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Green Trust, Green Usefulness, and Green Value Effects on Sustainable Customer Satisfaction through Digital Banking

Galih Aditya ^{1*)}; Yanto Ramli ²⁾

¹⁾ galihaditya24@gmail.com, Universitas Mercu Buana, Indonesia

²⁾ yanto.ramli@mercubuana.ac.id, Universitas Mercu Buana, Indonesia

*) Corresponding Author

ABSTRACT

Objectives: This study examines the influence of green trust, green perceived usefulness, and green perceived value on sustainable customer satisfaction, both directly and indirectly through digital banking, in the Indonesian banking sector. The study responds to the continuing gap between rapid digital-banking development and customers' understanding of the sustainability value embedded in digital and green banking services.

Methodology: The study used an explanatory quantitative design with a cross-sectional survey. Primary data were collected from 110 banking customers using a structured questionnaire measured on a five-point Likert scale. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess the measurement model, structural model, and mediating effects.

Findings: All direct relationships were positive and significant. Green trust, green perceived usefulness, and green perceived value significantly influenced sustainable customer satisfaction and digital banking. Digital banking also had a positive and significant effect on sustainable customer satisfaction and partially mediated the three green antecedents. The model explained 48.2% of the variance in digital banking and 80.0% of the variance in sustainable customer satisfaction.

Conclusion: The findings indicate that sustainable customer satisfaction in banking is shaped not only by functional digital-service performance, but also by customers' trust, perceived usefulness, and perceived value regarding sustainability. Banks should strengthen digital banking while communicating credible green commitments to create efficient, responsible, and sustainable customer experiences.

Keywords: Digital Banking; Green Perceived Usefulness; Green Perceived Value; Green Trust; Sustainable Customer Satisfaction.

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INTRODUCTION

The banking industry plays an important role in collecting funds from the public and redistributing them through credit, financing, and other services to improve economic welfare. In Indonesia, the acceleration of information and communication technology has transformed banking services from predominantly branch-based processes into digital channels such as

mobile banking, internet banking, digital account opening, and application-based services (OJK, 2021; Putra & Wiratmoko, 2021). This transformation is expected to reduce queues, shorten transaction processes, improve service efficiency, and increase customer satisfaction through faster and more flexible access.

However, the development of digital banking does not automatically remove all conventional service problems. Customers may still need to visit bank branches for account opening, customer-data updates, credit applications, service activation, or service consultations. This situation indicates a gap between the ideal function of digital banking and the actual customer experience in the field (Husania et al., 2025; Setyartantya et al., 2024). Previous studies also show that digital banking adoption can improve operational efficiency and banking performance, but the extent to which digital banking produces sustainable customer satisfaction depends on perceived service quality, reliability, usefulness, security, and customer value (Fianto et al., 2021; Indrasari et al., 2022; Setiawan & Prakoso, 2024).

At the customer level, digital-banking satisfaction is influenced by dimensions such as reliability, customer service and support, responsiveness, perceived performance, problem solving, communication quality, and visual attractiveness (Alnaser, et al., 2023; Tedjokusumo & Murhadi, 2023). These findings suggest that customer satisfaction in digital banking cannot be separated from the quality of the digital interface and the confidence customers place in the bank. In the current sustainability-oriented business environment, satisfaction is also increasingly connected to whether customers perceive the bank as responsible, efficient, and aligned with green banking practices (Costa & Di Pillo, 2024; Mir et al., 2025).

The research gap addressed in this study lies in the fragmented nature of earlier studies. Many studies examine digital banking, perceived usefulness, perceived value, trust, satisfaction, loyalty, or intention to use separately, while fewer studies integrate green trust, green perceived usefulness, green perceived value, digital banking, and sustainable customer satisfaction in one model. Moreover, green variables have more often been tested in product-purchase contexts than in banking services, and digital banking is rarely positioned as a mediating mechanism linking green perceptions to sustainable customer satisfaction (Budiman & Firdausy, 2025; Román-Augusto et al., 2023; Wicaksono & Darpito, 2023).

A preliminary survey of 30 respondents also supported the selection of the study variables. Green trust and green perceived usefulness each obtained 26 positive responses, green perceived value obtained 25 positive responses, and digital banking obtained 24 positive responses. Because each selected construct exceeded the threshold of 20 positive responses, these variables were considered relevant to examine in relation to sustainable customer satisfaction. Therefore, this study aims to analyze the effects of green trust, green perceived usefulness, and green perceived value on sustainable customer satisfaction through digital banking in Indonesian banking.

LITERATURE REVIEW

Grand Theory

This study is grounded in Sustainable Strategic Management, which emphasizes the integration of economic, social, and environmental goals into organizational strategy to create long-term value. In this perspective, sustainability is not an additional program separated from business activity; it becomes a strategic orientation that guides innovation, efficiency, stakeholder trust, and competitiveness (Sulich & Sotoduch-Pelc, 2024; Thun et al., 2024).

Digital-sustainable business models also show that digitalization can help organizations improve efficiency and scale while supporting responsible value creation (Palmié et al., 2024; Valcozzena et al., 2025).

The study is also supported by the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). TAM helps explain why customers accept digital banking when they perceive it as useful, easy, efficient, and relevant to their needs (Nihayah & Purnama, 2024). TPB complements this explanation by showing that customer behavior toward green banking is shaped by attitudes, subjective norms, and perceived behavioral control; when customers trust the bank's environmental commitment and perceive positive value, their tendency to accept digital banking is expected to increase (Jain et al., 2026).

Sustainable Customer Satisfaction

Sustainable customer satisfaction refers to customer satisfaction formed not only by functional service quality, convenience, and usefulness, but also by the perception that a company operates responsibly and supports long-term environmental and social value. Sustainability-related satisfaction is considered different from conventional satisfaction because customers evaluate both the service experience and the sustainability value attached to that service (Globocnik & Holzmann, 2024; Junhee et al., 2024). In banking, sustainable customer satisfaction emerges when customers perceive banking services as efficient, secure, convenient, digitally accessible, and aligned with green banking principles (Mir et al., 2025).

Digital Banking

Digital banking is the delivery of banking services through digital channels that enable customers to access information, conduct transactions, and manage accounts without visiting a physical branch. In the context of the Financial Services Authority blueprint, digital banking is positioned as part of a broader transformation of bank operations that must balance innovation, prudential principles, security, and public trust (OJK, 2021). Digital banking is therefore not merely a mobile application; it is a transformation of service delivery toward faster, safer, more efficient, and more customer-oriented banking experiences (Lakchan & Samaraweera, 2023; Sugihyanto & Arsjah, 2023).

Green Trust

Green trust refers to customers' confidence that a bank's environmental commitments, claims, and green practices are credible and reliable. Trust is important because customers may be skeptical of green claims when they perceive them as symbolic or inconsistent. Prior studies indicate that green trust can reduce skepticism, strengthen green word of mouth, and support customer decisions in sustainability-related contexts (De Sio et al., 2022; Guerreiro & Pacheco, 2021; Ha, 2022). In banking, green trust may encourage customers to accept digital banking when they believe that the bank genuinely reduces environmental impact and manages services responsibly.

Green Perceived Usefulness

Green perceived usefulness describes customers' belief that digital banking provides functional benefits and sustainability-related benefits. Customers may perceive digital banking as useful when it makes transactions easier, saves time, reduces the need to visit branches, and supports paperless processes. In the logic of TAM, perceived usefulness is a central factor

explaining technology acceptance, while in the green-banking context it also connects service benefits with environmental responsibility (Mohapatra et al., 2024; Nihayah & Purnama, 2024).

Green Perceived Value

Green perceived value reflects customers' overall assessment that the benefits of a service exceed the costs while also providing environmental, emotional, and moral value. In digital banking, this value may arise from efficient transactions, reduced paper use, modern service quality, and the feeling that the customer is participating in more responsible banking practices. Previous studies show that green perceived value can influence green trust, green satisfaction, and green behavioral intention (Román-Augusto, 2023; Saif et al., 2024; Zhang et al., 2025)

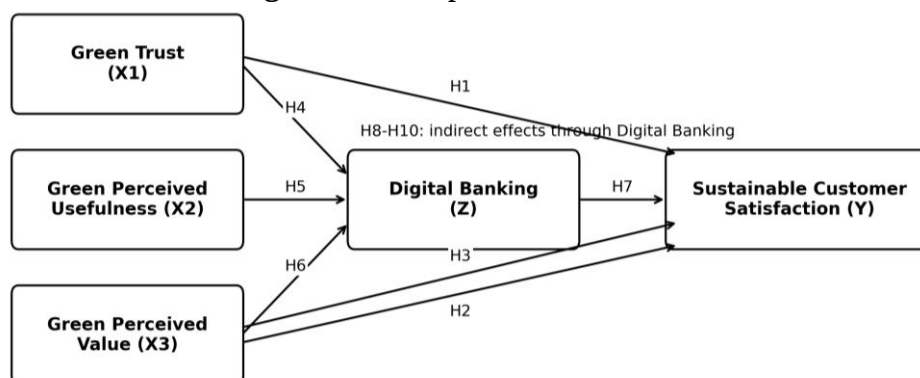
Hypotheses Development

Based on the theoretical arguments above, green trust, green perceived usefulness, and green perceived value are expected to improve sustainable customer satisfaction directly. These three antecedents are also expected to strengthen digital banking because customers who trust green commitments and perceive functional and sustainability value are more likely to accept digital banking. Digital banking is further expected to improve sustainable customer satisfaction and mediate the effects of the green antecedents (Costa & DiPillo, 2024; Joseph F. Hair et al., 2022; Mir et al., 2025). The hypotheses are summarized in Table 1.

Table 1. Research Hypotheses

Hypothesis	Relationship
H1	Green Trust -> Sustainable Customer Satisfaction
H2	Green Perceived Usefulness -> Sustainable Customer Satisfaction
H3	Green Perceived Value -> Sustainable Customer Satisfaction
H4	Green Trust -> Digital Banking
H5	Green Perceived Usefulness -> Digital Banking
H6	Green Perceived Value -> Digital Banking
H7	Digital Banking -> Sustainable Customer Satisfaction
H8	Green Trust -> Digital Banking -> Sustainable Customer Satisfaction
H9	Green Perceived Usefulness -> Digital Banking -> Sustainable Customer Satisfaction
H10	Green Perceived Value -> Digital Banking -> Sustainable Customer Satisfaction

Figure 1. Conceptual Framework



METHOD

This study used a quantitative explanatory approach with a cross-sectional design. The design was selected because the study aims to test causal relationships among latent variables in a defined research model. The population consisted of banking customers in Indonesia who use or understand digital banking services and green banking-related concepts. A total of 110 respondents were included in the analysis. Primary data were collected through a structured closed-ended questionnaire using a five-point Likert scale ranging from strongly disagree to strongly agree. Quantitative survey research is appropriate when a study aims to measure perceptions and test relationships among variables based on numerical data (Sekaran & Bougie, 2023; Sugiyono, 2022).

The variables consisted of green trust (X1), green perceived usefulness (X2), green perceived value (X3), digital banking (Z), and sustainable customer satisfaction (Y). Sustainable customer satisfaction was operationalized through satisfaction with service performance, sustainability value, responsible digital-service experience, and long-term relationship satisfaction. Digital banking was measured through accessibility, transaction speed, time saving, reliability, accuracy, information trustworthiness, security, application usability, feature completeness, and customer support. Green trust, green perceived usefulness, and green perceived value were measured through indicators adapted from recent studies on green banking, digital banking, and sustainability-related customer evaluation (Globocnik & Holzmann, 2024; Mir et al., 2025; Mohapatra et al., 2024).

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. The measurement model was assessed through outer loading, Average Variance Extracted (AVE), Cronbach's alpha, composite reliability, Fornell-Larcker criterion, and Heterotrait-Monotrait Ratio (HTMT). The structural model was assessed through R-square, Q-square, effect size, and bootstrapping-based hypothesis testing. In accordance with PLS-SEM criteria, indicators are generally considered acceptable when outer loadings exceed 0.70, AVE values exceed 0.50, reliability values exceed 0.70, and the path is significant when the t-statistic exceeds the critical value and the p-value is below 0.05 (Joseph F. Hair et al., 2022)

RESULTS AND DISCUSSION

Results

Respondent Characteristics

The study involved 110 banking customers. Based on gender, 61 respondents were male and 49 were female. Based on age, most respondents were older than 30 years, followed by the 21-25 and 26-30 age groups. The respondent profile indicates that the sample included customers who were sufficiently familiar with banking services and digital-banking usage.

Table 2. Respondent Characteristics

Characteristic	Category	Frequency	Percentage
Gender	Male	61	55%
Gender	Female	49	45%
Age	17-20 years	4	4%
Age	21-25 years	25	23%
Age	26-30 years	25	23%
Age	> 30 years	56	51%

Measurement Model Assessment

The measurement model showed satisfactory validity and reliability. The outer loading values for all indicators ranged from 0.700 to 0.877, indicating that the indicators were valid in measuring their respective constructs. The AVE values ranged from 0.614 to 0.708, exceeding the recommended threshold of 0.50. Cronbach's alpha values ranged from 0.956 to 0.962 and composite reliability values ranged from 0.960 to 0.967, indicating strong internal consistency. Discriminant validity was also acceptable based on the Fornell-Larcker criterion and HTMT values, which supported the distinctiveness of the constructs (Joseph F. Hair et al., 2022)

Table 3. Measurement Model Summary

Construct	Outer Loading Range	AVE	Cronbach's Alpha	Composite Reliability	Result
Green Trust (X1)	0.759-0.871	0.697	0.960	0.965	Valid and reliable
Green Perceived Usefulness (X2)	0.825-0.877	0.708	0.962	0.967	Valid and reliable
Green Perceived Value (X3)	0.742-0.868	0.682	0.958	0.962	Valid and reliable
Sustainable Customer Satisfaction (Y)	0.778-0.872	0.694	0.960	0.965	Valid and reliable
Digital Banking (Z)	0.700-0.853	0.614	0.956	0.960	Valid and reliable

Structural Model Assessment

The structural model demonstrated strong explanatory ability. Green trust, green perceived usefulness, and green perceived value explained 48.2% of the variance in digital banking. All exogenous variables together with digital banking explained 80.0% of the variance in sustainable customer satisfaction. The Q-square value for sustainable customer satisfaction was 0.448, indicating predictive relevance because the value was greater than zero. These values show that the research model has adequate explanatory and predictive power for sustainable customer satisfaction in the banking context (Joseph F. Hair et al., 2022).

Table 4. Structural Model Results

Endogenous Construct	R-square	Adjusted R-square	Q-square	Interpretation
Digital Banking (Z)	0.482	0.468	-	Moderate explanatory power
Sustainable Customer Satisfaction (Y)	0.800	0.793	0.448	Strong explanatory and predictive relevance

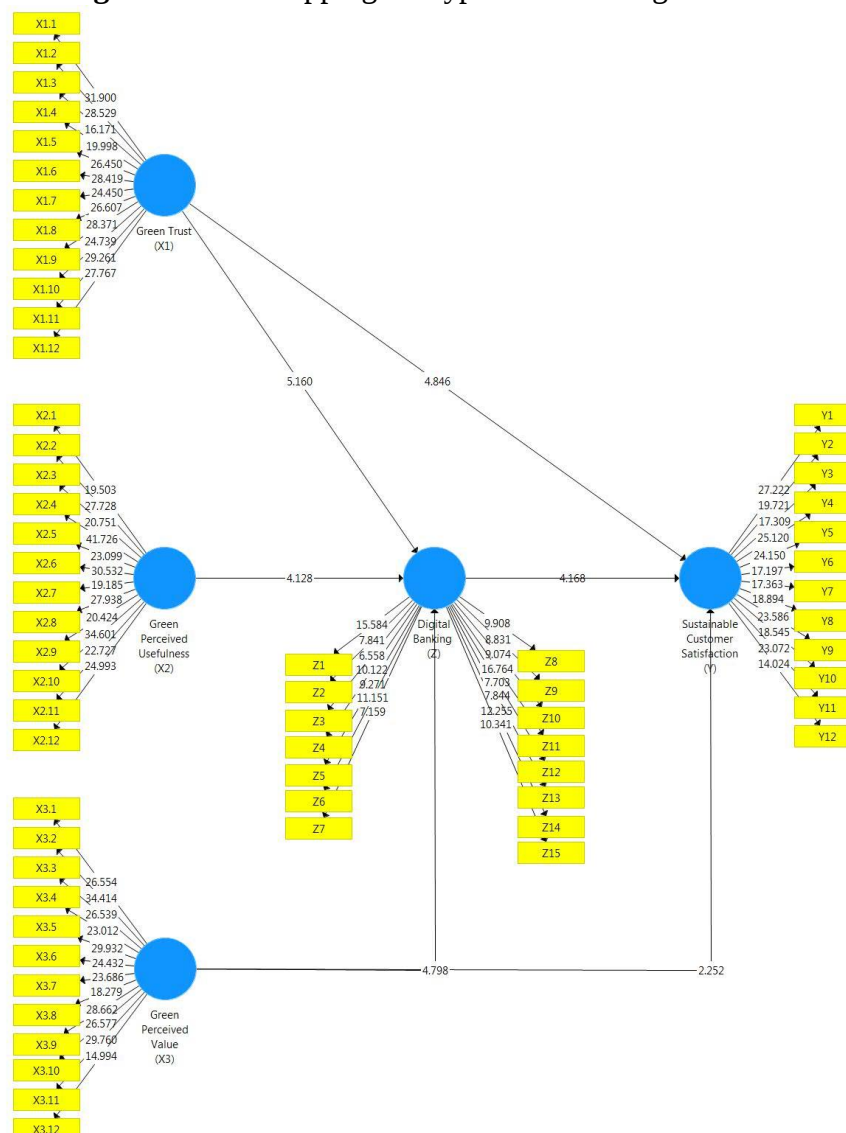
Hypothesis Testing Results

Bootstrapping results showed that all direct and indirect effects were positive and statistically significant. The strongest direct effect on sustainable customer satisfaction was digital banking ($O = 0.473$, $t = 4.168$, $p < 0.001$), followed by green trust ($O = 0.328$, $t = 4.846$, $p < 0.001$), green perceived usefulness ($O = 0.205$, $t = 4.271$, $p < 0.001$), and green perceived value ($O = 0.174$, $t = 2.252$, $p = 0.025$). Green trust, green perceived usefulness, and green perceived value also significantly influenced digital banking. The indirect effects through digital banking were significant for green trust, green perceived usefulness, and green perceived value, indicating partial mediation.

Table 5. Hypothesis Test Results

Hyp.	Relationship	O	STDEV	T-stat.	P-value	Decision
H1	GT -> SCS	0.328	0.068	4.846	0.000	Supported
H2	GPU -> SCS	0.205	0.048	4.271	0.000	Supported
H3	GPV -> SCS	0.174	0.077	2.252	0.025	Supported
H4	GT -> DB	0.351	0.068	5.160	0.000	Supported
H5	GPU -> DB	0.311	0.075	4.128	0.000	Supported
H6	GPV -> DB	0.336	0.070	4.798	0.000	Supported
H7	DB -> SCS	0.473	0.113	4.168	0.000	Supported
H8	GT -> DB -> SCS	0.166	0.057	2.914	0.004	Partial mediation
H9	GPU -> DB -> SCS	0.147	0.050	2.928	0.004	Partial mediation
H10	GPV -> DB -> SCS	0.159	0.063	2.535	0.012	Partial mediation

Figure 2. Bootstrapping of Hypothesis Testing Results



Discussion

The Influence of Green Trust on Sustainable Customer Satisfaction

The results show that Green Trust has a positive and significant effect on Sustainable Customer Satisfaction, with an original sample value of 0.328, a t-statistic of 4.846, and a p-value below 0.001. This finding indicates that customers become more sustainably satisfied when they believe that the bank is honest, reliable, and consistent in carrying out its green-banking commitments. In the banking industry, trust is especially important because customers do not only evaluate service speed or product features, but also the credibility of information, data protection, and the consistency between sustainability claims and actual service practices.

This result supports the view that green trust reduces customer skepticism and strengthens positive evaluation toward sustainability-oriented services (De Sio et al., 2022; Guerreiro & Pacheco, 2021; Ha, 2022). For Indonesian banking, this means that green-banking communication should be supported by visible actions, such as paperless transactions, transparent digital-service procedures, secure account management, and consistent explanations from bank officers. If customers perceive that the bank is truly committed to sustainability, their satisfaction becomes more stable and long-term.

The Influence of Green Perceived Usefulness on Sustainable Customer Satisfaction

Green Perceived Usefulness also has a positive and significant effect on Sustainable Customer Satisfaction, with an original sample value of 0.205, a t-statistic of 4.271, and a p-value below 0.001. This result indicates that customers are more satisfied when they perceive that green-oriented banking services provide clear benefits. These benefits include easier transactions, faster service processes, reduced need to visit branch offices, paperless documentation, and more efficient use of time and resources.

This finding is consistent with the Technology Acceptance Model, which emphasizes perceived usefulness as a key factor in technology acceptance and service evaluation (Budiman & Firdausy, 2025; Nihayah & Purnama, 2024). In the context of this study, usefulness is not limited to functional convenience. It also reflects the extent to which digital banking helps customers participate in more sustainable banking practices. Therefore, banks should make the practical and environmental benefits of digital banking clearer to customers so that usefulness can be directly connected to satisfaction.

The Influence of Green Perceived Value on Sustainable Customer Satisfaction

Green Perceived Value has a positive and significant effect on Sustainable Customer Satisfaction, with an original sample value of 0.174, a t-statistic of 2.252, and a p-value of 0.025. Although the coefficient is smaller than the effects of Green Trust and Green Perceived Usefulness, the relationship remains significant. This means that customers still consider the overall value of green banking when evaluating their satisfaction with banking services.

Customers assess value not only from monetary or technical benefits, but also from convenience, security, time efficiency, and the perception that the service supports responsible banking. This finding aligns with previous studies showing that green perceived value can strengthen satisfaction, trust, and behavioral intention (Román-Augusto, 2023; Wicaksono & Darpito, 2023; Zhang et al., 2025). For banks, the implication is that sustainability value should be translated into customer-facing benefits. Green value will be more meaningful when customers can experience it directly through efficient digital transactions, reduced paperwork, reliable digital records, and easier service access.

The Influence of Green Trust on Digital Banking

Green Trust has a positive and significant effect on Digital Banking, with an original sample value of 0.351, a t-statistic of 5.160, and a p-value below 0.001. This is the strongest direct effect among the three antecedent variables on Digital Banking. The result suggests that customers are more willing to accept and use digital banking when they trust the bank's commitment, system reliability, and ability to protect their information.

In digital banking, customers face perceived risks related to data privacy, transaction failure, fraud, and system errors. Therefore, trust becomes a foundation for digital adoption. When customers believe that the bank is credible and responsible, they are more likely to perceive digital banking as safe and useful. This finding supports the strategic role of trust in digital and green service transformation (Costa & DiPillo, 2024; Mir et al., 2025). Banks should therefore strengthen system security, transparent communication, and customer protection as part of their digital-banking development.

The Influence of Green Perceived Usefulness on Digital Banking

Green Perceived Usefulness has a positive and significant effect on Digital Banking, with an original sample value of 0.311, a t-statistic of 4.128, and a p-value below 0.001. This finding shows that customers are more likely to accept digital banking when they perceive that it provides practical benefits and supports sustainability-oriented behavior. Digital banking becomes attractive when it helps customers complete transactions quickly, avoid unnecessary branch visits, reduce printed documents, and access services more flexibly.

The finding reinforces the logic of technology acceptance, in which usefulness encourages users to adopt and continue using digital systems (Nihayah & Purnama, 2024). For banks, this means that digital banking should not only be promoted as a modern channel, but also as a service that solves real customer problems. Features such as electronic statements, digital account services, online queues, transfer confirmation, and responsive customer support can strengthen perceived usefulness and encourage more consistent digital-banking usage.

The Influence of Green Perceived Value on Digital Banking

Green Perceived Value has a positive and significant effect on Digital Banking, with an original sample value of 0.336, a t-statistic of 4.798, and a p-value below 0.001. This result indicates that customers are more receptive to digital banking when they perceive that the service provides value beyond basic transaction functions. The value may come from convenience, reliability, cost efficiency, environmental contribution, and the feeling that the bank provides a modern and responsible service experience.

This result is in line with research showing that perceived value plays an important role in digital-bank adoption and green customer behavior (Román-Augusto, 2023; Saif et al., 2024). In practical terms, banks should design digital services that combine functional value and sustainability value. Customers need to feel that digital banking is not only available, but also worth using because it makes their banking activities easier, safer, faster, and more aligned with responsible consumption.

The Influence of Digital Banking on Sustainable Customer Satisfaction

Digital Banking has the strongest direct effect on Sustainable Customer Satisfaction, with an original sample value of 0.473, a t-statistic of 4.168, and a p-value below 0.001. This finding confirms that digital banking is a central service mechanism in shaping customer

satisfaction. When digital banking is accessible, reliable, secure, accurate, and easy to use, customers are more likely to feel that the bank delivers efficient and sustainable service.

The result is consistent with previous studies showing that digital banking quality, mobile banking reliability, application design, security, and responsiveness improve customer satisfaction (Alnaser, 2023; Fianto et al., 2021; Indrasari et al., 2022; Tedjokusumo & Murhadi, 2023). In the Indonesian banking context, digital banking can also reduce service queues and transaction barriers, which were identified in the thesis background as important practical issues. Therefore, digital transformation should be evaluated not only from the existence of an application, but also from its ability to improve the entire customer journey.

The Mediating Role of Digital Banking

Digital Banking partially mediates the effects of Green Trust, Green Perceived Usefulness, and Green Perceived Value on Sustainable Customer Satisfaction. The indirect effect of Green Trust through Digital Banking is significant, with an original sample value of 0.166, a t-statistic of 2.914, and a p-value of 0.004. The indirect effect of Green Perceived Usefulness through Digital Banking is also significant, with an original sample value of 0.147, a t-statistic of 2.928, and a p-value of 0.004. In addition, the indirect effect of Green Perceived Value through Digital Banking is significant, with an original sample value of 0.159, a t-statistic of 2.535, and a p-value of 0.012.

These mediation results indicate that green perceptions do not only influence satisfaction directly; they also become stronger when translated into actual digital-banking experience. In other words, customers may trust the bank, perceive green usefulness, and recognize green value, but these perceptions become more meaningful when customers experience a digital service that is fast, secure, reliable, and resource-efficient. Because the direct effects remain significant, the mediation is partial. This means that digital banking strengthens, but does not fully replace, the direct role of green trust, usefulness, and value in forming sustainable satisfaction.

This finding supports Sustainable Strategic Management because digital banking functions as a strategic bridge between sustainability orientation and customer experience. Sustainability will have stronger customer impact when it is embedded in business processes, digital channels, and daily service delivery rather than communicated only as a corporate statement (Costa & Di Pillo, 2024; Palmié et al., 2024; Sulich & Sotoduch-Pelc, 2024). Therefore, banks should manage green banking and digital banking as an integrated strategy.

CONCLUSION

This study concludes that green trust, green perceived usefulness, and green perceived value have positive and significant effects on sustainable customer satisfaction in Indonesian banking. These three variables also significantly influence digital banking, and digital banking has a positive and significant effect on sustainable customer satisfaction. Digital banking partially mediates the relationships between the three green antecedents and sustainable customer satisfaction. Therefore, sustainable customer satisfaction is shaped by a combination of credible green commitment, perceived functional usefulness, perceived sustainability value, and effective digital-banking implementation.

Practically, banks should strengthen digital banking as a strategic service platform while ensuring that sustainability commitments are communicated credibly and translated into customer-facing benefits. Digital services should be reliable, secure, easy to use, and capable

of reducing unnecessary paper use and branch visits. Banks also need to educate customers about the environmental and practical benefits of digital banking so that green banking is understood as a real service value, not merely as corporate communication.

The study is limited by its cross-sectional design, sample size, and reliance on self-reported questionnaire data. Future research should involve larger samples across different regions and banking segments, compare conventional and Islamic banks, and consider additional variables such as green banking awareness, digital service quality, perceived risk, customer loyalty, and customer engagement. Longitudinal or mixed-method studies may also provide deeper insight into how sustainable customer satisfaction develops over time.

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