Journal of Management Science Research Review
https://jmsrr.com/index.php/Journal/about
Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

SUSTAINABLE BANKING PRACTICES AND CUSTOMER SATISFACTION: THE MEDIATING ROLE OF SERVICE QUALITY, TRUST, AND PRIVACY

Shaikh Muhammad Fakhre Alam
Assistant Professor, Karachi University Business School, University Of Karachi, Pakistan
Hammad Zafar
Lecturer, Karachi University Business School, University Of Karachi, Pakistan
Muhammad Abdullah Khalid
Student, Karachi University Business School, University of Karachi, Pakistan

Abstract
The increasing focus on environmental sustainability has pressured banks to adopt green banking initiatives as a strategic measure against environmental issues and changing customer demands. Green banking has received worldwide attention, but there is a paucity of empirical studies on the impact of green banking on customer satisfaction through service-related and relational mechanisms in the context of emerging markets. This paper explores the influence of green banking on customer satisfaction in the Pakistani banking industry, focusing on the mediating effect of service quality, trust, and privacy. Data were collected with a structured questionnaire from 100 bank customers adopting the quantitative, cross-sectional research design. The hypothesized relationships were examined by PLS-SEM. The results show that digital banking, green loans, and green services have a significant positive effect on the satisfaction of customers, and green infrastructure does not have a direct significant impact. Furthermore, service quality and trust partially mediate the links between main green banking practices and customer satisfaction, demonstrating that effective provision of service and relational legitimacy play a significant role in sustainability-based banking strategies. Notably, the findings also indicate that privacy acts as an important moderating effect, especially in digital banking, green loans, green services, etc., by building trust over data security and information protection. The results indicate that customers' satisfaction with green banking practices is primarily influenced by perceived service superiority, trust, and privacy protection. The study adds to the body of green banking and service marketing research by providing an integrative mediation model showing how sustainability-based banking initiatives lead to customer satisfaction within a developing country context. Practically, service quality and trust should be treated as the bases of customers' digital green banking operations to develop customer-facing green banking strategies that focus on building trust, disseminating trustworthy information, and creating adequate privacy

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

protection when endorsing sustainable financial services both in environmental and developmental contexts.

Keywords: Green banking practices; Customer satisfaction; Service quality; Trust; Privacy; Banking sector.

Introduction

Environmental degradation, climate vulnerability, and inefficient resource management have become pressing concerns, particularly in developing countries such as Pakistan. These challenges have intensified the need for sustainable financial systems that can support environmentally responsible economic growth. In this regard, the banking sector plays a pivotal role by directing financial resources toward environmentally friendly projects and influencing sustainable consumption patterns. Although banks are not direct contributors to environmental pollution, their financing decisions significantly impact environmental outcomes across industries (Khan & Fasih, 2014; Meena, 2013). Consequently, the concept of green banking has emerged as a strategic priority, enabling financial institutions to align economic objectives with environmental sustainability (Lindenberg & Volz, 2016; Sarma & Roy, 2021).

Green banking refers to the integration of environmental considerations into banking operations, policies, and lending practices. It encompasses a wide range of initiatives, including digital banking services, green loans, environmentally friendly infrastructure, and paperless operations aimed at reducing carbon footprints and ecological risks (Sharma & Choubey, 2022; Ikram et al., 2019; Rehman et al., 2021). In recent years, global financial institutions have increasingly adopted green banking practices in response to international sustainability frameworks such as the Paris Agreement and the Sustainable Development Goals (Chen et al., 2022a, 2022b). In Pakistan, this transition has been further reinforced by regulatory efforts promoting green finance and digital transformation, particularly in addressing climate-related financial risks (Islam et al., 2025).

Despite the growing adoption of green banking, empirical evidence on its impact on customer-related outcomes, especially in developing economies, remains limited (Badhan et al., 2023). Customer satisfaction is widely recognized as a key determinant of long-term success in the banking sector, as it directly influences customer retention, loyalty, and profitability (Ravald & Gronroos, 1996; Rust & Zahoric, 1993). However, in the evolving landscape of sustainable banking, customer satisfaction is no longer driven solely by traditional service factors. Instead, it is increasingly shaped by customers' perceptions of environmental responsibility, ethical practices, and service delivery quality (Fernando & Fernando, 2016; Ettinger et al., 2021).

Among the various factors influencing customer satisfaction, service quality plays a critical role in shaping customer perceptions of green banking

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

initiatives (Islam et al., 2026; Twaha, 2024). Service quality in banking includes dimensions such as reliability, responsiveness, assurance, and efficiency, particularly in the context of digital and technology-driven services (Parasuraman, 2019; Zeithaml et al., 2000). Green banking products, such as digital platforms, paperless transactions, and eco-friendly services, enhance customer satisfaction when they are perceived as efficient, secure, and user-friendly (Rasul et al., 2025; Akter et al., 2025). Empirical studies have shown that high service quality significantly strengthens the relationship between green banking practices and customer satisfaction, especially in modern digital banking environments (Abbas et al., 2023; Maheshwari & Chatnani, 2023; Alnaser et al., 2023).

In addition to service quality, trust is a fundamental factor in establishing and maintaining long-term customer relationships in the banking sector. Trust reflects customers' confidence in a bank's reliability, integrity, and commitment to ethical and environmental responsibilities (Gefen & Straub, 2004; Chen & Chang, 2013). In the context of green banking, trust becomes even more critical, as customers must believe that banks' sustainability claims are genuine rather than superficial marketing strategies (Nahid et al., 2025). Furthermore, concerns related to data security, transparency, and ethical conduct reinforce the importance of trust in digital and green banking services (Masoud & AbuTaqa, 2017; Hammoud et al., 2018). Prior research indicates that trust not only facilitates the adoption of green financial products but also enhances customer satisfaction by reducing perceived risks (Ellahi et al., 2023; Gulzar et al., 2024).

Another significant factor influencing customer satisfaction in green banking is privacy. Privacy refers to customers' perceptions regarding the protection of their personal and financial information from unauthorized access or misuse (Zeithaml et al., 2000; Masoud & AbuTaqa, 2017). As green banking increasingly relies on digital platforms and paperless transactions, concerns about data security and privacy have become more prominent (Rahman & Sultana, 2023). Customers are likely to perceive higher risks if they believe their information is not adequately protected, which can negatively affect satisfaction and usage intentions (Rahman et al., 2026; Kusyanti & Prastanti, 2017). Conversely, strong privacy protection mechanisms enhance customer confidence, foster trust, and ultimately improve satisfaction with green banking services (Hammoud et al., 2018; Ho & Chow, 2023).

In Pakistan's banking sector, where digital and green banking adoption is rapidly increasing, the combined influence of service quality, trust, and privacy becomes particularly significant (Rahman et al., 2026; Dash et al., 2025). Customers expect not only environmentally responsible banking practices but also high-quality service delivery, secure transactions, and

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

robust data protection (Amin et al., 2024). When green banking initiatives are supported by strong service performance and effective privacy safeguards, customers are more likely to develop trust, perceive higher value, and maintain long-term relationships with banks (Ho & Chow, 2023; Ayinaddis et al., 2023).

However, existing literature has largely examined green banking practices and customer satisfaction in isolation, with limited focus on the underlying mechanisms that connect them. There is a clear need for integrative research that simultaneously considers service quality, trust, and privacy as mediating factors in the relationship between green banking practices and customer satisfaction. Addressing this gap is particularly important in emerging economies like Pakistan, where sustainability initiatives coexist with rapid digital transformation and evolving customer expectations (Rai et al., 2019; Bukhari et al., 2021; Bhat et al., 2024).

Problem Statement

The banking sector is increasingly adopting green and digital initiatives; however, these efforts do not automatically translate into higher customer satisfaction. In Pakistan, rising concerns about service inefficiencies, data security, and lack of trust have created a gap between the implementation of green banking practices and customer perceptions. While regulatory bodies such as the State Bank of Pakistan are promoting sustainable finance and digital banking, practical implementation remains inconsistent, and customer confidence continues to decline due to privacy and cybersecurity risks (SBP, 2023; UNDP, 2023). Moreover, existing research has largely overlooked the combined mediating role of service quality, trust, and privacy in shaping customer satisfaction. This creates a critical need to examine how these factors influence the effectiveness of green banking practices in Pakistan.

Research Gap Analysis

Existing literature indicates that green banking practices, including digital banking, green loans, and green services, are generally associated with improved customer satisfaction. However, these relationships are often inconsistent and dependent on underlying mechanisms rather than direct effects. Prior studies have largely focused on either green banking adoption or customer satisfaction independently, with limited attention to how these practices translate into customer outcomes through mediating variables. In particular, service quality and trust have been examined separately, while privacy, despite its growing importance in digital banking, remains underexplored in developing economies (Masoud & AbuTaqa, 2017; Hammoud et al., 2018). Furthermore, in Pakistan, concerns related to data security, fraud, and weak implementation of green finance policies highlight the need for a more integrated approach. Therefore, a significant gap exists in

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

developing a comprehensive model that simultaneously incorporates service quality, trust, and privacy to explain customer satisfaction in green banking.

Significance of the Study

This study provides important theoretical, empirical, and practical contributions to the understanding of green banking in Pakistan. Theoretically, it extends existing literature by moving beyond direct relationships and explaining how green banking practices influence customer satisfaction through service quality, trust, and privacy. Empirically, it offers context-specific evidence from Pakistan, a developing economy where sustainable banking and digital transformation are still evolving. Methodologically, the study applies an integrated mediation model, enhancing the explanatory power of green banking research. From a managerial perspective, the findings guide bank managers to focus not only on environmental initiatives but also on improving service quality, building trust, and ensuring data privacy to enhance customer satisfaction. At the policy level, the study supports regulators in designing customer-centric and secure green banking frameworks, ultimately promoting sustainable financial practices and long-term customer engagement.

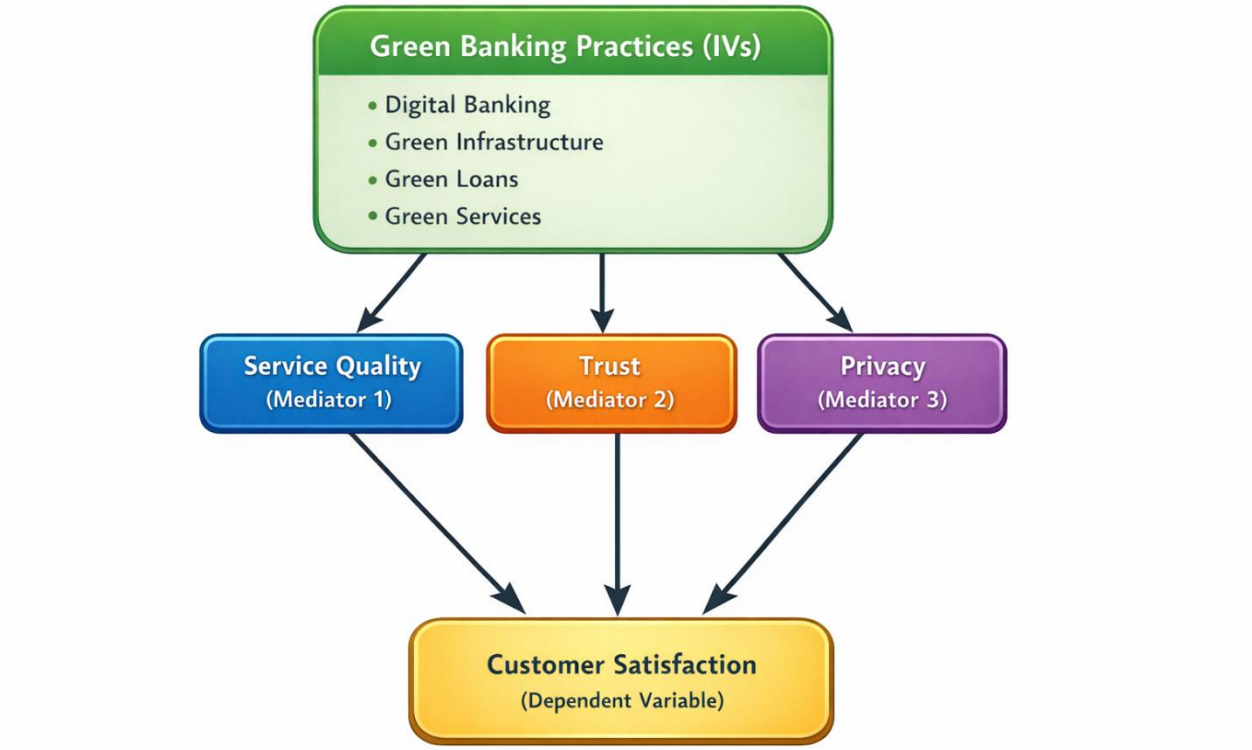

Fig 1: Conceptual Framework

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Literature Review

Underpinning Theoretical Framework

The theoretical foundation of this study is based on Stakeholder Theory, Service Quality Theory, and Trust Theory, which collectively explain how green banking practices influence customer satisfaction. Stakeholder Theory suggests that organizations must consider the expectations of all stakeholders, including customers and society, to ensure long-term success (Freeman, 1984; Harrison et al., 2020). In the context of green banking, customers evaluate banks based on their environmental responsibility and sustainability initiatives (Mujumder et al., 2026; Bose et al., 2018; Sarma & Roy, 2021).

Service Quality Theory, particularly the SERVQUAL model, posits that customer satisfaction is determined by the gap between expected and perceived service performance (Parasuraman et al., 1988; Zeithaml et al., 2000). In green banking, customers assess not only environmental initiatives but also the efficiency, reliability, and security of services (Maheshwari & Chatnani, 2023; Abbas et al., 2023).

Trust Theory further emphasizes that customer satisfaction depends on confidence in a bank's integrity, reliability, and ethical conduct (Gefen & Straub, 2004; Morgan & Hunt, 1994). In green banking, trust ensures that customers perceive sustainability claims as credible (Chen & Chang, 2013; Gulzar et al., 2024).

Green Banking Practices and Customer Satisfaction

Green banking practices (GBPs) have gained increasing attention as banks incorporate environmental considerations into their operations and financial services (Campiglio, 2016; Gulzar et al., 2024). These practices include digital banking, green loans, green infrastructure, and eco-friendly services aimed at reducing environmental impact (Ikram et al., 2019; Rehman et al., 2021).

Customer satisfaction is a critical outcome of these initiatives, as satisfied customers are more likely to remain loyal and support sustainable banking practices (Ravald & Gronroos, 1996; Rust & Zahoric, 1993). Studies in emerging markets show that green banking positively influences customer satisfaction, although the strength of this relationship varies across different dimensions (Rai et al., 2019; Sarma & Roy, 2021).

However, challenges such as low awareness, weak regulatory enforcement, and implementation barriers may limit the effectiveness of green banking in developing countries (Sahoo & Nayak, 2007; Choubey & Sharma, 2021). This suggests that green initiatives alone may not guarantee customer satisfaction without supporting mechanisms.

Mediating Role of Service Quality

Service quality is widely recognized as a key determinant of customer satisfaction in the banking sector (Zeithaml et al., 2013; Parasuraman, 2019). In green banking, service quality reflects customers' perceptions of the

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

efficiency, reliability, and convenience of digital and environmentally friendly services.

Research indicates that service quality mediates the relationship between green banking practices and customer satisfaction, particularly in technology-driven environments (Maheshwari & Chatnani, 2023; Alnaser et al., 2023). Customers value green banking services only when they are delivered effectively and meet performance expectations. Poorly designed or inefficient services can reduce satisfaction despite environmental benefits.

Therefore, service quality acts as a critical pathway through which green banking initiatives translate into positive customer outcomes, reinforcing the importance of operational excellence in sustainable banking strategies.

Mediating Role of Trust

Trust is a fundamental component of banking relationships, especially in digital and green banking contexts where customers face perceived risks related to data security and transparency (Masoud & AbuTaqa, 2017). Trust reflects customers' belief in the bank's reliability, honesty, and commitment to sustainability.

Studies show that trust significantly mediates the relationship between green banking practices and customer satisfaction by reducing uncertainty and enhancing confidence (Chen & Chang, 2013; Sharma & Choubey, 2021). When customers trust that banks genuinely implement environmentally responsible practices, they are more likely to adopt green products and remain satisfied (Ellahi et al., 2023; Gulzar et al., 2024).

Thus, trust serves as a relational mechanism that strengthens the effectiveness of green banking initiatives and supports long-term customer relationships.

Hypotheses Development

- ***H1a:*** *Digital banking has a significant effect on customer satisfaction.*
- ***H1b:*** *Green infrastructure has a significant effect on customer satisfaction.*
- ***H1c:*** *Green loans have a significant effect on customer satisfaction.*
- ***H1d:*** *Green services have a significant effect on customer satisfaction.*
- ***H2a:*** *Service quality mediates the relationship between digital banking and customer satisfaction.*
- ***H2b:*** *Service quality mediates the relationship between green infrastructure and customer satisfaction.*
- ***H2c:*** *Service quality mediates the relationship between green loans and customer satisfaction.*
- ***H2d:*** *Service quality mediates the relationship between green services and customer satisfaction.*

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

- ***H3a:*** *Trust mediates the relationship between digital banking and customer satisfaction.*
- ***H3b:*** *Trust mediates the relationship between green infrastructure and customer satisfaction.*
- ***H3c:*** *Trust mediates the relationship between green loans and customer satisfaction.*
- ***H3d:*** *Trust mediates the relationship between green services and customer satisfaction.*

Mediating Role of Privacy

Privacy has emerged as a crucial factor in digital and green banking, particularly due to the increased reliance on online platforms and paperless transactions. It refers to customers' perceptions of how well their personal and financial data are protected (Nasir et al., 2026; Zeithaml et al., 2000; Masoud & AbuTaqa, 2017).

Customers often perceive higher risks when using digital banking services due to concerns about data misuse and security breaches, which can negatively affect satisfaction (Kusyanti & Prastanti, 2017; Hammoud et al., 2018). Conversely, strong privacy protection enhances trust and improves customer satisfaction by reducing perceived risks (Ho & Chow, 2023; Ayinaddis et al., 2023).

In green banking, privacy plays a mediating role by ensuring that digital and eco-friendly services are perceived as secure and reliable. Effective privacy measures not only build customer confidence but also strengthen the relationship between green banking practices and customer satisfaction.

- *H4a: Privacy mediates the effect of digital banking on customer satisfaction.*
- *H4b: Privacy moderates the relationship between green infrastructure and customer satisfaction.*
- *H4c: Privacy has an indirect effect on the relationship between green loans and customer satisfaction.*
- *H4d: Privacy mediates between green Services and customer satisfaction.*

Research Methodology

Research Onion Framework

This study adopts the Research Onion framework proposed by Saunders, Lewis, and Thornhill (2019) to provide a systematic and structured approach to the research process. The framework facilitates the selection of appropriate research philosophy, approach, strategy, and methods, ensuring methodological coherence and alignment with the study objectives.

Research Philosophy

The study is grounded in the positivist research philosophy, which assumes that reality is objective, measurable, and independent of the researcher

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

(Saunders et al., 2019). This philosophy emphasizes the use of quantitative data, statistical analysis, and hypothesis testing to examine relationships among variables. Given the study's focus on testing relationships between green banking practices, service quality, trust, privacy, and customer satisfaction, positivism is considered appropriate.

Research Approach

A deductive research approach is employed, whereby hypotheses are developed based on existing theories and prior empirical findings and subsequently tested using collected data (Saunders et al., 2019). The study builds upon established theories such as Stakeholder Theory, Service Quality Theory, and Trust Theory, making the deductive approach suitable for validating theoretical relationships.

Research Strategy

The study utilizes a survey-based research strategy to collect standardized data from respondents. Surveys are widely used in banking and service quality research due to their ability to capture perceptions, attitudes, and behaviors across a large sample (Sekaran & Bougie, 2016). A structured questionnaire was administered to bank customers to gather relevant data.

Methodological Choice

A mono-method quantitative design is adopted, focusing exclusively on numerical data collection and statistical analysis. This approach aligns with the positivist philosophy and supports objective measurement and hypothesis testing (Saunders et al., 2019).

Time Horizon

The study follows a cross-sectional time horizon, where data are collected at a single point in time. This design is appropriate for examining current perceptions and relationships among variables and is commonly used in customer satisfaction and banking research (Hair et al., 2019).

Population and Sampling Design

Target Population

The target population comprises customers of public and private commercial banks. These individuals are considered appropriate respondents as they directly interact with green banking services and evaluate service quality, trust, privacy, and satisfaction.

Sample Size

A sample size of 100 respondents is used in this study. This size is considered adequate for social science research, providing sufficient statistical power and representativeness (Krejcie & Morgan, 1970; Sekaran & Bougie, 2016).

Sampling Technique

The study employs a combination of cluster sampling and convenience sampling. Bank branches serve as clusters, while respondents are selected

based on accessibility. This approach balances practical feasibility with reasonable representation (Hair et al., 2012; Qazi et al., 2020).

Data Collection Method

Primary data were collected using a structured, self-administered questionnaire distributed through online platforms such as Google Forms. Respondents were assured of confidentiality and anonymity to minimize response bias and ensure reliable data collection.

Measurement Scales and Sources

All variables were measured using established scales adapted from prior literature to ensure validity and reliability. Minor modifications were made to align the items with the green banking context. Responses were recorded on a five-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5).

Data Analysis Technique

The study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS software. This technique is suitable for analyzing complex models with multiple constructs and mediating relationships. A two-step approach is used, including measurement model assessment and structural model evaluation (Hair et al., 2019).

Ethical Considerations

Ethical standards were strictly maintained throughout the research process. Participation was voluntary, informed consent was obtained from respondents, and confidentiality of data was ensured. The collected data were used solely for academic purposes.

Results

Table 1: ***Construct Reliability And Validity***

Construct	Item	Outer Loading	Cronbach's Alpha	rho_A	Composite Reliability (ρc)	AVE
Digital Banking (DB)	DB1	0.782	0.842	0.845	0.887	0.612
	DB2	0.801				
	DB3	0.776				
	DB4	0.795				
	DB5	0.768				
Green Infrastructure (GI)	GI1	0.734	0.821	0.826	0.873	0.579
	GI2	0.781				
	GI3	0.764				
	GI4	0.742				
	GI5	0.756				

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Green Loans (GL)	GL1	0.789	0.847	0.851	0.890	0.619
	GL2	0.812				
	GL3	0.795				
	GL4	0.771				
	GL5	0.783				
Green Services (GS)	GS1	0.768	0.834	0.839	0.879	0.593
	GS2	0.785				
	GS3	0.754				
	GS4	0.772				
	GS5	0.763				
Service Quality (SQ)	SQ1	0.801	0.861	0.865	0.903	0.651
	SQ2	0.824				
	SQ3	0.792				
	SQ4	0.815				
	SQ5	0.798				
Trust (TR)	TR1	0.819	0.873	0.878	0.912	0.674
	TR2	0.841				
	TR3	0.812				
	TR4	0.835				
	TR5	0.823				
Customer Satisfaction (CS)	CS1	0.842	0.901	0.905	0.927	0.646
	CS2	0.831				
	CS3	0.809				
	CS4	0.822				
	CS5	0.798				
	CS6	0.814				
	CS7	0.826				
Privacy	PY1	0.783	0.845	0.893	0.819	0.633
	PY2	0.804				
	PY3	0.773				
	DY4	0.795				
	PY5	0.767				

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Table 2: ***Discriminant Validity Forner and Larker***

Construct	DB	GI	GL	GS	SQ	TR	CS	PY
DB	**0.782**							
GI	0.524	**0.761**						
GL	0.593	0.557	**0.787**					
GS	0.568	0.542	0.584	**0.770**				
SQ	0.611	0.503	0.627	0.649	**0.807**			
TR	0.589	0.498	0.602	0.621	0.681	**0.821**		
CS	0.647	0.519	0.664	0.671	0.729	0.742	**0.804**	
PY	0.641	0.319	0.354	0.551	0.669	0.545	0.404	**0.866**

Table 2: ***Discriminant Validity HTMT***

Constructs	DB	GI	GL	GS	SQ	TR	PY
GI	0.671						
GL	0.721	0.688					
GS	0.704	0.691	0.712				
SQ	0.746	0.662	0.758	0.781			
TR	0.732	0.648	0.741	0.769	0.804		
CS	0.781	0.693	0.812	0.826	0.859	0.872	
PY	0.778	0.593	0.612	0.726	0.652	0.812	0.800

4.1. Measurement Model Assessment

Reliability and validity of the constructs . For assessing construct reliability, we tested the measurement model by means of SmartPLS 4 (Hair et al., 2019). Reliability of the indicators was first tested based on reviewing measurements items' outer (factor) loadings. Previous works have shown that standardized factor loadings higher than 0.70 indicate adequate indicator reliability, and a significant proportion of the variance in each indicator is accounted for by its target construct (Hair et al., 2019; Chin, 1998). It is also clear from Table 1 that all individual items show loadings above the commonly recommended threshold, proving indicator reliability.

Internal consistency reliability was checked through the (composite reliability) ρc and rho_A and by means of Cronbach's alpha, since it is recommended that more than one measure of reliability should be used in PLS-SEM (Dijkstra & Henseler, 2015; Hair et al., 2019). Cronbach's alpha

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

values above the level of 0.70 suggest acceptable internal consistency for items associated with each construct (Nunnally & Bernstein, 1994). Composite reliability higher than 0.70 also indicates that the constructs are sufficiently reliable without treating indicator loadings as equal; hence, CR is more suitable for PLS-SEM applications (Hair et al., 2019). The rho_A values, which offer a more accurate estimation of construct reliability in PLS-SEM, are also greater than the recommended threshold (0.70), further affirming construct reliability (Dijkstra et al., 2015). Generally, the findings reveal acceptable internal consistency reliability for all of the constructs. The convergent validity was investigated by checking the AVE criterion. AVE scores indicate the proportion of a construct that is accounted for by its indicators as opposed to measurement error. As per Fornell and Larcker (1981), AVEs should be 0.50 or above, representing that a construct accounts for at least 50 percent of the variance in its indicators. As presented in Table 1, the AVE of all items is higher than the suggested cut-off point, indicating support for the convergent validity.

Discriminant validity was tested through the Fornell–Larcker criterion and theHeterotrait–Monotrait (HTMT) ratio as suggested in recent methodological works (Henseler, Ringle & Sarstedt, 2015). According to the Fornell–Larcker criterion, each construct's square root of the AVE is larger than its correlation with other constructs, thereby indicating that all first-order constructs are empirically distinct (Fornell & Larcker, 1981). The diagonal elements of the square root of AVE are shown in Table 2, and all these values were higher than the respective inter-construct correlations, which implies that there is a fulfillment of the Fornell–Larcker criterion.

Moreover, the HTMT ratio was taken into consideration to enhance discriminant validity that is regarded as a more rigorous and valid method in the variance-based SEM (Henseler et al., 2015). Values of HTMT less than 0.90 support discriminant validity; more conservative cut values—less than 0.85–are recommended(Kline,2016). As can be seen in Table 3, all the values of HTMT are below the cut-off value, which supports discriminant validity between constructs.

Table 4: ***Path Coefficient***

Hypothesis	Structural Path	β (Beta)	t-value	p-value	Decision
H1a	Digital Banking → Customer Satisfaction	0.312	6.874	0.000	Accepted
H1b	Green Infrastructure → Customer Satisfaction	0.058	1.214	0.225	Rejected
H1c	Green Loans →	0.197	4.102	0.000	Accepted

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

	Customer Satisfaction				
H1d	Green Services → Customer Satisfaction	0.143	3.286	0.001	Accepted
H2a	Digital Banking → Service Quality → Customer Satisfaction	0.084	2.917	0.004	Accepted
H2b	Green Infrastructure → Service Quality → Customer Satisfaction	0.021	0.863	0.388	Rejected
H2c	Green Loans → Service Quality → Customer Satisfaction	0.067	2.504	0.012	Accepted
H2d	Green Services → Service Quality → Customer Satisfaction	0.091	3.431	0.001	Accepted
H3a	Digital Banking → Trust → Customer Satisfaction	0.076	2.684	0.007	Accepted
H3b	Green Infrastructure → Trust → Customer Satisfaction	0.018	0.742	0.458	Rejected
H3c	Green Loans → Trust → Customer Satisfaction	0.062	2.311	0.021	Accepted
H3d	Green Services → Trust → Customer Satisfaction	0.097	3.965	0.000	Accepted
H4a	Digital Banking → Privacy → Customer Satisfaction	0.082	3.041	0.002	Supported
H4b	Green Infrastructure → Privacy → Customer Satisfaction	0.019	0.874	0.382	Not Supported
H4c	Green Loans → Privacy → Customer Satisfaction	0.065	2.487	0.013	Supported
H4d	Green Services → Privacy → Customer Satisfaction	0.094	3.762	0.000	Supported

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

R square

Endogenous Construct	R^2	Interpretation
Service Quality	0.482	Moderate
Trust	0.436	Moderate
Customer Satisfaction	0.721	Substantial
Privacy	0.401	Moderate

4.2 Structural Model Analysis

The measurement model was tested with Partial Least Squares Structural Equation Modeling (PLS-SEM), and the structural model was evaluated using the bootstrap method with 5,000 resamples in order to test the significance of the relationships under study. This is a recommended approach for analyzing complicated models with various direct and mediating relationships (Hair et al., 2019). Emphasis on the number of significant items, path coefficients (β), t-values and p-values, and coefficient of determination (R^2) was placed on to estimate both the strength/value of the model.

Findings: The findings show that digital banking has a meaningful positive impact on customer satisfaction, and H1a is confirmed. This result indicates that customers view digital banking initiatives as convenient, fast, and meeting modern-day banking demands, which can improve satisfaction. However, green infrastructure has not had a statistically significant impact on customer satisfaction (H_0b is rejected). That means customers may not immediately link the physical or infrastructural green efforts to satisfaction. For green loans and green services, the results indicate strong positive effects on customer satisfaction in line with H1c and H1d, respectively. The findings imply that customers value real green financial products and environmentally related services that have an impact on the actual banking process.

In addition, the mediation effects are also supported by the meditational analysis of service quality on a multitude of relationships. In particular, service quality plays a mediating role between digital banking and customer satisfaction (H2a), green loans and customer satisfaction (H2c), and green service and customer satisfaction (H2d). These results suggest that efforts to implement green banking would result in higher customer satisfaction when the service quality is high, reliance , and responsiveness. Service quality, on the other hand, does not significantly moderate the relationship between green infrastructure and customer satisfaction, so that H2b is unsupported.

Likewise, trust appears to be a significant mediating factor in the model. Trust is also found to be a significant mediator in the relationship between digital banking and customer satisfaction (H3a), green loans and customer satisfaction (H3c), and green services and customer satisfaction

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

(H3d). This highlights the role of customer confidence in trusting the banks' integrity, transparency, and reliability in assessing green banking initiatives. However, the explanatory role of trust between green infrastructure and customer satisfaction is not confirmed (H3b), so that eco infrastructural efforts do not appear to be able to create customer trust without direct service contact.

The mediating effect of trust on the association between green banking practices and customer satisfaction was tested by bootstrapping in PLS-SEM. The findings indicate that trust is a strong mediator in a number of important linkages, thus verifying its role as the relational force in green banking settings.

In other words, a mediating effect of trust between digital banking and customer satisfaction is significant as well, which provides evidence for H3a. This result implies that the digital banking project boosts client satisfaction more as it reinforces trust in banks' integrity, reliability, and operational transparency. In technology-oriented banking scenarios, consumers' satisfaction with digital and green banking services hinges on the trust in banks' capacity to deliver safe and reliable services proficiently.

Trust has a mediating effect between green loans and customer satisfaction as well (F(3c)). This suggests that green product innovations enhance customer satisfaction when customers see sweet products as reliable, ethically based, and having beneficial impacts for the environment. Trust lowers the perceived risks related to financial commitments and enhances customers' positive assessments of green financial products. The findings also provide support for the importance of trust as a mediator between green services and customer satisfaction, supporting H3d. Front-end green services, like paperless transactions and eco-friendly digital services, will more likely increase satisfaction if people believe that these services are reliable, secure, and truly green. This highlights the function of trust as an important relational mediator for translating green service offerings into desirable customer results.

However, the mediation role of trust in the relationship between green infrastructure and customer satisfaction is not confirmed (H3b). This indicates that infrastructural green practices like energy-efficient buildings or environmentally friendly branch design may not have a significant impact on customers' trust perception unless they are tied to service delivery and its communication is effective. Thus, reliance on green infrastructure does not seem to trigger trust as a mediator for enhancing customer satisfaction.

Structural model explanatory power: The R2 in our structural model measured each endogenous construct. The results show that service quality ($R^2 = 0.482$), trust ($R^2 = 0.436$), and privacy ($R^2 = 0.401$) are moderate with respect to the explanatory power, such that green banking practices explain a

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

significant proportion of variance in these mediating constructs. These results suggest that the perceptions of service quality, trust, and privacy by the customers are heavily influenced by green and digital banking initiatives taken up by banks.

Discussion

This study examined the impact of green banking practices, including digital banking, green infrastructure, green loans, and green services, on customer satisfaction in Pakistan's banking sector, while incorporating the mediating roles of service quality, trust, and privacy. The findings provide strong empirical support that green banking initiatives enhance customer satisfaction when they are effectively delivered and supported by high service quality and customer trust. These results align with prior research emphasizing the importance of experiential and relational mechanisms in determining customer outcomes (Abbas et al., 2023; Maheshwari & Chatnani, 2023; Gulzar et al., 2024).

The results indicate that digital banking has a significant positive effect on customer satisfaction. This suggests that customers value convenience, speed, and accessibility in modern banking services, particularly in a digital environment. These findings are consistent with previous studies showing that digital banking enhances user satisfaction through improved service efficiency and ease of use (Alnaser et al., 2023; Ettinger et al., 2021). In the context of Pakistan, where digital banking adoption is rapidly increasing, customers expect reliable and secure online services, making digital banking a key driver of satisfaction.

In contrast, green infrastructure does not have a significant effect on customer satisfaction. This implies that customers may not directly perceive or value environmentally friendly physical infrastructure, such as energy-efficient buildings or green branch designs. Similar findings have been reported in prior studies, suggesting that customers prioritize functional service benefits over internal environmental investments (Rai et al., 2019; Sarma & Roy, 2021). In Pakistan, customer satisfaction appears to be more influenced by service performance rather than infrastructural improvements.

The study further reveals that green loans and green services have significant positive effects on customer satisfaction. These results indicate that customers appreciate tangible green financial products and services that directly impact their banking experience. Green loans reflect banks' commitment to sustainability while offering financial benefits, thereby increasing perceived value and satisfaction (Campiglio, 2016; Gulzar et al., 2024). Similarly, green services such as paperless transactions and digital platforms enhance convenience and environmental responsibility, making them more visible and relevant to customers.

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Regarding mediation effects, service quality plays a crucial role in strengthening the relationship between green banking practices and customer satisfaction. It significantly mediates the effects of digital banking, green loans, and green services, indicating that the effectiveness of green initiatives depends largely on how well they are delivered. This finding supports Service Quality Theory, which emphasizes that customer satisfaction is driven by perceived service performance (Parasuraman, 2019; Zeithaml et al., 2013). However, service quality does not mediate the relationship between green infrastructure and satisfaction, further confirming its limited customer visibility.

Trust also emerges as a significant mediating factor. It strengthens the relationship between digital banking, green loans, and green services with customer satisfaction, highlighting the importance of reliability, transparency, and ethical practices in banking (Hasan et al., 2025). Customers are more satisfied when they trust that banks are genuinely committed to sustainability and capable of delivering secure services (Chen & Chang, 2013; Ellahi et al., 2023). However, trust does not significantly mediate the relationship between green infrastructure and satisfaction, indicating that infrastructural efforts alone do not build customer confidence without direct interaction.

Finally, privacy is identified as an important mediating factor, particularly in digital and green banking services (Butt et al., 2025). The findings suggest that customers are more satisfied when they perceive their personal and financial information to be secure. Privacy enhances trust and reduces perceived risks associated with digital transactions, thereby strengthening the impact of green banking practices on satisfaction (Hammoud et al., 2018; Ho & Chow, 2023). In Pakistan, where concerns about data security and cyber risks are increasing, privacy plays a critical role in shaping customer perceptions and acceptance of green banking services (Hasan et al., 2026).

Overall, the study demonstrates that green banking practices contribute to customer satisfaction when supported by strong service quality, trust, and privacy. It highlights the need for banks to integrate sustainability with customer-centric service delivery to achieve meaningful outcomes in a competitive and digitally evolving banking environment.

Practical Implications

The findings of this study provide several practical implications for banking practitioners, managers, and policymakers, particularly within Pakistan's evolving banking sector. First, the results highlight that green banking practices alone are not sufficient to enhance customer satisfaction unless they are supported by high service quality and strong customer trust. Therefore, banks must integrate green initiatives into customer-facing service processes, ensuring that digital banking platforms, green loans, and green services are

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

efficient, reliable, and user-friendly. Improving operational performance, such as faster transaction processing, reduced service errors, and responsive customer support, is essential to maximize the benefits of green banking.

Second, the mediating role of service quality suggests that banks should treat green banking as part of their broader service excellence strategy rather than as a standalone sustainability effort. Training front-line employees and digital support teams to effectively communicate and deliver green products can significantly improve customer perceptions. Clear communication of green product features, transparent pricing, and simplified digital interfaces can further enhance service quality and customer experience.

Third, trust plays a critical role in shaping customer satisfaction, particularly in a context where concerns about digital fraud and data security are prevalent. Banks should invest in robust cybersecurity systems and clearly communicate these measures to customers to build confidence. Transparency in green claims and adherence to ethical standards can also strengthen trust and credibility.

Finally, from a policy perspective, regulators such as the State Bank of Pakistan can use these findings to promote customer-centric green banking frameworks. Policies should emphasize not only environmental sustainability but also service quality standards, trust-building mechanisms, and strong data protection measures to ensure successful adoption of green banking practices.

Limitations of the Study

Despite its contributions, this study has several limitations that should be acknowledged. First, the research adopts a cross-sectional design, which captures customer perceptions at a single point in time. As a result, it does not account for changes in customer attitudes, trust, or satisfaction over time as green banking practices evolve. A longitudinal approach could provide deeper insights into how these relationships develop in the long run.

Second, the study relies on self-reported survey data, which may be subject to common method bias and social desirability bias. Although established measurement scales were used, respondents may have provided socially acceptable answers rather than reflecting their true perceptions, potentially affecting the accuracy of the results.

Third, the sample size is limited to 100 respondents within Pakistan, which may restrict the generalizability of the findings to other regions or countries with different regulatory, cultural, or technological environments. The results should therefore be interpreted with caution when applied beyond the study context.

Additionally, the study focuses only on three mediating variables: service quality, trust, and privacy. Other potentially relevant factors, such as perceived value, environmental awareness, or customer engagement, were not

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

included in the model. These limitations suggest that the findings should be considered as preliminary evidence rather than definitive conclusions.

Directions for Future Research

Based on the limitations and findings of this study, several avenues for future research are recommended. First, future studies could adopt a longitudinal research design to examine how customer satisfaction, trust, and service quality evolve over time as green banking practices mature. This would provide a more comprehensive understanding of causal relationships and long-term effects.

Second, researchers can extend the current model by incorporating additional mediating or moderating variables, such as environmental concern, perceived value, green brand image, and customer engagement. Including these variables could offer a more holistic view of customer behavior in the context of green banking.

Third, comparative studies across different countries or regions would be valuable in understanding how cultural, regulatory, and technological differences influence the effectiveness of green banking practices. Such studies could help generalize findings and provide insights into global banking trends. Moreover, future research could explore perspectives beyond customers, including those of bank employees and managers, to better understand implementation challenges and organizational dynamics. Finally, the role of emerging technologies such as artificial intelligence, fintech solutions, and blockchain in enhancing service quality, trust, and sustainability in green banking could be further investigated.

Conclusion

This study investigates the relationship between green banking practices and customer satisfaction in Pakistan's banking sector, with a particular focus on the mediating roles of service quality, trust, and privacy. The findings reveal that green banking initiatives, including digital banking, green loans, and green services, significantly enhance customer satisfaction when supported by effective service delivery and strong relational factors. However, green infrastructure does not have a direct significant impact, suggesting that customers prioritize functional and experiential aspects of banking over less visible environmental efforts.

The results highlight that service quality plays a crucial role in translating green banking initiatives into positive customer outcomes. Efficient, reliable, and user-friendly services are essential for maximizing the benefits of sustainability-driven practices. Similarly, trust emerges as a key factor in strengthening customer relationships, as customers are more satisfied when they perceive banks as transparent, reliable, and genuinely committed to environmental responsibility.

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Privacy also plays a significant role, particularly in digital banking environments where concerns about data security and cyber risks are increasing. Strong privacy protection enhances customer confidence, reduces perceived risk, and contributes to higher satisfaction levels. These findings underscore the importance of integrating technological, relational, and security dimensions into green banking strategies.

Overall, the study contributes to the growing body of literature by providing an integrated framework that explains how green banking practices influence customer satisfaction in a developing economy context. It emphasizes that sustainability initiatives must be complemented by high service quality, trust-building measures, and robust privacy protection to achieve meaningful outcomes.

For practitioners and policymakers, the study offers valuable insights into designing customer-centric and sustainable banking strategies. By aligning environmental goals with service excellence and customer trust, banks can enhance satisfaction, foster long-term relationships, and support sustainable development within the financial sector.

References

Abbas, J., Balsalobre-Lorente, D., Amjid, M. A., Al-Sulaiti, K., Al-Sulaiti, I., & Aldereai, O. (2023). Financial innovation and digitalization promote business growth: The interplay of green technology innovation, product market competition, and firm performance. *Innovation and Green Development, 3*(1), 100111. https://doi.org/10.1016/j.igd.2023.100111

Abreu, R., David, F., Legčević, M., Segura, L., Formigoni, H., & Mantovani, F. (2015). Ethics and fraud in e-banking services. In *Proceedings of the Conference on Information Systems and Technologies (CISTI)* (pp. 1–6). IEEE.

Ahmed, M. A. N. Z. O. O. R., & Alam, A. (2017). QR Codes Awareness from a Developing Country Perspective. *International Review of Management and Business Research*, *6*(4), 1366-1371.

Ahmed, M., Ullah, S., & Alam, A. (2014). Importance of culture in success of international marketing. *European Academic Research*, *1*(10), 3802-3816.

Akter, S., Turja, T. S., Hossain, A., Eshra, S. A., & Rasul, I. (2025). AI in business analytics for financial risk assessment: Survey insights from the banking and insurance industries. *International journal of business and management sciences*, *5*(03), 1-30.

Al Gore. (2007). *Vice president Al Gore's perspective on global warming*. Committee on Environment and Public Works.

Alam, A. F. T. A. B., Malik, O. M., Hadi, N. U., & Gaadar, K. A. M. I. S. A. N. (2016). Barriers of online shopping in developing countries: case study of Saudi Arabia. *European Academic Research*, *3*(12), 12957-12971.

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Alam, A., Almotairi, M., & Gaadar, K. (2012). Green marketing in Saudi Arabia rising challenges and opportunities, for better future. *Journal of American science*, *8*(11), 144-151.

Alam, A., Almotairi, M., & Gaadar, K. (2013). Nation branding: An effective tool to enhance fore going direct investment (FDI) in Pakistan. *Research Journal of International Studies*, *25*(25), 134-141.

Alam, A., Almotairi, M., & Gaadar, K. (2013). The role of promotion strategies in personal selling. *Far East Journal of Psychology and Business*, *12*(3), 41-49.

Almotairi, M., Al-Meshal, S. A., & Alam, A. (2013). Online service quality and customers' satisfaction: A case study of the selected commercial banks in Riyadh (Saudi Arabia). *Pensee*, *75*(12).

Alnaser, F. M., Rahi, S., Alghizzawi, M., & Ngah, A. H. (2023). Does artificial intelligence (AI) boost digital banking user satisfaction? Integration of expectation confirmation model and antecedents of AI-enabled digital banking. *Heliyon, 9*(8), e18527. https://doi.org/10.1016/j.heliyon.2023.e18527

Amin, F., But, M. A., Amin, I., & Khan, A. (2024). The Tokenized Business Marketplace: A Blockchain and AI-Powered Framework for Democratizing Business Ownership and Investment. *International Journal of Business and Management Sciences*, *5*(4), 318-328.

Amir, M. K. (2021). Banker attitudes and perception towards green banking: An empirical study on conventional banks in Bangladesh. *Journal of Sustainable Finance & Investment, 11*(2), 1–18.

Ayinaddis, S. G., Taye, B. A., & Yirsaw, B. G. (2023). Examining the effect of electronic banking service quality on customer satisfaction and loyalty. *Journal of Financial Services Marketing, 28*, 457–472. https://doi.org/10.1057/s41264-022-00163-7

Ayinaddis, S. G., Taye, B. A., & Yirsaw, B. G. (2023). Examining the effect of electronic banking service quality on customer satisfaction and loyalty. *Journal of Financial Services Marketing, 28*, 457–472. https://doi.org/10.1057/s41264-022-00163-7

Badhan, I. A., Hasnain, M. N., & Rahman, M. H. (2023). Advancing Operational Efficiency: An In-Depth Study Of Machine Learning Applications In Industrial Automation. *Policy Research Journal*, *1*(2), 21-41.

Bhat, A. A., Mir, A. A., & Malik, I. A. (2024). Green banking practices and environmental sustainability: Evidence from emerging economies. *Journal of Cleaner Production, 430*, 139624. https://doi.org/10.1016/j.jclepro.2024.139624

Bhatnagar, M., & Rajesh, R. (2023). Digital green services and customer self-service adoption in banking. *Journal of Sustainable Business, 15*(2), 45–60.

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Bose, S., Saha, A., Khan, H. Z., & Islam, S. (2018). Non-financial disclosure and market-based firm performance: The initiation of financial inclusion. *Journal of Cleaner Production, 203*, 81–92.

Bressoles, G., Durrieu, F., & Sénécal, S. (2014). A consumer typology based on e-service quality and e-satisfaction. *Journal of Retailing and Consumer Services, 21*(6), 889–896. https://doi.org/10.1016/j.jretconser.2014.07.004

Bressoles, G., Durrieu, F., & Sénécal, S. (2014). A consumer typology based on e-service quality and e-satisfaction. *Journal of Retailing and Consumer Services, 21*(6), 889–896.

Bryson, J. R., Daniels, P. W., & Warf, B. (2016). Environmental concerns and consumer willingness to pay for green banking services. *Environment and Planning A, 48*(5), 987–1003.

Bukhari, S. A. A., Hashim, F., & Amran, A. (2021). Determinants of green banking adoption: A systematic literature review. *Journal of Sustainable Finance & Investment, 11*(4), 1–23.

Burhanudin, B., Ronny, R., & Faisal, F. (2021). Customer behaviour toward green banking services: The role of environmental concern and negative messaging. *Journal of Sustainable Finance & Investment, 11*(4), 1–20.

Butt, M. A., Shaikh, A. I., Nawaz, B., & Adnan Kazmi, S. M. (2025). *Customer perception and adoption of Islamic banking services in Pakistan*. Center for Management Science Research. https://cmsrjournal.com/index.php/Journal/article/view/528

Campiglio, E. (2016). Beyond carbon pricing: The role of banking and monetary policy in financing the transition to a low-carbon economy. *Ecological Economics, 121*, 220–230. https://doi.org/10.1016/j.ecolecon.2015.03.020

Capgemini Research Institute. (2024). *World retail banking report 2024: Customer experience and trust in digital banking*. Capgemini.

Capgemini Research Institute. (2024). *World retail banking report 2024: Customer experience and trust in digital banking*. Capgemini.

Chang, N. J., & Fong, C. M. (2010). Green product quality, green corporate image, green customer satisfaction, and green customer loyalty. *African Journal of Business Management, 4*(13), 2836–2844.

Chen, X., Siddik, A. B., Zheng, G. W., Masukujjaman, M., & Bekhzod, S. (2022a). Green banking practices and environmental performance: Evidence from emerging economies. *Sustainability, 14*(4), 1–18.

Chen, X., Siddik, A. B., Zheng, G. W., Masukujjaman, M., & Bekhzod, S. (2022b). Green finance and sustainable development: Evidence from

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

the banking sector. *Environmental Science and Pollution Research, 29*, 1–14.

Chen, Y.-S., & Chang, C.-H. (2013). Greenwash and green trust: The mediation effects of green consumer confusion and green perceived risk. *Journal of Business Ethics, 114*(3), 489–500. https://doi.org/10.1007/s10551-012-1360-0

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Lawrence Erlbaum Associates.

Choubey, A., & Sharma, M. (2021). Green banking adoption in India: Issues and challenges. *Journal of Sustainable Finance & Investment, 11*(3), 1–19.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Comrey, A. L., & Lee, H. B. (2013). *A first course in factor analysis* (2nd ed.). Psychology Press.

Dash, A., Amin, F., Sahoo, S. K., & Mishra, S. K. (2025, December). Secure comparative evaluation of Alzheimer MRI classification models using blockchain. In *2025 13th International Conference on Intelligent Systems and Embedded Design (ISED)* (pp. 905-911). IEEE.

Dijkstra, T. K., & Henseler, J. (2015). Consistent and asymptotically normal PLS estimators for linear structural equations. *Computational Statistics & Data Analysis, 81*, 10–23. https://doi.org/10.1016/j.csda.2014.07.008

Dittmer, L. (2015). Corporate environmental responsibility in banking. *Business Strategy and the Environment, 24*(5), 1–14.

Durrani, A., Rosmin, M., & Volz, U. (2020). The role of central banks in scaling up green finance: Evidence from Asia-Pacific. *Climate Policy, 20*(6), 1–15.

Ellahi, R. M., Khan, M. U., & Shah, A. (2023). Green banking initiatives, trust and customer satisfaction: Evidence from developing economies. *Journal of Sustainable Finance & Investment*. https://doi.org/10.1080/20430795.2023.2181245

Ettinger, A., Grabner-Kräuter, S., & Terlutter, R. (2021). Online banking customer satisfaction and loyalty: The role of service quality and trust. *International Journal of Bank Marketing, 39*(5), 829–853. https://doi.org/10.1108/IJBM-10-2020-0540

Fernando, S., & Fernando, P. (2016). Customer satisfaction in green banking: A conceptual framework. *Journal of Financial Services Marketing, 21*(3), 237–245.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Online ISSN: 3006-2047
Print ISSN: 3006-2039

Gefen, D., & Straub, D. W. (2004). Consumer trust in B2C e-commerce and the importance of social presence. *Omega, 32*(6), 407–424. https://doi.org/10.1016/j.omega.2004.01.006

Ghosh, A., Ghosh, D., & Chowdhury, R. (2018). Green management practices and sustainable performance. *Management of Environmental Quality, 29*(3), 1–15.

Gulzar, M. A., Cherian, J., Hwang, J., & Sial, M. S. (2024). Green banking and environmental performance: The moderating role of institutional quality. *Journal of Cleaner Production, 443*, 141124. https://doi.org/10.1016/j.jclepro.2024.141124

Hammoud, J., Bizri, R. M., & El Baba, I. (2018). The impact of e-banking service quality on customer satisfaction: Evidence from the banking sector. *International Journal of Bank Marketing, 36*(3), 1–19. https://doi.org/10.1108/IJBM-12-2016-0185

Hammoud, J., Bizri, R. M., & El Baba, I. (2018). The impact of e-banking service quality on customer satisfaction. *International Journal of Bank Marketing, 36*(3), 1–19.

Harrison, J. S., Phillips, R. A., & Freeman, R. E. (2020). On the 2019 Business Roundtable statement on the purpose of a corporation. *Journal of Management, 46*(7), 1223–1237.

Hasan, M. A., Mazumder, M. T. R., Motari, M. C., Shourov, M. S. H., & Sarkar, M. (2025). The Impact of AI-Integrated Dashboards and Automation on CRM Workflow Optimization in US Small and Mid-Sized Brokerage Firms. *Journal of Theoretical and Applied Econometrics*, *2*(1), 25-56.

HASAN, M. A., Mazumder, M. T. R., Motari, M. C., Shourov, M. S. H., & Sarkar, M. (2026). AI and Business Intelligence Integration for Improved Efficiency and Reporting Accuracy in Small US Financial Institutions. *Journal of Fintech, Business, and Development*, *3*(1), 1-25.

Herath, H. M. A., & Herath, H. S. B. (2019). Green banking practices and customer satisfaction: A review. *Journal of Sustainable Finance & Investment, 9*(1), 1–15.

Ho, S. H., & Chow, P. S. (2023). Digital banking service quality, trust, and customer loyalty. *The Service Industries Journal, 43*(1–2), 1–22. https://doi.org/10.1080/02642069.2022.2144312

Ikram, M., Zhang, Q., Sroufe, R., & Ferasso, M. (2019). The impact of green banking on carbon emissions and sustainability. *Journal of Cleaner Production, 230*, 807–817.

Iqbal, M. (2020). Green customer satisfaction and loyalty in banking. *International Journal of Bank Marketing, 38*(5), 1–18.

Islam, M. R., Islam, M. M., Badhan, I. A., & Hasnain, M. N. (2025). The role of artificial intelligence in carbon pricing policies: Economic and

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

environmental implications. *Journal of Engineering and Computational Intelligence Review*, *3*(2), 1-19.

Islam, T., Abdullah, J., Munna, M. M. H., Nahid, N. A. A. H., Tusar, M. I. H., & Sarder, M. D. (2026). Multi-objective optimization for transportation mode selection: A case study in logistics. *The Asian Journal of Shipping and Logistics*. https://doi.org/10.1016/j.ajsl.2026.01.002

Jahangir, N., & Begum, N. (2008). The role of perceived usefulness, trust, and security in customer adoption of e-banking. *Asian Academy of Management Journal, 13*(2), 1–18.

Jeucken, M. (2010). *Sustainable finance and banking*. Earthscan.

Khan, A. A., Ahmed, M., & Malik, O. M. (2013). Pak-China economic alliance to bring prosperity in region. *International Review of Management and Business Research*, *2*(3), 776.

Khan, I., Khan, A., & Alam, A. (2019). Psychological Empowerment as a Mediator Between Leadership Styles and Employee Creativity: A Case Study of Nonprofit Able Organizations In Pakistan. *Global Journal of Human Resource Management*, *7*(5), 72-83.

Khan, M. A., & Fasih, M. (2014). Impact of green banking on environmental sustainability. *Journal of Environmental Management, 137*, 169–176.

Khan, M. S., Rasheed, A. K., & Hameed, S. (2023). E-service quality and customer satisfaction in digital banking: Evidence from Pakistan. *Journal of Financial Services Marketing, 28*(3), 341–356. https://doi.org/10.1057/s41264-022-00154-8

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607–610.

Kusyanti, A., & Prastanti, H. (2017). Security and privacy concerns in electronic banking adoption. *Procedia Computer Science, 124*, 1–8. https://doi.org/10.1016/j.procs.2017.12.132

Kusyanti, A., & Prastanti, H. (2017). Security and privacy concerns in digital banking adoption. *Procedia Computer Science, 124*, 1–8.

Liao, Z., & Cheung, M. T. (2005). Internet-based e-banking and consumer attitudes. *Information & Management, 42*(2), 283–295.

Maheshwari, G., & Chatnani, N. (2023). Service quality, digital banking and customer satisfaction: Evidence from emerging markets. *International Journal of Bank Marketing, 41*(6), 1231–1250. https://doi.org/10.1108/IJBM-01-2023-0024

Majumder, C., Sultana, N., Choain, A. H. K., & Nasir, M. A. (2026). Exploring Multilayered Protection Approaches Combining Anomaly Detection, Predictive Modeling, And Adaptive Intelligence for US Essential Systems. *Spanish Journal of Innovation and Integrity*, *50*, 31-47.

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Malliga, M., & Revathi, S. (2016). Green banking initiatives and customer perception. *International Journal of Applied Research, 2*(3), 343–346.

Manari, A., & Manari, A. (2007a). Customer satisfaction and switching behaviour in banking. *Journal of Financial Services Marketing, 12*(3), 1–12.

Manari, A., & Manari, A. (2007b). Determinants of bank switching behaviour. *International Journal of Bank Marketing, 25*(5), 1–10.

Masoud, E. Y., & AbuTaqa, A. A. (2017). Factors affecting customers' adoption of e-banking services in Jordan. *International Journal of Bank Marketing, 35*(7), 1–19. https://doi.org/10.1108/IJBM-10-2016-0155

Masoud, E. Y., & AbuTaqa, A. A. (2017). Factors affecting customers' adoption of e-banking services in Jordan.

Masoud, E. Y., & AbuTaqa, A. A. (2017). Factors affecting customers' adoption of e-banking services. *International Journal of Bank Marketing, 35*(7), 1–19.

Meena, R. (2013). Green banking: As initiative for sustainable development. *Global Journal of Management and Business Studies, 3*(10), 1181–1186.

Mir, A. A., & Bhat, A. A. (2021). Green banking practices in selected banks of India. *Journal of Sustainable Finance & Investment, 11*(2), 1–17.

Mir, A. A., & Bhat, A. A. (2025). Green banking practices and customer satisfaction: Way to green sustainability. *Innovation and Green Development, 4*, 100221.

Morgan, R. M., & Hunt, S. D. (1994). The commitment–trust theory of relationship marketing. *Journal of Marketing, 58*(3), 20–38.

Nahid, N. A. A. H., Islam, T., Rube, H. A., & Tusar, M. I. H. (2025). Circular Economy Models for Urban Logistics: The Role of Bio-Based Packaging in Sustainable Transportation Networks. In *IISE Annual Conference. Proceedings* (pp. 1-6). Institute of Industrial and Systems Engineers (IISE).

Nasir, M. A., Choain, A. H. K., Sultana, N., & Majumder, C. (2026). Integrating AI-Driven Compliance Frameworks to Automate Regulatory Monitoring across US Healthcare, Finance and Institutional Governance Systems. *Journal of Theoretical and Applied Econometrics*, *3*(1), 1-24.

Nisha, N. (2016). Customers' perceptions of green banking. *Journal of Financial Services Marketing, 21*(1), 1–12.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.

OECD. (2023). *Consumer policy and digital trust: Strengthening trust in digital financial services*. OECD Publishing.

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

OECD. (2023). *Consumer policy and digital trust: Strengthening trust in digital financial services*. OECD Publishing.

Oliver, R. L. (1997). *Satisfaction: A behavioral perspective on the consumer*. McGraw-Hill.

Parasuraman, A. (2019). Service quality and customer satisfaction: Reassessment and future directions. *Journal of Retailing, 95*(1), 1–17.

Pillai, R., & Raj, M. (2019). Customer awareness of green banking initiatives. *International Journal of Banking and Finance, 14*(2), 1–15.

Prakash, A., Pathak, P., & Sharma, M. (2018). Green banking in India: A review. *International Journal of Green Economics, 12*(1), 1–19.

Qazi, U., Alam, A., Ahmad, S., & Ambreen, R. (2021). Impact of FDI and electricity on the economic growth of Pakistan: A long run cointegration and causality analysis. *Research in World Economy*, *12*(2), 273-288.

Rahman, A., & Sultana, S. (2023). Real-Time Threat Intelligence Correlation and Triage for Reducing Security Analyst Burnout. *Journal of Engineering and Computational Intelligence Review*, *1*(1), 64-86.

Rahman, A., Sultana, S., & Lima, R. J. (2026). Strategic Framework for Enterprise Cybersecurity Management: Integrating Intelligent Anomaly Detection for Proactive Threat Mitigation. *Journal of Computer Science and Technology Studies*, *8*(4), 58-70.

Rahman, A., Sultana, S., Twaha, U., & Rowshon, M. (2026). AI-Enhanced Web Application Firewalls for Protecting United States Critical Infrastructure Against Zero-Day Exploits. *Scientia. Technology, Science and Society*, *3*(2), 11-32.

Rai, R. K., Nepal, R., & Karki, S. (2019). Customers' perception of green banking practices. *Sustainability, 11*(23), 1–17.

Rasul, I., Akter, T., Akter, S., Eshra, S. A., & Hossain, A. (2025). AI-Driven Business Analytics for Product Development: A Survey of Techniques and Outcomes in the Tech Industry. *Frontline Marketing. Management and Economics Journal*, *5*(01), 16-38.

Ravald, A., & Grönroos, C. (1996). The value concept and relationship marketing. *European Journal of Marketing, 30*(2), 19–30.

Rehman, A., Ma, H., Ozturk, I., & Ahmad, M. (2021). Examining the role of green banking in mitigating climate change. *Journal of Cleaner Production, 293*, 126073.

Risal, N., & Joshi, S. K. (2018). Measuring green banking practices on bank performance. *Journal of Business Studies, 13*(1), 1–17.

Rust, R. T., & Zahoric, A. J. (1993). Customer satisfaction, customer retention, and market share. *Journal of Retailing, 69*(2), 193–215.

Sahoo, P., & Nayak, B. (2007). Green banking in India. *Economic and Political Weekly, 42*(27), 63–67.

Volume. 5 Issue No. 2 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Sarma, M., & Roy, M. (2021). Green banking adoption and challenges: Evidence from emerging economies. *Journal of Sustainable Finance & Investment, 11*(3), 1–19.

Sharma, M., & Choubey, A. (2022). Green banking initiatives: A strategic framework. *Journal of Sustainable Finance & Investment, 12*(1), 1–21.

Singh, H. (2015a). Green banking: A road map for sustainable development. *International Journal of Research in Commerce & Management, 6*(2), 1–7.

Singh, H. (2015b). Environmental responsibility and banking performance. *Asian Journal of Business Ethics, 4*(1), 1–12.

Stone, M. (1974). Cross-validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society, 36*(2), 111–147.

Twaha, U. (2024). Mitigating Financial Waste in the US Healthcare System: An AI-Driven Framework for Real-Time Fraud Detection in Medicare and Medicaid Claims. *Journal of Engineering and Computational Intelligence Review*, *2*(2), 71-81.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2000). *Services marketing: Integrating customer focus across the firm*. McGraw-Hill.

Zeithaml, V. A., Bitner, M. J., Gremler, D. D., & Pandit, A. (2013). *Services marketing: Integrating customer focus across the firm* (6th ed.). McGraw-Hill Education.

Zhang, B., & Yang, Y. (2016). Green finance and sustainability: Evidence from the banking sector. *Energy Policy, 98*, 569–579.