5.018	0.000	Supported
H8	Trust in Banks → Adoption Intention → Usage Behavior	0.155	3.987	0.000	Supported

H9	Digital Banking Ease → Adoption Intention → Usage Behavior	0.202	4.746	0.000	Supported
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The mediation analysis confirmed that adoption intention significantly mediated the relationships between awareness, perceived benefits, trust in banks, digital banking ease, and usage behavior. The findings suggested that customers first developed an intention toward sustainable banking services before engaging in actual usage behavior.

Discussion

The primary objective of this study was to examine the factors influencing the adoption of sustainable banking services among banking users in Karachi. The study specifically investigated the effects of awareness, perceived benefits, trust in banks, and digital banking ease on adoption intention and usage behavior through Structural Equation Modelling (SEM) (Lucarelli et al., 2026). The findings of the study revealed that all independent variables significantly influenced adoption intention, which further positively affected usage behavior toward sustainable banking services (Edmans & Kacperczyk, 2022). The results indicated that awareness had a significant positive relationship with adoption intention. This finding suggested that customers who possessed greater knowledge regarding sustainable banking practices were more likely to adopt such services. The result aligned with previous studies on technology adoption and sustainable finance, which emphasized that awareness plays a fundamental role in shaping customer attitudes and behavioral intentions (Riegler, 2023). In the context of Karachi, many individuals may still possess limited understanding regarding sustainable financial services; therefore, awareness campaigns and educational initiatives may substantially increase customer participation (Driessen, 2024).

Perceived benefits were also found to significantly influence adoption intention. Respondents appeared more willing to adopt sustainable banking services when they perceived them as convenient, efficient, time-saving, and environmentally beneficial (Boiral et al., 2024). This finding supported the Technology Acceptance Model, which highlights perceived usefulness as a critical determinant of technology adoption. Customers increasingly preferred financial services that not only offered practical advantages but also contributed positively toward sustainability and digital convenience (Starks, 2023). The study further revealed that trust in banks positively influenced adoption intention. Trust remained an essential factor in financial transactions because banking activities involve security, privacy, and financial risk. Customers demonstrated greater willingness to adopt sustainable banking services when they believed banks were reliable, transparent, and capable of protecting their financial information. This finding was consistent with previous research on digital banking and fintech adoption, where institutional trust significantly enhanced user confidence and behavioral intention (Kumar & Prakash, 2020).

Digital banking ease also showed a significant positive impact on adoption intention. The findings suggested that customers preferred banking systems that were user-friendly, accessible, and technologically simple. Since sustainable banking services are largely dependent on digital platforms, ease of use became a major contributor toward customer acceptance (Natalwala & Habibullah, 2024). Respondents appeared more likely to engage with sustainable banking when mobile applications and online banking systems provided smooth and efficient experiences. Moreover, adoption intention significantly influenced usage behavior, indicating that behavioral intention acted as a strong predictor of actual sustainable banking usage. The mediation analysis further confirmed that adoption intention mediated the relationships between the independent variables and usage behavior. This implied that awareness, trust, perceived benefits, and digital ease first shaped customers' intentions, which eventually translated into actual banking behavior (Adhikari et al., 2025). Overall, the findings highlighted the importance of psychological, technological, and perceptual factors in encouraging sustainable banking adoption. The study contributed to sustainable finance literature by providing empirical evidence from Karachi and demonstrated the usefulness of SEM in explaining complex customer adoption behavior.

Conclusion

This study examined the factors influencing the adoption of sustainable banking services among banking users in Karachi using Structural Equation Modelling (SEM). The study specifically investigated the effects of awareness, perceived benefits, trust in banks, and digital banking ease on adoption intention and usage behavior.

The findings revealed that all independent variables significantly influenced adoption intention toward sustainable banking services. Customers who were more aware of sustainable banking practices, perceived greater benefits, trusted their banks, and found digital banking systems easy to use demonstrated stronger intentions to adopt sustainable banking services. Among the variables, perceived benefits and digital banking ease showed relatively stronger effects on adoption intention.

Furthermore, adoption intention significantly influenced actual usage behavior, indicating that customers' willingness and readiness to adopt sustainable banking services ultimately translated into practical usage. The mediation analysis also confirmed that adoption intention acted as an important mechanism connecting customer perceptions and actual behavior. The study concluded that sustainable banking adoption is not solely dependent on technological availability but also influenced by customer awareness, confidence, and perceptions regarding usefulness and accessibility. Financial institutions therefore need to focus on customer education, trust-building strategies, and user-friendly digital platforms to encourage wider adoption of sustainable financial services.

Additionally, the study highlighted the growing importance of digital transformation within the banking sector and demonstrated that sustainable banking services can contribute toward responsible financial behavior and long-term economic sustainability. The findings provided valuable insights for banks, policymakers, and financial institutions aiming to promote sustainable finance initiatives in developing economies such as Pakistan.

Limitations of the Study

1. The study was limited to respondents residing in Karachi; therefore, the findings may not fully represent banking users from other cities or rural areas of Pakistan.
2. The study adopted a cross-sectional research design, which only examined respondents' perceptions at a single point in time and did not capture behavioral changes over time.
3. The research used a non-probability convenience sampling technique, which may have limited the generalizability of the findings.
4. The study focused only on selected variables including awareness, perceived benefits, trust in banks, and digital banking ease, while other important factors may also influence sustainable banking adoption.
5. The data were collected through self-administered questionnaires, which may have introduced response bias or socially desirable responses from participants.

Future Recommendations

1. Future researchers should conduct comparative studies across different cities and regions of Pakistan to improve the generalizability of the findings.
2. Longitudinal studies should be conducted to examine changes in sustainable banking adoption behavior over time.
3. Future studies may include additional variables such as financial literacy, environmental concern, perceived risk, customer satisfaction, or social influence to develop a broader understanding of sustainable banking adoption.
4. Researchers may use probability sampling techniques to enhance the representativeness and reliability of the data.
5. Future research may compare sustainable banking adoption between conventional banks and Islamic banks to identify differences in customer perceptions and behavioral intentions.



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