

The Role of Customer Experience in Mediating the Effects of Digital Financial Literacy and E-Service Quality on Customer Retention in Digital Banking Services

Syahdad Perkasa*, R. Ghifari Ramadhana Agueni, Abi Rilo Pambudi, Minsani Mariani

BINUS University, Indonesia

Email: syahdad.perkasa@binus.ac.id*, r.agueni@binus.ac.id, abi.pambudi@binus.ac.id, minsani.mariani@binus.ac.id

Keywords:

Digital Financial Literacy;
E-Service Quality;
Customer Experience;
Customer Retention;
Digital Banking

Abstract

The rapid expansion of digital banking services has intensified competition in customer retention, particularly among Generation Z and Millennial users who prioritize seamless and personalized digital experiences. This study investigates the role of customer experience in mediating the influence of digital financial literacy and e-service quality on customer retention in Indonesia's digital banking sector. Employing a quantitative explanatory approach with a cross-sectional design, data were collected from 230 active digital banking users through structured online questionnaires. Structural Equation Modeling–Partial Least Squares (SEM-PLS) was applied to analyze the direct and indirect effects among variables. The findings reveal that digital financial literacy and e-service quality do not directly affect customer retention, but both significantly enhance customer experience, which in turn fully mediates their effect on retention. Customer experience emerges as the central determinant of loyalty, emphasizing the importance of cognitive, emotional, and functional interactions with digital banking services. The study confirms that technical quality and digital literacy alone are insufficient to sustain long-term engagement without fostering positive customer experiences. These results extend theoretical understanding through the Expectation-Confirmation Theory and Service-Dominant Logic frameworks, and provide practical implications for digital banking institutions aiming to design experience-centered strategies to enhance retention among tech-savvy customer segments.

INTRODUCTION

The development of digital technology has driven a major transformation in the global banking industry, including in Indonesia. Digital banking services such as mobile banking, internet banking, and e-wallets allow customers to access financial services more quickly, flexibly, and efficiently (Leong et al., 2020). Digital banking services have become one of the primary innovations in the financial services industry, offering convenient transactions free from the constraints of space and time (Mbama & Ezepue, 2018). This development is supported by strong infrastructure, with internet users in Indonesia reaching 215.63 million by 2023 (APJII, 2023). The pandemic that began in the early second quarter of 2020 also contributed to the significant acceleration of digital banking adoption, as restrictions on

physical contact led to changes in consumer behavior and a shift toward online services (Aji et al., 2020). This is reflected in the surge in the volume of Bank Indonesia's electronic money transactions, which grew by 3,669% from 2018 to 2019 (Bank Indonesia, 2020), a trend that has continued in the post-pandemic period.

With the increasing popularity of online banking services, the younger generation — particularly Generation Z and Millennials — has become the primary user segment of digital banking due to their characteristic adaptability to technology, often described as being digitally savvy. In recent developments, the digital banking landscape has evolved beyond mere transaction channels to an embedded finance model, where banking services are seamlessly integrated into everyday ecosystem platforms such as e-commerce and super-apps — for example, the integration of Bank Jago with Gojek and SeaBank with Shopee. Another notable trend is hyper-personalization, in which artificial intelligence is used to offer financial products and insights tailored to individual needs, as well as a shift in the role of banks toward becoming financial wellness partners that assist customers in financial planning through goal-based saving and budgeting features. Fierce competition is characterized by a massive "interest war" to attract customer funds, which has proven effective as an initial draw. A global survey by McKinsey (2022) shows that around 40% of consumers in Southeast Asia open new bank accounts because of better interest rate offers. However, a survey conducted by Populix (2023) revealed that in the long term, ease of transactions and customer experience are actually stronger determinants of loyalty than interest rates alone. This dynamic has resulted in high customer mobility, as reflected in the rapid growth in the number of accounts during the 2023–2024 period — for instance, SeaBank Indonesia recorded 39 million accounts (growing 48% year-on-year in Q3 2023) and Bank Jago reached 9.2 million customers (growing 46% year-on-year in Q3 2023), with Third Party Funds (DPK) growth of 32% year-on-year in Q1 2024 (Kontan, 2024). These various innovations in digital banking products and services aim to provide optimal service and retain customers amid intensifying competition and high user mobility (Ahmed et al., 2024).

In this context, Digital Financial Literacy (DFL) — encompassing knowledge, attitudes, behaviors, security awareness, and the ability to evaluate information regarding digital financial services (OECD, 2024; Zaimovic et al., 2024) — serves as a crucial foundation. Customers with high DFL are expected to utilize technology such as mobile banking applications more optimally, thereby contributing to a more positive experience (Dhal et al., 2024). Similarly, e-service quality, measured through aspects of system reliability, ease of use, security, responsiveness, and interface design (Malc et al., 2023; Redda et al., 2023), functions as both a hygiene factor and a strategic instrument that directly influences satisfaction and loyalty intentions (Sikarwar et al., 2025; Sinha et al., 2019). However, a bank's success in achieving customer retention — characterized by customer loyalty and satisfaction (Lakshman & Faiz, 2021) — does not depend solely on digital financial literacy and e-service quality. Customer experience, defined as a customer's holistic perception encompassing cognitive, emotional, and sensory aspects during interactions with digital services (Kim et al., 2023), is strongly suspected to play a key mediating role. Positive experiences shaped by ease of use, perceived benefits, and company reputation (Eisingerich & Bell, 2008; Windasari et al., 2022) can strengthen the influence of digital financial literacy and e-service quality on retention, as customers who have meaningful experiences tend to exhibit greater long-term loyalty (Gazi et

al., 2024; Verhoef et al., 2002). Therefore, this study aims to analyze the mediating role of customer experience in the relationship between digital financial literacy, e-service quality, and customer retention in digital banking services, which are now used by more than 70% of the adult account-holding population in Indonesia (OJK, 2023).

Previous studies have largely focused on how traditional product knowledge and service quality affect customer experience and customer retention. In the current digital era, however, this context has begun to shift toward more contemporary constructs such as digital financial literacy and e-service quality — encompassing usability, UI/UX design, security, and personalization — that are more relevant to the digitally savvy Generation Z and Millennial segments. Moreover, most studies have examined financial literacy primarily in relation to intention to use, and relatively few have explored how digital financial literacy influences customer retention, particularly among users of digital banking services. The OECD (2024) emphasized that digital financial literacy can affect customer security, trust, and comfort in using digital banking services — factors that are closely linked to customer retention. Some studies have also identified e-service quality as a significant factor in customer retention (Sikarwar et al., 2025). However, according to Mbama and Ezepe (2018), service quality alone is insufficient to enhance customer retention, particularly in the absence of personalization, ease of navigation, or emotional support. This underscores the need for additional variables to strengthen the relationship between digital financial literacy, e-service quality, and customer retention.

Despite this growth, digital banking faces intense competition for customer retention, making it essential to understand the determinants of customer loyalty. Global surveys indicate that while promotional incentives such as interest rates and cashback initially attract customers, long-term retention is strongly influenced by customer experience and ease of transactions (McKinsey, 2022; Populix, 2023). This highlights a critical challenge for digital banks: providing technologically advanced services alone is insufficient to maintain customer loyalty in a competitive and mobile market dominated by Generation Z and Millennial users.

A specific concern arises with Generation Z and Millennial users, who constitute the primary consumers of digital banking services due to their high digital literacy and adaptive behaviors (Ameen & Anand, 2020; Alruthaya, 2021). These digital natives prioritize seamless, personalized, and meaningful interactions with digital platforms, where cognitive, emotional, and sensory experiences strongly shape their perceptions of value. Consequently, the quality of user experience becomes a central factor in customer retention, surpassing the traditional emphasis on service features and financial incentives.

Previous research has established the importance of service quality and financial literacy in shaping customer satisfaction (Andreou & Anyfantaki, 2021; Lakshman & Faiz, 2021). However, traditional studies primarily focus on general financial literacy and service attributes without adequately exploring the digital context, including usability, security, UI/UX design, and personalization that are highly relevant to digitally savvy users. Furthermore, many studies evaluate digital financial literacy mainly in terms of usage intention rather than its influence on sustained customer retention, creating a gap in understanding the mediating mechanisms involved.

This research gap becomes evident when examining the mediating role of customer experience in linking digital financial literacy and e-service quality to customer retention.

Although the literature acknowledges the relevance of customer experience in driving loyalty (Lemon & Verhoef, 2016; Windasari et al., 2022), empirical studies focusing on Generation Z and Millennial users in the Indonesian digital banking context remain limited. This gap highlights the need for a comprehensive investigation into how digital literacy and service quality translate into positive experiences that ultimately foster retention among younger consumers.

The urgency of this research stems from the dynamic and highly competitive digital banking environment in Indonesia, where customer mobility and switching behavior are high, and retention strategies must account for the experiential expectations of tech-savvy users. By understanding the mediating role of customer experience, banks can move beyond feature-based strategies to focus on holistic, user-centered approaches that enhance satisfaction, engagement, and long-term loyalty.

The novelty of this study lies in integrating the contemporary constructs of digital financial literacy, e-service quality, and customer experience within a mediation framework to evaluate customer retention in a developing country context. Unlike prior studies, this research focuses explicitly on Generation Z and Millennial customers in Indonesia, providing insights into how their digital capabilities and perceptions of service quality shape retention through experiential pathways. This approach bridges a critical gap between theoretical frameworks and real-world banking practices.

The purpose of this research is to analyze the direct and indirect influences of digital financial literacy and e-service quality on customer retention, as mediated by customer experience, among digitally active users. By employing a quantitative explanatory approach and Structural Equation Modeling–Partial Least Squares (SEM-PLS), the study measures both the cognitive and experiential dimensions of interactions with digital banking platforms, providing robust evidence of the causal relationships among these variables.

This research contributes to the academic literature by confirming the full mediating role of customer experience in the relationship between digital financial literacy, e-service quality, and customer retention. Theoretically, it extends the application of Expectation-Confirmation Theory and Service-Dominant Logic to the digital banking context, illustrating how experiential factors drive retention beyond functional or cognitive elements alone (Bhattacharjee, 2001; Vargo & Lusch, 2004). Practically, it offers actionable insights for digital banking institutions seeking to design experience-based retention strategies targeting younger demographics, with an emphasis on usability, personalization, and perceived value.

Finally, the research objectives focus on providing evidence-based recommendations to improve digital banking strategies in Indonesia. Specifically, the study seeks to: (1) evaluate the influence of digital financial literacy on customer experience and retention; (2) assess the impact of e-service quality on customer experience and retention; and (3) establish the mediating role of customer experience in translating digital literacy and service quality into sustainable customer loyalty. By achieving these objectives, the study benefits both the academic community and practitioners seeking to enhance customer engagement and retention in digital financial ecosystems.

RESEARCH METHOD

Research Design

Based on the literature review, this study uses a quantitative explanatory approach to analyze the effect of *Digital Financial Literacy* (X1) and *E-service Quality* (X2) on *Customer Retention* (Y) with *Customer Experience* (M) as a mediating variable. The research design is cross-sectional, with data collected in one period to measure the direct and indirect effects between variables. The research model initially refers to the possibility of partial mediation, so that *Digital Financial Literacy* (X1) and *E-Service Quality* are suspected to influence *Customer Retention* both directly and through improving *Customer Experience*.

Chiguvi (2023) explains that good *customer service* can meet customer expectations, thus closely linking it to *customer experience*. This mediation process is reinforced by the *Customer Experience perspective*, which encompasses all interactions at every *touchpoint* and influences post-purchase behavior or *customer retention* (Lemon & Verhoef, 2016). This experience involves cognitive, emotional, social, and sensory elements (Bhattacharya et al., 2019), ultimately reflecting a company's ability to create good *customer retention* (Suriansha et al., 2024).

Sampling Methods and Processes

To examine the influence of *digital financial literacy* and *e-service quality* on *customer retention*, with *customer experience* mediating these three variables, a *non-probability study using purposive sampling* techniques will be conducted, focusing on the Generation Z and Millennial populations. The population itself is defined as a subset of the subjects to be studied based on predetermined qualities and criteria (Sugiyono, 2018). A representative sample will then be drawn from this population. In this study, the sample will be drawn based on criteria that meet several categories, namely:

1. These respondents are Millennials or Gen Z with birth years 1981-1996 or 1997-2012.
2. Domiciled or residing in Java.
3. Already working or have a source of income/funds managed through *digital banking*
4. Is an active customer of *digital banking* in Indonesia
5. Using at least one *digital banking product* for 1 year.

To test the research hypothesis, SEM (*Structural Equation Modeling*) is used, a *multivariate* technique consisting of a combination of factor analysis and regression analysis carried out together so that the relationship between latent variables can be measured simultaneously (Hair et al., 2021). Referring to the exploratory research objective, the analytical tool used is PLS SEM (*Partial Least Squares - Structural Equation Model*). The PLS-SEM analysis tool itself provides significant results by using small sample data to validate the model and refine parameter estimates, especially when the sample size is smaller than the indicators used in the measurement model (Jhantasana, 2023). To determine the sample size, this study will also use the rule *of thumb* for PLS-SEM, namely a minimum of 100 respondents supported by sufficiently strong statistical data (Reinartz et al., 2009). The sample size will also be adjusted to five to ten times (the best ratio) the number of indicators in the study (Hair et al., 2021). Thus, the strength of the relationship between variables can be analyzed comprehensively. The sample size in this study was calculated as follows:

Sample = Indicator x 10
Sample = 22 x 10
Sample = 220 respondents

Data Collection Techniques and Data Analysis Methods

For data collection, this study used a survey method using a structured questionnaire distributed online to Generation Z and Millennial customers who have used digital banking services in the past year. The data collection technique used was a *self-administered online survey* through various channels such as *WhatsApp* and *Instagram*. This technique was chosen because it can reach geographically dispersed populations efficiently, reduces *interviewer bias*, and is more cost-effective in obtaining a large sample size in a short time. Online surveys are also appropriate for the research context because target respondents are accustomed to using digital platforms, thus increasing the likelihood of participation and accuracy of filling in the questionnaire. In addition, the use of a questionnaire with an *ordinal scale* (a *Likert scale* of 1–5 is very appropriate) to measure latent variables such as *Digital Financial Literacy*, *E-Service Quality*, *Customer Experience*, and *Customer Retention* which can then be analyzed using SEM. The collected data consisted of direct respondents' answers or primary data and data in the form of industry statistical reports, as well as relevant previous literature or secondary data.

Furthermore, this analysis utilizes primary data from survey results as the main source to test the measurement model and structural model, including reliability tests (*Cronbach's Alpha*, *Composite Reliability*), convergent validity (*Average Variance Extracted/AVE*), discriminant validity (*Heterotrait-Monotrait Ratio*), coefficient of determination (R^2), effect size (f^2), and path significance tests using *bootstrapping* (Hair et al., 2021) which will be carried out to determine the accuracy of each indicator in this study to find out whether the research instrument is appropriate (valid) and consistent (reliable). The validity test will be said to be valid if the questionnaire can answer or reveal something from being measured in the study (Ghozali, 2018). The indicator of the variable can be declared valid if the *loading factor score* is >0.5 and *the loading factor* with a range of 0.5-0.6 is still considered sufficient or valid (Ghozali & Latan, 2015) and AVE (*Average Variance Extracted*) >0.5 (*critical value*). The reliability test aims to assess the extent to which the research instrument is able to measure variables consistently and can be replicated. The test is carried out using Cronbach's Alpha and Composite Reliability through SmartPLS software. If the Cronbach's Alpha (α) score is >0.6 , it can be declared *reliable* for data with structural and composite reliability >0.70 (Sekaran & Bougie, 2016). And finally, for the hypothesis test, a T value test of 1.96 will be carried out which has been determined based on the PLS-SEM hypothesis test standard.

Meanwhile, secondary data such as industry statistical reports and previous studies were used as references to verify the findings and contextualize the analysis results. PLS-SEM was chosen based on its ability to process complex models, support mediation analysis, and does not require normal data distribution. It has also proven effective in previous research on digital banking and customer experience (Kresnowati, 2022; Saputra et al., 2023; Lemon & Verhoef, 2016).

RESULTS AND DISCUSSION

Respondent Characteristics

The data collected in this study amounted to 265 respondents. After data cleaning *and* selection based on research criteria, 230 respondents were selected who met the requirements for further analysis. All respondents resided on the island of Java and belonged to the Millennial Generation (1981–1996) and Generation Z (1997–2012), selected because these two generations have high levels of technology adoption and are the primary users of digital banking services in Indonesia.

All respondents were active customers of various digital banking products such as Jenius, Bank Jago, Digibank, Neobank, LINE Bank, PermataMe, TMRW, SeaBank, Blu, and others. Respondents owned or used at least two digital banking products for at least two years. Furthermore, all respondents were employed or had a steady source of income managed through digital banking services, whether for daily transactions, savings, investments, or bill payments. This indicates that respondents had direct experience and a sufficient understanding of the features and benefits of digital banking services.

Based on the demographic characteristics of the respondents, the gender distribution of respondents was relatively balanced, with 121 male respondents (52.6%) and 109 female respondents (47.4%). In terms of age, the majority of respondents were in the 31–40 age range (112 people (48.7%)), followed by 107 respondents (46.5%) aged 21–30. Eight respondents were aged 41–45 (3.5%), while three were aged 15–20 (1.3%). This distribution indicates that most respondents were of productive age with high financial activity and significant intensity of use of digital financial services.

In terms of education, the majority of respondents (178 respondents) had a bachelor's degree (S1), followed by 22 (9.6%) with a postgraduate degree, 20 (8.7%) with a high school/vocational school degree, and 10 (4.3%) with a diploma. The high proportion of respondents with higher education indicates a good level of digital and financial literacy, thus supporting their ability to understand and critically evaluate digital banking services.

Respondents' income levels showed quite wide variations. The majority of respondents were in the range of IDR 10–20 million per month, namely 88 people (38.3%), followed by IDR 5–10 million, as many as 84 people (36.5%). A total of 26 respondents (11.3%) had an income of IDR 20–30 million, and 15 respondents (6.5%) earned more than IDR 30 million per month. Meanwhile, respondents with an income of IDR 1–5 million numbered 14 people (6.1%), and respondents with an income of less than IDR 1 million were 3 people (1.3%). This data shows that the majority of respondents came from *the middle-income to upper-middle income segment*, which is the main target of digital banking services in Indonesia.

In terms of user experience, the majority of respondents (103 respondents, 44.8%) had been digital banking customers for more than six years. 38 respondents (16.5%) had 4–5 years of experience, 35 (15.2%) had 3–4 years, 34 (14.8%) had 2–3 years, and 20 (8.7%) had 5–6 years. This indicates that the majority of respondents have extensive and mature experience using digital banking services.

In terms of the number of digital banking products owned, 85 respondents (36.9%) owned two products, 65 respondents (28.3%) owned three products, 51 respondents (22.2%) owned four products, 19 respondents (8.3%) owned five products, and 10 respondents (4.3%) owned more than five digital banking products. These findings indicate a fairly high level of

service diversification, which indicates the level of engagement *and* trust respondents have in the digital banking ecosystem. Overall, the characteristics of respondents in this study were dominated by productive-age individuals with high levels of education, middle to upper-middle incomes, and relatively long and diverse experience using digital banking. This profile strengthens the validity of the study because respondents are considered to have adequate experience, good literacy, and active involvement in the use of digital banking services as part of their daily financial activities.

Table 1. Respondent Demographics

Information	N	Percentage (%)
Gender		
Man	121	52.6%
Woman	109	47.4%
Age		
15-20	3	1.3%
21-30	107	46.5%
31-40	112	48.7%
41-45	8	3.5%
Education		
High School/Vocational School	20	8.7%
Diploma	10	4.3%
Bachelor	178	77.4%
Postgraduate	22	9.6%
Income		
< 1 Million	3	1.3%
1-5 Million	14	6.1%
5-10 Million	84	36.5%
10-20 Million	88	38.3%
20-30 Million	26	11.3%
> 30 Million	15	6.5%
Long-time Digital Banking Customer		
2-3 Years	34	14.8%
3-4 Years	35	15.2%
4-5 Years	38	16.5%
5-6 Years	20	8.7%
> 6 Years	103	44.8%
Number of Digital Banking Products Owned		
2	85	36.9%
3	65	28.3%
4	51	22.2%
5	19	8.3%
> 5	10	4.3%

Validity and Reliability Test, R-Square, F-Square, HTMT

Validity and reliability testing in this study was conducted using *the Structural Equation Modeling–Partial Least Squares (SEM-PLS)* approach. Evaluation of the measurement model (*outer model*) was carried out through *convergent validity* and *internal consistency reliability testing*. *Convergent validity* was measured using *loading factor* and *Average Variance Extracted (AVE)* values, while construct reliability was evaluated through *Composite Reliability (CR)* and *Cronbach's Alpha values*. The criteria used in this study refer to the general standards of SEM-PLS, namely *loading factor* ≥ 0.70 (tolerable ≥ 0.50 in the exploratory stage), *AVE* ≥ 0.50 , and *Composite Reliability* and *Cronbach's Alpha values* \geq

0.70. In the first test experiment, one of the DFL5 indicators had a value of 0.329. Subsequently, this DFL5 indicator was removed from the model because it had a *loading factor* > 0.50 and did not meet the *convergent validity criteria*. Conceptually, DFL5 measures the behavior of reading terms and conditions of service—a dimension that, as reflected in the findings of this study, tends to be ignored by the majority of digital banking customers and therefore does not represent the DFL construct in general in this sample.

Then, after the DFL5 indicator was removed, a retest was carried out on the measurement model, and the results of the processing of the reliability and validity tests were as follows:

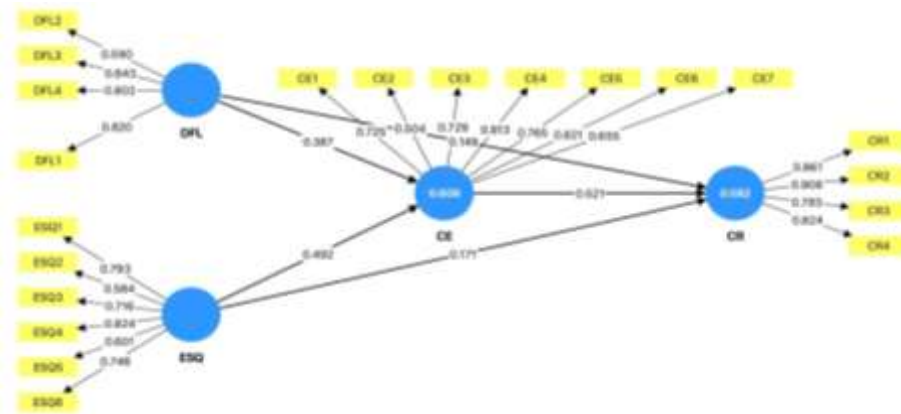


Figure 2.
Validity and Reliability Testing

Table 2. *Validity and Reliability Testing*

Variable	Loading Factor	AVE	Composite Reliability	Cronbach's Alpha
<i>Digital Financial Literacy (X1)</i>				
DFL1	0.820	0.594	0.811	0.772
DFL2	0.590			
DFL3	0.843			
DFL4	0.802			
<i>E-Service Quality (X2)</i>				
ESQ1	0.793	0.513	0.836	0.810
ESQ2	0.584			
ESQ3	0.716			
ESQ4	0.824			
ESQ5	0.601			
ESQ6	0.746			
<i>Customer Experience (M)</i>				
CE1	0.725	0.523	0.854	0.842
CE2	0.504			
CE3	0.729			
CE4	0.813			
CE5	0.765			
CE6	0.821			
CE7	0.655			
<i>Customer Retention (Y)</i>				
CR1	0.861	0.714	0.876	0.866
CR2	0.908			
CR3	0.783			
CR4	0.824			

The results show an increase in the quality of the *Digital Financial Literacy* (DFL) construct, with *loading factors* ranging from 0.590 to 0.843. The AVE value is 0.594 (>0.50), indicating that the construct has met the *convergent validity criteria*. In addition, the *Composite Reliability value* increased to 0.811 and Cronbach's Alpha to 0.772, confirming that the DFL construct has good internal consistency and reliability.

Meanwhile, for the *E-Service Quality* (ESQ), *Customer Experience* (CE), and *Customer Retention* (CR) variables, the *loading factor*, AVE, *Composite Reliability*, and *Cronbach's Alpha values* are still the same and are not significantly affected by the removal of the DFL5 indicator. However, researchers also found that DFL2, ESQ2, ESQ5, and CE2 have *loading factor values* that almost touch the minimum limit of 0.5 but are still maintained based on Ghozali & Latan (2015) who stated that *loading factor values* of 0.5-0.6 are still considered and still meet research standards.

Overall, after removing the DFL5 indicator and retesting, all constructs in this study met the criteria for *convergent validity* and *internal consistency reliability*. All variables had AVE values above 0.50 and *Composite Reliability* and Cronbach's Alpha above 0.70. Thus, the measurement model in this study was declared valid and reliable, allowing for further testing of the structural model (*inner model*) to examine the relationships between variables.

In addition to the test results above, we can see how the R-square value was tested with the following table details:

Table 3. R-square Analysis

	R-square	Adjusted R-square
Customer Experience	0.608	0.605
Customer Retention	0.582	0.577

From the table above, it can be said that the *Customer Experience* variable is influenced by the *Digital Financial Literacy* and *E-Service Quality* variables by 60.8% (0.608) while 39.2% (0.392) is a variable that was not examined in this study. Similar to the *Customer Retention* variable which shows that the variable is influenced by the *Customer Experience* variable which is influenced by two independent variables by 58.2% (0.582), as well as 41.8% (0.418) variables that were not examined, so that other researchers can conduct research with other variables to measure *customer experience & customer retention*. Furthermore, from the testing side, the F-square value is as follows:

Table 4. F-square Analysis

	Customer Experience (CE)	Customer Retention (CR)	Digital Financial Literacy (DFL)	E-Service Quality (ESQ)
Customer Experience (CE)	-	0.254	-	-
Customer Retention (CR)	-	-	-	-
Digital Financial Literacy (DFL)	0.258	0.028	-	-
E-Service Quality (ESQ)	0.418	0.034	-	-

the *effect size (f²)* test, it is known that the influence of *E-Service Quality* on *Customer Experience* has a value of 0.418, which is included in the large category. This indicates that

digital service quality is a very dominant factor in shaping customer experience in using digital banking services. Meanwhile, *Digital Financial Literacy* has an influence on *Customer Experience* with an f^2 value of 0.258, which is included in the medium category, which means that the level of customer understanding of digital financial services also contributes significantly to improving customer experience.

Furthermore, regarding *Customer Retention*, the *Customer Experience* variable shows an f^2 value of 0.254 which is in the medium category, so it can be interpreted that customer experience has an important role in driving customer retention. On the other hand, the direct influence of *Digital Financial Literacy* and *E-Service Quality* on *Customer Retention* is relatively small, with f^2 values of 0.028 and 0.034, respectively. This indicates that these two variables do not provide a strong direct contribution to customer retention, but rather play a role through intermediary variables. Overall, these results indicate that *Customer Experience* is a key variable that mediates the influence of *Digital Financial Literacy* and *E-Service Quality* on *Customer Retention*.

Table 5. Discriminant Validity (Heterotrait-Monotrait Ratio)

	Customer Experience (CE)	Customer Retention (CR)	Digital Financial Literacy (DFL)	E-Service Quality (ESQ)
Customer Experience (CE)	-	-	-	-
Customer Retention (CR)	0.862	-	-	-
Digital Financial Literacy (DFL)	0.805	0.678	-	-
E-Service Quality (ESQ)	0.815	0.718	0.638	-

Discriminant validity testing using the *Heterotrait-Monotrait Ratio* (HTMT) method, all correlation values between constructs in this study are below the threshold of 0.90. The highest HTMT value is found in the relationship between *Customer Experience* and *Customer Retention* at 0.862, followed by the relationship between *E-Service Quality* and *Customer Experience* at 0.815, and between *Digital Financial Literacy* and *Customer Experience* at 0.805. Meanwhile, the relationship between other constructs shows lower values, such as *Digital Financial Literacy* to *Customer Retention* at 0.678, *E-Service Quality* to *Customer Retention* at 0.718, and *Digital Financial Literacy* to *E-Service Quality* at 0.638.

These results indicate that all constructs have correlation levels that are still within acceptable limits, so each variable in this study can be empirically distinguished from one another. Therefore, it can be concluded that the research model has met the criteria for discriminant validity, so the constructs used do not experience conceptual multicollinearity issues and are suitable for use in further analysis.

Hypothesis Testing

Bootstrapping test or hypothesis test is carried out to see whether or not the previously determined hypothesis is accepted with the following image and results:

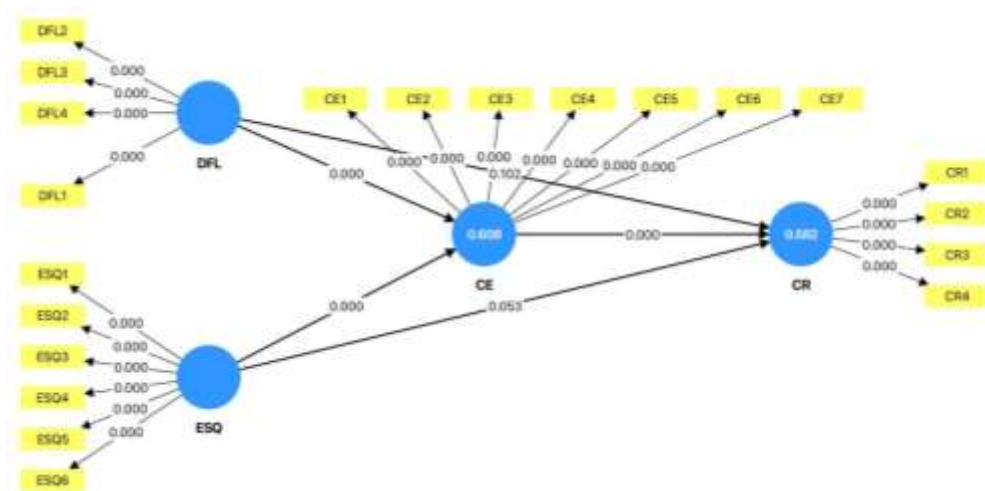


Figure 3. Hypothesis Test

Table 6. Hypothesis Test

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
(H1) Digital financial literacy has a positive effect on customer retention.	0.149	0.157	0.091	1,634	0.102
(H2) Digital financial literacy has a positive effect on Customer Experience	0.387	0.389	0.051	7,542	0.000
(H3) E-Service Quality has a positive effect on Customer Retention	0.171	0.168	0.088	1,937	0.053
(H4) E-Service Quality has a positive effect on Customer Experience	0.492	0.493	0.055	8,950	0.000
(H5) Customer experience has a positive effect on customer retention	0.521	0.517	0.086	6,065	0.000
(H6) Customer experience simultaneously has a positive influence in mediating the relationship between digital financial literacy and customer retention.	0.201	0.201	0.043	4,730	0.000
(H7) Customer experience simultaneously has a positive influence in mediating the relationship between e-service quality and customer retention.	0.256	0.255	0.051	5,038	0.000

Based on the table above, the test results show that H1 (Digital Financial Literacy on Customer Retention) and H3 (E-Service Quality on Customer Retention) have T-statistic

values below 1.96 and p-values above 0.05. This indicates that both hypotheses are rejected, meaning that digital financial literacy and e-service quality do not have a significant direct influence on customer retention. The p-value of H3 is 0.053, which is close to the 0.05 threshold, suggesting that with a larger sample size, this value may reach statistical significance.

In contrast, the remaining hypotheses (H2, H4, and H5) have p-values below 0.05, indicating that they are accepted. Regarding the indirect effect test, the results in the Specific Indirect Effects table show that H6 and H7 are also significantly accepted. This confirms that customer experience plays a mediating role in the relationship between digital financial literacy, e-service quality, and customer retention. Given that the direct effects (H1 and H3) were found to be insignificant while the indirect effects were significant, the nature of the mediation in this model is full mediation. This finding confirms that digital financial literacy and e-service quality can only enhance customer retention if they first succeed in forming a positive customer experience.

Broadly speaking, this study aims to analyze the retention of Generation Z and Millennial users of digital banking services, with respect to service quality and digital literacy as mediated by customer experience. These two generations are often referred to as digital natives (Ameen & Anand, 2020), having been exposed to and embedded in digital technology throughout their lives, which has significantly shaped their behavior and preferences. The digital habits of these generations encompass a wide range of technology-facilitated activities (Alruthaya, 2021). Mobile devices have become their primary means of accessing the digital world, providing connectivity and ease of access at any time and from anywhere, from communicating to conducting online transactions (Kahawandala, Peter, & Niwunhella, 2020). Ultimately, the main findings of this study confirm the full mediating role of customer experience (CE) in the relationship between digital financial literacy (DFL) and e-service quality (ESQ) on customer retention (CR) — a pattern that cannot be explained by a direct path between the two independent variables and customer retention. In general, the findings indicate that although DFL and ESQ do not have a significant direct influence on customer retention, they play a significant role through the mediation of customer experience. This is also supported by Pratiwi (2023), who argues that in the context of digital banking, financial literacy alone is insufficient to address customer trust issues that affect retention, thus emphasizing the importance of a more holistic approach.

In testing the first hypothesis (H1), the results showed that digital financial literacy did not have a significant effect on customer retention. This finding is consistent with research indicating that financial literacy plays a greater role in improving decision-making capabilities but does not directly drive customer loyalty (Lusardi & Mitchell, 2014). In the context of digital banking, literacy functions as a cognitive enabler rather than a primary determinant of retention. In contrast, the second hypothesis (H2) confirmed that digital financial literacy has a positive effect on customer experience, indicating that users' understanding of digital services can enhance perceived ease of use and satisfaction. Customers with strong digital literacy tend to explore service features more effectively and experience less uncertainty in their use of digital platforms.

In the third hypothesis (H3), e-service quality did not have a significant effect on customer retention. This finding supports the view that digital service quality has become a

minimum standard — a hygiene factor — in the digital banking industry and is therefore no longer a major differentiating factor in building loyalty (Zeithaml et al., 2002). In other words, good service quality is considered a basic expectation rather than an added value. In contrast, the fourth hypothesis (H4) confirmed that e-service quality has a positive effect on customer experience, consistent with research showing that system quality, service reliability, and security contribute directly to user experience (Parasuraman et al., 2005). Responsive and easy-to-use services enhance positive perceptions of digital interactions.

Furthermore, the fifth hypothesis (H5) shows that customer experience has a significant positive effect on customer retention, a finding consistent with the literature confirming that customer experience is a key determinant of loyalty and retention (Lemon & Verhoef, 2016). A positive experience creates emotional attachment and increases the likelihood of continued use.

The results of the indirect effect test indicate that customer experience acts as a full mediator in the relationship between DFL, ESQ, and customer retention, confirming the acceptance of H6 and H7. Therefore, neither digital financial literacy nor e-service quality can directly enhance customer retention without first generating a positive customer experience. This finding is consistent with Expectation-Confirmation Theory (ECT), which posits that satisfaction and continued use are determined by actual experiences relative to initial expectations (Bhattacharjee, 2001). From a Service-Dominant Logic perspective, value is co-created through customer interactions and experiences rather than through product or service attributes alone (Vargo & Lusch, 2004). Thus, DFL and ESQ function as enabling factors, while customer experience serves as the primary mediating mechanism through which retention is formed.

The full mediating role of customer experience is also particularly relevant to the characteristics of Generation Z and Millennials as the primary segments of digital banking users. These two generations are known as experience-first consumers — users who consider not only the functional aspects of services but also the quality of the experience they have while interacting with digital platforms (Windasari et al., 2022). Generation Z and Millennials tend to have high expectations for ease of use, service personalization, speed of access, and seamless, intuitive digital experiences (Ameen & Anand, 2020; Kahawandala et al., 2020). Therefore, although digital financial literacy and e-service quality are important service foundations, they are insufficient to generate retention if they do not translate into positive customer experiences, both emotionally and functionally. In this context, the results suggest that retention behavior among Generation Z and Millennial users is more strongly influenced by how they experience using digital banking services than by the quality of features or the level of digital financial literacy alone. This finding supports Windasari et al. (2022), who found that younger digital banking users place greater emphasis on convenience, personalized experiences, rewards, and ease of interaction as key drivers of loyalty. Thus, customer experience is a central element in building long-term relationships with digitally savvy segments that have high service expectations and high mobility.

In the context of digital banking, customer-bank interactions are entirely mediated by technology, making customer experience a crucial factor. Research shows that a positive digital experience — encompassing ease of use, speed, and security — significantly affects user satisfaction and loyalty (Klaus & Maklan, 2013). Furthermore, the low switching costs

associated with digital services make it easier for customers to migrate to other providers, making experience a key differentiating factor (Keiningham et al., 2017). Therefore, digital banks need to focus not only on technical quality but also on creating personalized and valuable experiences for their customers. The results of this study also reinforce the phenomenon of digital banking competition described in the introduction regarding the "interest rate war" strategy among digital banks. In the initial stages, offering high interest rates, cashback, and financial promotions is effective in attracting new customers, as noted in a McKinsey report (2022) showing that around 40% of consumers in Southeast Asia open new accounts because of better interest rates. However, the results of this study indicate that these factors are insufficient for long-term customer retention if they are not accompanied by a positive customer experience. These findings are consistent with a Populix (2023) report asserting that ease of transactions, user-friendly applications, and positive digital experiences are more important determinants of loyalty than financial incentives alone. This is reflected in the insignificant direct influence of digital financial literacy and e-service quality on customer retention, while customer experience proved to be a full mediator of continued digital banking use. Thus, this study empirically confirms that acquisition strategies based on financial promotions are effective only in attracting users at the initial stage, while long-term retention is more strongly determined by the quality of the customer experience during the use of digital banking services.

Effect size (f^2) analysis shows that e-service quality has the greatest influence on customer experience, followed by digital financial literacy, indicating that digital service quality is the primary factor shaping customer experience while digital financial literacy plays a supporting role. Furthermore, customer experience has a moderate influence on customer retention, while the direct influences of digital financial literacy and e-service quality on customer retention are relatively small. These findings confirm that customer retention is more strongly influenced indirectly through customer experience, thereby reinforcing the mediating role of customer experience in the research model (Hair et al., 2021; Lemon & Verhoef, 2016).

The results of the discriminant validity test using HTMT show that all values between constructs are below the threshold of 0.90, indicating that discriminant validity is sufficiently established. The highest HTMT value is found in the relationship between customer experience and customer retention, reflecting a strong relationship that nonetheless remains empirically distinguishable. This indicates that each construct in the model has clear conceptual boundaries, allowing the structural analysis results to be interpreted with validity. The relatively high relationship between customer experience and customer retention is consistent with the literature positioning customer experience as the primary determinant of loyalty in digital services (Henseler et al., 2015; Lemon & Verhoef, 2016).

This study has several limitations that should be considered when interpreting the findings. One key limitation is the relatively small sample size, which may affect the generalizability of the results. Although the sample met the minimum criteria for PLS-SEM analysis, future research is recommended to employ larger and more diverse samples to enhance external validity and improve the representativeness of findings. In addition, the use of a single time-point data collection method may introduce common method bias (CMB), whereby observed relationships between constructs may be partly attributable to the shared data collection method rather than to the true relationships among constructs (Podsakoff et al.,

2003). Future researchers are encouraged to conduct a pre-survey at a time point separate from the main measurement to mitigate this risk.

A notable distinction of this study from prior research is the finding that digital financial literacy and e-service quality do not directly influence customer retention in the digital banking industry. It is therefore recommended that future research expand the scope of respondents beyond Java and consider moderating variables such as perceived value and trust, as well as other variables that may play a significant role in building customer retention, in order to deepen understanding of the mechanisms underlying loyalty and retention formation in the Indonesian digital banking ecosystem, which continues to evolve.

CONCLUSION

This study aimed to analyze the influence of digital financial literacy and e-service quality on customer retention, with customer experience as a mediating variable, in the context of digital banking services. The results show that digital financial literacy and e-service quality do not have a significant direct influence on customer retention. In contrast, both variables have a positive influence on customer experience, which in turn has a significant influence on customer retention. Thus, customer experience acts as a full mediator in the relationship between the independent variables and customer retention. This finding confirms that in the context of digital banking, customer loyalty is not formed directly from service quality or the level of digital financial literacy, but rather through the customer experience arising from interactions with digital services. Therefore, customer experience is a key factor in building customer retention in the digital era.

Overall, this research contributes to the growing body of literature on customer behavior in the digital banking sector, particularly in understanding the mechanisms of retention through a customer experience lens. Furthermore, the findings offer practical implications for the digital banking industry, encouraging institutions to place greater emphasis on creating a superior customer experience as a key strategy for enhancing customer retention.

REFERENCE

- Aji, H. M., Berakon, I., & Md Husin, M. (2020). COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia. *Cogent Business & Management*, 7(1), Article 1804181. <https://doi.org/10.1080/23311975.2020.1804181>
- Ahmed, F., Hussain, A., Khan, S. N., Malik, A. H., Asim, M., Ahmad, S., & El-Affendi, M. (2024). Digital risk and financial inclusion: Balance between auxiliary innovation and protecting digital banking customers. *Risks*, 12(8), Article 133.
- Alruthaya, A. (2021). The application of digital technology and the learning characteristics of Generation Z in higher education. *Australasian Conference on Information Systems*, 1–7.
- Ameen, N., & Anand, A. (2020). Generation Z in the United Arab Emirates: A smart tech-driven iGeneration. In *The new generation Z in Asia: Dynamics, differences, digitalization* (pp. 181–192). <https://doi.org/10.1108/978-1-80043-220-820201018>
- Andreou, P. C., & Anyfantaki, S. (2021). Financial literacy and its influence on internet banking behavior. *European Management Journal*, 39(5), 658–674. <https://doi.org/10.1016/j.emj.2020.12.001>

- APJII. (2023). *Laporan survei internet APJII 2022–2023*.
- Bank Indonesia. (2020). *Laporan perekonomian Indonesia 2019*.
- Bhatt, S., & Patel, J. (2020). Customer experience management in the banking sector. *International Journal of Bank Marketing*, 38(1), 15–31.
- Bhattacharya, A., Islam, T., & Biswas, M. (2019). Customer experience in digital banking: A comprehensive review and research agenda. *International Journal of Bank Marketing*, 37(3), 646–664. <https://doi.org/10.1108/IJBM-11-2017-0243>
- Bhattacharya, A., Srivastava, M., & Verma, S. (2019). Customer experience in online shopping: A structural modeling approach. *Journal of Global Marketing*, 32(1), 3–16. <https://doi.org/10.1080/08911762.2018.1441938>
- Chiguvi, D. (2023). Customer experience management in the post-COVID-19 era: Challenges and opportunities. *Journal of Customer Experience*, 9(2), 102–115.
- Dhal, A., Gupta, R. K., Malagatti, V. D., Dwivedi, P. K., Bharadwaj, R., & Purohit, V. (2024). The impact of technology on customer experience in financial services. *Journal of Information Systems Engineering and Management*, 9(4).
- Gazi, M. A. I., Al Mamun, A., Al Masud, A., Senathirajah, A. R. B. S., & Rahman, T. (2024). The relationship between CRM, knowledge management, organization commitment, customer profitability and customer loyalty in the telecommunication industry: The mediating role of customer satisfaction and the moderating role of brand image. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), Article 100227. <https://doi.org/10.1016/j.joitmc.2024.100227>
- Ghozali, I. (2018). *Aplikasi analisis multivariate dengan program IBM SPSS 25*. Badan Penerbit Universitas Diponegoro.
- Ghozali, I., & Latan, H. (2015). *Partial least squares: Konsep, teknik, dan aplikasi menggunakan program SmartPLS 3.0*. Badan Penerbit Universitas Diponegoro.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)* (3rd ed.). SAGE Publications.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Jhantasana, C. (2023). Should a rule of thumb be used to calculate PLS-SEM sample size? *Asia Social Issues*, 16(5), e254658. <https://doi.org/10.48048/22021254658>
- Kahawandala, N., Peter, S., & Niwunhella, H. (2020). Profiling purchasing behavior of Generation Z. In *Proceedings of the International Research Conference on Smart Computing and Systems Engineering (SCSE 2020)* (pp. 155–160). <https://doi.org/10.1109/SCSE49731.2020.9313038>
- Keiningham, T. L., Aksoy, L., Bruce, H. L., Cadet, F., Clennell, N., Hodgkinson, I. R., & Kearney, T. (2020). Customer experience driven business model innovation. *Journal of Business Research*, 116, 431–440. <https://doi.org/10.1016/j.jbusres.2019.08.003>
- Kim, L., Jindabot, T., Yeo, S. F., & Janthong, S. (2023). Determinants of intention to repurchase antigen test kit (ATK) product. *ABAC Journal*, 43(4), 410–429.
- Klaus, P., & Maklan, S. (2013). Towards a better measure of customer experience. *International Journal of Market Research*, 55(2), 227–246. <https://doi.org/10.2501/IJMR-2013-021>

- Kresnowati, A. M. (2022). Decisions of the young generation in using digital banking services: Structural equation modeling analysis. *Bulletin of Islamic Economics*, 1(2), 65–70. <https://doi.org/10.14421/bie.2022.012-06>
- Lakshman, C., & Faiz, F. (2021). Digital banking service quality and customer loyalty: The mediating role of customer satisfaction. *International Journal of Quality and Service Sciences*, 13(1), 35–52. <https://doi.org/10.1108/IJQSS-05-2020-0073>
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69–96. <https://doi.org/10.1509/jm.15.0420>
- Leong, K., Sung, A., & Luo, Z. (2020). Digital banking: A systematic review and future research agenda. *International Journal of Bank Marketing*, 38(5), 1045–1069.
- Leong, L. Y., Hew, T. S., Ooi, K. B., & Wei, J. (2020). Predicting mobile wallet resistance: A two-staged structural equation modeling-artificial neural network approach. *International Journal of Information Management*, 51, Article 102047. <https://doi.org/10.1016/j.ijinfomgt.2019.102047>
- Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy. *Journal of Economic Literature*, 52(1), 5–44. <https://doi.org/10.1257/jel.52.1.5>
- Malc, D., Jagrič, T., & Jagrič, V. (2023). The development of e-banking services quality and its impact on customer satisfaction. *Sustainability*, 15(14), Article 10988.
- Mbama, C. I., & Ezepue, P. O. (2018). Digital banking, customer experience and bank financial performance: UK customers' perceptions. *International Journal of Bank Marketing*, 36(2), 230–255.
- McKinsey & Company. (2022). *The 'S' in ESG: Asia's sustainability agenda and the banking opportunity*.
- OECD. (2024). *OECD/INFE survey instrument to measure digital financial literacy*. OECD Publishing.
- Otoritas Jasa Keuangan. (2023). *Snapshot perbankan Indonesia Desember 2023*.
- Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research*, 7(3), 213–233. <https://doi.org/10.1177/1094670504271156>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Populix. (2023). *Digital banking consumer report 2023*.
- Pratiwi, A. R., Amalia, S. N., & Gultom, P. (2023). Pengaruh penggunaan mobile banking dan potensi risiko terhadap kepercayaan nasabah dengan literasi keuangan sebagai variabel moderasi. *Jurnal Keuangan dan Perbankan*, 19(2), 119–130.
- Redda, E. H., Hailu, F. G., & Nigussie, H. A. (2023). E-banking quality and customer loyalty: The mediating role of customer satisfaction. *Banks and Bank Systems*, 18(1), 107–118.
- Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *SSRN Electronic Journal*, 26(4), 332–344. <https://doi.org/10.2139/ssrn.1441588>
- Saputra, M. E., Sumiati, & Yuniarinto, A. (2023). The effect of customer experience on

- customer loyalty mediated by customer satisfaction and customer trust (Study on users of PLN mobile application at PLN UP3 Malang). *Journal of Economics and Business Letters*, 3(3), 27–37. <https://doi.org/10.55942/jeb1.v3i3.205>
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach* (7th ed.). Wiley.
- Sikarwar, T. S., Gupta, R., & Srivastava, P. (2025). The impact of service quality on customer satisfaction in online banking. *Advances in Consumer Research*, 53, 45–53.
- Sinha, M., Majra, H., Hutchins, J., & Saxena, R. (2019). Mobile payments in India: The privacy factor. *International Journal of Bank Marketing*, 37(1), 192–209. <https://doi.org/10.1108/IJBM-05-2017-0099>
- Sugiyono. (2018). *Metode penelitian kuantitatif*. Alfabeta.