

# Digitalizing Customer Relationships: The Role of E-CRM in Enhancing Customer Satisfaction at Microfinance Institution (Badan Kredit Desa Sembada)

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**Abstract.** The declining number of customers at Badan Kredit Desa (BKD) Sembada Sleman, a microfinance institution, and inconsistent findings from previous studies regarding the effectiveness of Electronic Customer Relationship Management (E-CRM) highlight the need for a multidimensional examination within the microfinance context. This study examines the effects of customer data management, customer engagement, personalization, service quality, technology infrastructure, and trust and security on customer satisfaction. An explanatory quantitative design was employed involving 239 active customers selected through purposive sampling. Data were collected using a Likert-scale questionnaire and analyzed using Structural Equation Modeling (SEM). The results show that customer data management ( $p = 0.006$ ), customer engagement ( $p = 0.001$ ), personalization ( $p = 0.001$ ), and technology infrastructure ( $p = 0.001$ ) have positive and significant effects on customer satisfaction. Conversely, service quality ( $p = 0.7989$ ) and trust and security ( $p = 0.0733$ ) have no significant effects. The model explains 75.7% of the variance in customer satisfaction ( $R^2 = 0.757$ ), with technology infrastructure emerging as the strongest predictor. These findings indicate that service quality and security tend to be perceived as baseline requirements, whereas technological readiness is the primary differentiator of the customer experience. Therefore, microfinance institutions should prioritize reliable, user-friendly technology integration that supports personalization and customer interaction.

**Keywords:** Electronic Customer Relationship Management; Customer Satisfaction; Microfinance Institution; Technology Infrastructure

## 1 Introduction

Microfinance Institutions (MFIs) play a strategic role in improving financial inclusion and supporting community economic development in Indonesia (Rokhim et al., 2023; Offiong, et al., 2024). These institutions provide access to financing, savings facilities, and other financial services for microentrepreneurs and low-income communities that are not adequately served by formal banking institutions. Their contribution extends beyond financial intermediation because MFIs also support poverty alleviation, community empowerment, and the development of micro and small enterprises (Abera et al., 2025; Offiong, et al., 2024). One form of village-based microfinance institution is the Badan Kredit Desa (BKD), which primarily serves micro-scale

traders, farmers, livestock breeders, and other rural communities requiring accessible financing for productive and consumption purposes (Kumar et al., 2022; Rokhim et al., 2023).

The rapid development of information and communication technology has encouraged financial institutions to transform how they deliver services and maintain relationships with their customers. Digital financial services allow customers to access information, communicate with service providers, and conduct transactions more quickly and efficiently without being constrained by time and location. This transformation also requires MFIs to adopt appropriate digital systems and customer-oriented strategies. Building strong customer relationships is particularly important because effective relationships can increase customer satisfaction, retention, and loyalty (Haghighinasab et al., 2025; Kumar et al., 2022). However, the adoption of digital services among MFIs remains uneven due to limitations in technological infrastructure, human resources, institutional policies, and digital capabilities.

Service quality is essential because accurate, consistent, and responsive services shape customer evaluations and satisfaction (Al Firdaus et al., 2024; Gazi et al., 2024). Nevertheless, creating customer satisfaction remains challenging when institutions cannot consistently meet customer expectations (Alnaser et al., 2023; Chang et al., 2025)

Table 1. Number of LKM BKD Sembada Customers in 5 Years

| No | Year | Number of Customers |
|----|------|---------------------|
| 1  | 2021 | 753                 |
| 2  | 2022 | 653                 |
| 3  | 2023 | 343                 |
| 4  | 2024 | 312                 |
| 5  | 2025 | 301                 |

The urgency of this issue is reinforced by the continued decline in the number of BKD Sembada customers. Institutional records show that the number of customers decreased from 753 in 2021 to 301 in 2025. Overall, this represents an approximately 60% decline within five years. Although this decrease cannot be attributed solely to customer dissatisfaction, it signals the need to strengthen service delivery and customer relationship management. Customers increasingly expect financial services that are accessible, responsive, personalized, secure, and supported by reliable technology. Therefore, BKD Sembada needs an integrated approach that combines customer-oriented management with the effective use of digital technology.

Electronic Customer Relationship Management (E-CRM) provides a relevant strategic framework for addressing these challenges. E-CRM refers to the use of information technology to manage customer information, facilitate digital interactions, personalize services, and build long-term relationships with customers. It should not be viewed merely as a technological system but as an integrated management strategy designed to improve the customer experience. In financial institutions, E-CRM can be examined through six interrelated dimensions: customer data management, customer engagement, personalization, service quality, technology infrastructure, and trust and security (Karmacharya, 2025). These dimensions explain how financial institutions collect and use customer information, establish meaningful interactions,

customize services, improve service delivery, provide reliable technological support, and protect customer data and transactions.

Previous studies have produced variation concerning the effectiveness of E-CRM. Haghighinasab (2025) demonstrated that effective E-CRM implementation can improve customer satisfaction and loyalty in digital-only banking. Kumar & Mokha (2022) similarly found that E-CRM and customer satisfaction contributed to customer loyalty, while Magatef et al., (2023) reported positive effects of E-CRM strategies on loyalty through relational mediators. Evidence from Indonesia also shows that E-CRM has a positive effect on customer loyalty, with customer satisfaction acting as a strong mediator (Syaifullah et al., 2024). However, Karmacharya (2025) found that only trust and security and personalization were significant in the PLS-SEM stage, whereas other dimensions did not show significant direct effects. These differences suggest that E-CRM should be evaluated as a multidimensional construct rather than as a single aggregate variable.

Most previous studies have focused on commercial banks, digital banking, or e-commerce settings, whereas empirical evidence from village-based microfinance institutions remains limited. This context is important because MFIs serve customers with distinctive socioeconomic characteristics and frequently rely on close, interpersonal relationships while operating with relatively limited digital resources. Accordingly, this study addresses both a contextual and an empirical gap by examining the individual effects of six E-CRM dimensions on customer satisfaction at BKD Sembada. Specifically, it investigates the effects of customer data management, customer engagement, personalization, service quality, technology infrastructure, and trust and security on customer satisfaction. The findings are expected to clarify which dimensions are most relevant to customer satisfaction and provide practical guidance for strengthening digital customer relationship strategies in microfinance institutions.

## 1.1 Literature Review and Hypothesis Development

### **Grand Theory: Stimulus-Organism-Response Theory**

Stimulus-Organism-Response (S-O-R) theory explains how environmental cues shape an individual's internal evaluation and subsequently generate an attitudinal or behavioral response (Palamidovska et al., 2024). Unlike a direct stimulus-response explanation, S-O-R recognizes that customers interpret external cues through cognitive and affective processes before forming an evaluation. In digital service settings, system design, information quality, technology-enabled interaction, and service features can therefore function as stimuli that influence customers' perceptions and emotions (Kumar et al., 2022; Palamidovska et al., 2024). Personalized digital recommendations provide a related example: they affect customer responses because users first assess their relevance and value (Jeong et al., 2022).

In this study, six dimensions of electronic customer relationship management (E-CRM), namely customer data management, customer engagement, personalization, service quality, technology infrastructure, and trust and security, are treated as service stimuli. Customers cognitively and affectively evaluate these stimuli during their interactions with BKD Sembada. Customer satisfaction represents the resulting evaluative response, reflecting the extent to which the overall service experience meets or exceeds customer expectations. Although the internal appraisal process is not modeled as a separate construct, S-O-R provides the theoretical logic linking each E-CRM stimulus to customer satisfaction.

## **1.2 E-Customer Relationship Management and Customer Satisfaction**

Customer relationship management regards customers as strategic assets and emphasizes the creation of long-term value through a systematic understanding of their needs (Magatef et al., 2023; Rokhim et al., 2023). E-CRM extends this orientation by integrating customer information from multiple sources, enabling organizations to coordinate interactions, analyze customer behavior, and deliver more relevant services through digital channels (Kumar, et al., 2022; Magatef et al., 2023). Digital technologies also improve service accessibility, communication speed, and responsiveness, thereby strengthening the customer experience (Offiong et al., 2024; Windasari et al., 2022). Accordingly, E-CRM is not merely a technological application; it is an integrated relational strategy that combines data, interaction, service processes, and system capabilities.

The multidimensional model adopted in this study comprises customer data management, customer engagement, personalization, service quality, technology infrastructure, and trust and security (Karmacharya, 2025). This specification is particularly relevant to financial services, where customers expect accurate information, convenient access, responsive communication, reliable transactions, and strong protection of personal data. Prior banking research links E-CRM to satisfaction (Karmacharya, 2025; Kumar, P., & Mokha, 2022), customer experience (Kumar et al., 2022; Windasari et al., 2022), communication quality (Alnaser et al., 2023). However, evidence for the individual dimensions is not uniform. For example, Karmacharya's SEM results identified personalization, service quality, and trust and security as significant predictors, whereas customer data management, customer engagement, and technology infrastructure were not significant, although they contributed in the accompanying artificial neural network analysis. This variation justifies testing each dimension separately in a village-based microfinance setting. Customer satisfaction is the overall evaluation formed by comparing expected with received service performance. In digital financial services, service quality and trust strengthen satisfaction (Chang et al., 2025; Gazi et al., 2024), while ease of use and transaction speed create positive experiences (Palamidovska et al., 2024; Windasari et al., 2022). Satisfaction is reflected in expectation confirmation, reuse intention, recommendation, and overall evaluation (Karmacharya, 2025; Kumar, P., & Mokha, 2022).

## **1.3 Hypothesis Development**

### **1.3.1 Customer Data Management and Customer Satisfaction**

Customer data management refers to an institution's ability to collect, integrate, update, store, retrieve, and use customer information accurately. A well-managed database gives employees timely access to transaction histories, customer characteristics, and service records. This reduces information errors and repeated requests, accelerates problem resolution, and enables the institution to match its services more closely to customer needs. Customer data management is therefore a foundational E-CRM capability (Karmacharya, 2025; Kumar et al., 2022). Data integration and analysis can also improve decision quality and the relevance of customer-related actions (Al-Bashayreh et al., 2024; Magatef et al., 2023). Similar service benefits have been reported (Magatef et al., 2023).

From an S-O-R perspective, accurate and accessible customer information is a stimulus that improves the consistency, speed, and relevance of service encounters. Customers are consequently more likely to perceive that the institution understands their circumstances and can respond appropriately. Although the direct SEM effect was not significant in one prior study Karmacharya (2025) banking evidence indicates that effective electronic management of

customer information strengthens experience and satisfaction (Kumar, P., & Mokha, 2022). The following hypothesis is therefore proposed:

**H1: Customer data management has a positive effect on customer satisfaction.**

### **1.3.2 Customer Engagement and Customer Satisfaction**

Customer engagement captures the intensity and quality of customers' interactions with an institution across direct and digital channels. Accessible communication channels, opportunities to provide feedback, and timely responses to questions or complaints allow customers to participate in the service relationship. Such interactions help the institution identify emerging needs while making customers feel heard and valued. Digital engagement can consequently strengthen relational closeness and the perceived quality of the customer-company relationship (Magatef et al., 2023; Karmacharya, 2025). It has also been linked to stronger relational and loyalty outcomes (Magatef et al., 2023).

Within the S-O-R framework, responsive two-way interaction functions as a social and informational stimulus. It reduces uncertainty, demonstrates attentiveness, and gives customers greater confidence that their concerns will be addressed. Evidence on successful E-CRM systems similarly emphasizes the contribution of interaction and service-system quality to customer satisfaction (Al-Bashayreh et al., 2022). Despite the non-significant direct effect reported in one financial-institution SEM model (Karmacharya, 2025), the underlying relational mechanism supports the expectation that greater engagement will improve satisfaction in a microfinance context.

**H2: Customer engagement has a positive effect on customer satisfaction.**

### **1.3.3 Personalization and Customer Satisfaction**

Personalization is the institution's ability to adapt information, communication, product offers, and service recommendations to individual customer needs and preferences. When customer data are translated into relevant and timely services, customers expend less effort in identifying suitable options and are more likely to perceive that the institution understands them. Personalization therefore increases perceived relevance, convenience, and recognition. Digital personalization has been shown to improve customer evaluations and behavioral responses (Jeong et al., 2022) and data-enabled customization can strengthen customer relationships (Karmacharya, 2025; Magatef et al., 2023). As an E-CRM stimulus, a personalized service signals attentiveness and fit between the institution's offering and the customer's circumstances. This positive appraisal should raise satisfaction because the received service is more likely to match prior expectations. Empirical findings support a significant positive relationship between personalization and satisfaction in digital financial services (Karmacharya, 2025), while personalized E-CRM practices have also been associated with favorable customer outcomes (Ali & Alfayez, 2024).

**H3: Personalization has a positive effect on customer satisfaction.**

### **2.3.4 Service Quality and Customer Satisfaction**

Service quality in E-CRM reflects the speed, ease of use, consistency, reliability, and responsiveness of digitally supported services. These attributes directly shape customers' encounters with the institution. Fast and dependable processing reduces waiting time and transaction uncertainty; simple procedures lower customer effort; and responsive problem handling demonstrates organizational competence. When these aspects meet or exceed expectations, customers form a favorable evaluation of the overall service. Prior studies provide consistent support for this mechanism. Electronic service quality has a positive and significant

effect on banking customer satisfaction (Al Firdaus & Rachmawati, 2024; Rezeki et al., 2023), while system efficiency, reliability, and responsiveness are significant determinants of online banking satisfaction (Gazi et al., 2024). Service quality has likewise emerged as a significant E-CRM dimension in financial institutions (Karmacharya, 2025) and related research reports positive effects of service quality on satisfaction and subsequent loyalty (Kumar et al., 2022; Magatef, 2023). Thus, higher service quality should produce stronger customer satisfaction.

**H4: Service quality has a positive effect on customer satisfaction.**

#### 2.3.5 Technology Infrastructure and Customer Satisfaction

Technology infrastructure refers to the availability, usability, reliability, integration, and processing capacity of the systems supporting E-CRM. Stable databases, communication platforms, and service applications enable the institution to retrieve information quickly, maintain service continuity, and process customer requests efficiently. Digital infrastructure can improve the effectiveness of customer relationship management by supporting faster and more accurate interactions (Abera et al., 2025; Al-Bashayreh et al., 2024). Organizational technology readiness is also critical to successful E-CRM implementation (Abera et al., 2025; Offiong, et al., 2024).

In S-O-R terms, a reliable and accessible system serves as a functional stimulus that reduces effort, delays, and service interruptions. These benefits create a smoother experience and should improve customers' overall evaluation. Technology infrastructure may operate partly as an enabling condition for the other E-CRM dimensions, which may explain why its direct SEM effect was not significant in one prior study (Karmacharya, 2025). Even though it contributed in the ANN analysis. Because inadequate infrastructure would constrain data management, engagement, personalization, and service delivery, the present study expects a positive direct effect in the BKD Sembada context.

**H5: Technology infrastructure has a positive effect on customer satisfaction.**

#### 1.3.6 Trust and Security and Customer Satisfaction

Trust and security refer to customers' confidence in institutional dependability and the protection of personal and transactional data. They are especially salient in financial services because customers disclose sensitive information and face monetary risk. Strong safeguards and transaction integrity reduce perceived vulnerability and increase willingness to rely on digital services. Security protection has accordingly been linked to favorable customer outcomes (Ali & Alfayez, 2024). From an S-O-R perspective, visible and dependable security mechanisms are reassuring stimuli that reduce anxiety and strengthen customers' confidence in the service provider. System security and information quality contribute to E-CRM success and satisfaction (Al-Bashayreh et al., 2022), while trust and security have been identified as a dominant determinant of satisfaction in financial institutions (Karmacharya, 2025). Effective E-CRM and secure management of customer information also support satisfaction in digital-only banking (Haghighinasab et al., 2025). Hence, customers who perceive BKD Sembada's services as trustworthy and secure should report higher satisfaction.

**H6: Trust and security have a positive effect on customer satisfaction.**

## **2 Methods**

### **2.1 Research Design**

This study employed a quantitative, explanatory, and cross-sectional survey design to examine the effects of six electronic customer relationship management (E-CRM) dimensions on customer satisfaction. Quantitative operationalization enables abstract constructs to be represented by observable indicators and analyzed systematically (Hair & Alamer, 2022; Maier et al., 2023). The study was conducted at BKD Sembada, a village-based microfinance institution in Sleman, Indonesia. The proposed model specified customer data management, customer engagement, personalization, service quality, technology infrastructure, and trust and security as exogenous latent constructs, with customer satisfaction as the endogenous latent construct.

### **2.2 Population, Sampling, and Data Collection**

The target population comprised all 301 active BKD Sembada customers recorded in 2025. Respondents were selected using purposive sampling, which is appropriate when participants must satisfy characteristics directly related to the research objective (Andrade, 2021). Eligible respondents were active customers who had used the institution's services and voluntarily agreed to participate. After the questionnaires were screened for eligibility and completeness, 239 valid responses were retained, representing 79.4% of the target population. Primary data were collected through a structured self-report questionnaire. Each item was rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Institutional records, books, and relevant scholarly publications were used as secondary sources to establish the research context and support instrument development. The use of a structured questionnaire ensured that all respondents evaluated the constructs through a consistent set of indicators (Hair & Alamer, 2022; Maier et al., 2023).

### **2.3 Measurement of Constructs**

All seven constructs were operationalized reflectively using 26 questionnaire items. Operational definitions and indicators were derived from established research measures (Hair & Alamer, 2022). The E-CRM dimensions were primarily adapted from research on digital customer relationship management in financial services (Karmacharya, 2025; Kumar et al., 2022). Service-quality indicators were further informed by the services-marketing literature (Al Firdaus & Rachmawati, 2024; Rezeki et al., 2023), whereas customer satisfaction was measured through expectation confirmation, reuse intention, recommendation intention, and overall satisfaction (Alnaser et al., 2023; Karmacharya, 2025). Table 1 summarizes the construct operationalization.

### **2.4 Data Analysis**

The hypothesized relationships were analyzed using partial least squares structural equation modeling (PLS-SEM). This variance-based approach was selected because the study emphasized explaining customer satisfaction, estimated six predictor paths simultaneously, and used latent constructs measured by multiple indicators. PLS-SEM is prediction-oriented and less dependent on multivariate normality than covariance-based SEM (Dash & Paul, 2021; Hair & Alamer, 2022). Following established multivariate and PLS-SEM procedures (Hair & Alamer, 2022), analysis proceeded in two stages. First, the reflective measurement model was evaluated through outer loadings, Cronbach's alpha, composite reliability, average variance extracted

(AVE), and the Fornell-Larcker criterion to establish indicator reliability, internal consistency, convergent validity, and discriminant validity (Hair & Alamer, 2022). And then, the structural model was assessed through inner-model collinearity, the coefficient of determination ( $R^2$ ), and the six path coefficients. Hypotheses were tested using nonparametric bootstrapping and were supported when the path had the proposed direction,  $t$  exceeded 1.96, and  $p$  was below 0.05 at the 5% two-tailed level (Hair & Alamer, 2022).

### 3 Results

#### 3.1 Respondent Profile

The analysis was based on 239 valid responses from active BKD Sembada customers. Women represented 57.7% of the sample, while men accounted for 42.3%. The age distribution was relatively broad, with the largest groups aged above 50 years (31.4%), 21-30 years (30.5%), and 41-50 years (28.9%). Most respondents had completed senior high school or vocational education (65.3%), and private-sector employees formed the largest occupational group (43.9%). In terms of customer tenure, 44.4% had used BKD Sembada's services for one to three years, indicating that most respondents had sufficient experience to evaluate the institution's customer relationship practices. All constructs received favorable evaluations. Mean scores ranged from 3.968 to 4.055 on the five-point scale. Trust and security recorded the highest mean ( $M = 4.055$ ), followed by customer satisfaction ( $M = 4.042$ ) and service quality ( $M = 4.035$ ). Customer data management and personalization had the lowest, although still high, means (both  $M = 3.968$ ). These results indicate a generally positive service evaluation, but they do not establish causal importance; the relative contribution of each E-CRM dimension was therefore examined through the structural model.

#### 3.2 Measurement Model Assessment

The reflective measurement model demonstrated adequate indicator reliability, internal consistency, and convergent validity. Minimum outer loadings ranged from 0.728 to 0.862 and therefore exceeded the commonly preferred threshold of 0.708. Average variance extracted (AVE) ranged from 0.555 to 0.775, composite reliability from 0.833 to 0.932, and Cronbach's alpha from 0.731 to 0.903. Thus, every construct explained more than half of the variance in its indicators and achieved acceptable internal consistency.

Table 2. Measurement Model Assessment

| Construct                 | AVE   | Composite reliability | Cronbach's alpha |
|---------------------------|-------|-----------------------|------------------|
| Customer data management  | 0.617 | 0.866                 | 0.793            |
| Customer engagement       | 0.646 | 0.880                 | 0.817            |
| Personalization           | 0.668 | 0.858                 | 0.751            |
| Service quality           | 0.650 | 0.848                 | 0.731            |
| Technology infrastructure | 0.595 | 0.855                 | 0.773            |
| Trust and security        | 0.555 | 0.833                 | 0.732            |
| Customer satisfaction     | 0.775 | 0.932                 | 0.903            |

*Source: Primary data processed (2026)*

### 3.3 Structural Model and Hypothesis Testing

The six E-CRM dimensions jointly explained 75.7% of the variance in customer satisfaction ( $R^2 = 0.757$ ; adjusted  $R^2 = 0.751$ ). This indicates substantial explanatory power in the BKD Sembada setting, while the remaining 24.3% is attributable to factors outside the proposed model. Hypotheses were evaluated from the sign and magnitude of the path coefficients and the bootstrapped t and p values at the 5% two-tailed level.

**Table 4. Structural paths and hypothesis decisions**

| Hypothesis                                            | B      | t     | P value | Decision      |
|-------------------------------------------------------|--------|-------|---------|---------------|
| H1: Customer data management → Customer satisfaction  | 0.181  | 3.462 | 0.0006  | Supported     |
| H2: Customer engagement → Customer satisfaction       | 0.228  | 4.081 | 0.0001  | Supported     |
| H3: Personalization → Customer satisfaction           | 0.235  | 4.087 | 0.0001  | Supported     |
| H4: Service quality → Customer satisfaction           | -0.014 | 0.255 | 0.7989  | Not supported |
| H5: Technology infrastructure → Customer satisfaction | 0.267  | 4.951 | <0.0001 | Supported     |
| H6: Trust and security → Customer satisfaction        | 0.097  | 1.799 | 0.0733  | Not supported |

*Source: Primary data processed (2026)*

Four hypotheses were supported. Technology infrastructure produced the largest positive effect (Beta = 0.267), followed by personalization (Beta = 0.235), customer engagement (Beta = 0.228), and customer data management (Beta = 0.181). Service quality had an essentially zero coefficient (Beta = -0.014,  $p = 0.7989$ ), whereas trust and security showed a small positive but statistically insufficient coefficient at the 5% level (Beta = 0.097,  $p = 0.0733$ ). The negative sign for service quality should not be interpreted as evidence that better service reduces satisfaction because the estimate was extremely small and non-significant. Instead, the multivariate results show which dimensions contributed unique explanatory power after the other E-CRM dimensions were considered simultaneously.

### 3.4 Discussion

#### 3.4.1 Customer Data Management and Customer Satisfaction

Customer data management had a positive and significant effect on customer satisfaction ( $p = 0.0006 < 0.05$ ) showed that H1 supported. Accurate and accessible customer records enable employees to retrieve transaction histories, recognize customer characteristics, and respond without repeatedly requesting the same information. Within a microfinance institution, these capabilities reduce procedural friction and allow service decisions to reflect the customer's actual financing and savings history. Customer data therefore creates value not merely through storage, but through its operational use in faster, more relevant service delivery. The finding is consistent with evidence that E-CRM-supported information management improves the institution's ability to understand and serve its customers (Kumar et al., 2022; Magatef et al.,

2023). It also supports research showing that system and information quality contribute to successful E-CRM and customer satisfaction (Al-Bashayreh et al., 2022; Chang et al., 2025), as well as the view that customer data is an essential input for customer-oriented decisions (Karmacharya, 2025; Kumar et al., 2022). Unlike prior evidence in which customer data management was not significant in the SEM stage, its significance here may reflect the local and relationship-intensive character of BKD Sembada. Because employees interact closely with customers, even relatively simple improvements in data accuracy and accessibility may be immediately visible in the service experience.

### **3.4.2 Customer Engagement and Customer Satisfaction**

Customer engagement positively influenced customer satisfaction ( $p = 0.0001 < 0.05$ ) showed that H2 supported. Customers become more satisfied when they can ask questions, provide feedback, obtain information, and receive timely responses through accessible channels. Engagement is particularly relevant to village-based microfinance because the service relationship is not purely transactional. Frequent, responsive interaction signals attentiveness and enables the institution to identify emerging customer needs before they develop into complaints or service discontinuation. This result agrees with research linking E-CRM interaction to stronger relational outcomes in banking (Magatef et al., 2023; Karmacharya, 2025) and with evidence that digitally enabled engagement strengthens customers' relationship and loyalty responses (Magatef et al., 2023). The difference reinforces the importance of context at BKD Sembada, direct and digital communication can complement the interpersonal proximity already characteristic of microfinance. Engagement is therefore most effective when communication channels are not only available but are also actively monitored and followed by clear institutional responses.

### **3.4.3 Personalization and Customer Satisfaction**

Personalization had a positive and significant effect on customer satisfaction ( $p = 0.0001 < 0.05$ ), showed that H3 supported. BKD Sembada serves customers with different occupations, income conditions, financing purposes, and service tenures. Standardized communication cannot fully accommodate this heterogeneity. By using customer information to tailor product explanations, payment reminders, savings information, financing recommendations, and financial education, the institution can increase the perceived fit between service delivery and individual needs. The result supports evidence identifying personalization as a significant E-CRM determinant of satisfaction in financial institutions (Karmacharya, 2025). It is also consistent with evidence that personalized digital banking practices improve satisfaction (Haghighinasab et al., 2025) and that tailored E-CRM enhances customer experience and relationship outcomes (Ali & Alfayez, 2024; Jeong et al., 2022; Magatef et al., 2023). Transparent, needs-based personalization can make services feel relevant while maintaining consistency and fairness across customer groups.

### **3.4.4 Service Quality and Customer Satisfaction**

Service quality did not have a significant unique effect on customer satisfaction ( $p = 0.7989 > 0.05$ ), showed that H4 not supported. The coefficient was extremely close to zero, so the result does not demonstrate a meaningful negative relationship. Instead, it indicates that service quality did not explain additional variation in satisfaction once customer data management, engagement, personalization, technology infrastructure, and trust and security were entered in the same model. The high descriptive mean for service quality ( $M = 4.035$ ) also suggests that respondents generally regarded acceptable service as already present, which may have reduced

its ability to distinguish more satisfied from less satisfied customers. This finding differs from evidence that electronic service quality influences satisfaction (Al Firdaus & Rachmawati, 2024; Rezeki et al., 2023), from studies linking system efficiency, reliability, and responsiveness to satisfaction (Gazi et al., 2024), and from banking research positioning satisfaction as an outcome of service quality (Kumar & Mokha, 2022; Rezeki et al., 2023). Service quality functions as a basic requirement or hygiene condition in this setting: customers expect courteous, accurate, and responsive service, but these attributes alone do not differentiate the experience when more specific E-CRM capabilities are considered. Some of the customer-visible benefits of service quality may also be captured more directly by engagement and technology infrastructure. Accordingly, the institution should maintain service quality while integrating it with reliable digital processes, active communication, and personalized delivery.

### **3.4.5 Technology Infrastructure and Customer Satisfaction**

Technology infrastructure had the largest positive effect on customer satisfaction ( $p = 0.0001 < 0.05$ ) showed that H5 supported. This result identifies the reliability, availability, usability, and processing speed of the supporting system as the most influential E-CRM dimension in the model. When customer databases and communication tools are stable and easy to use, employees can retrieve information promptly, process requests accurately, and maintain service continuity. These benefits are directly observable to customers through shorter waiting times, clearer information, and fewer procedural disruptions. The finding is consistent with evidence that system and information quality are central to E-CRM success and satisfaction (Al-Bashayreh et al., 2022; Chang et al., 2025), and with research emphasizing organizational technology readiness as a foundation for effective E-CRM (Abera et al., 2025; Offiong et al., 2024). In a resource-constrained microfinance context, infrastructure improvement does not necessarily require a complex platform. A structured customer database, digital records, monitored WhatsApp Business communication, automated payment reminders, secure backups, and integration with appropriate digital payment options can substantially improve the service experience. The dominant path coefficient suggests that BKD Sembada should prioritize foundational system reliability before pursuing more sophisticated digital features.

### **3.4.6 Trust and Security and Customer Satisfaction**

H6 was not supported at the 5% level: trust and security produced a positive but statistically insufficient effect on customer satisfaction (Beta = 0.097,  $t = 1.799$ ,  $p = 0.0733$ ). The positive direction indicates that stronger confidence and perceived protection tend to accompany higher satisfaction, but the evidence was not strong enough to confirm a unique effect in the full model. Trust and security recorded the highest descriptive mean ( $M = 4.055$ ), suggesting that many respondents already viewed these attributes favorably. Security may therefore operate as a prerequisite for participation rather than as a visible source of additional satisfaction unless a failure or risk event occurs. The result contrasts with research identifying trust and security as dominant determinants of satisfaction in financial institutions (Karmacharya, 2025; Kumar et al., 2023) and with evidence linking information protection and transaction security to favorable digital-service evaluations (Al-Bashayreh et al., 2022; Chang et al., 2025). Comparable online banking research also emphasizes the role of security in customer satisfaction (Gautam et al., 2023; Gazi et al., 2024). The difference may arise because BKD Sembada customers experience the immediate benefits of system convenience, communication, and personalization more frequently than they observe back-end security controls. Non-significance must not be interpreted as permission to reduce protection. The institution should maintain secure data

handling and transaction procedures while explaining safeguards in simple language so that an essential but largely invisible capability becomes understandable to customers.

## **4 Conclusion and Recommendation**

### **4.1 Conclusion**

This study examined the effects of six E-CRM dimensions on customer satisfaction at BKD Sembada using data from 239 active customers analyzed through PLS-SEM. The model explained 75.7% of the variance in customer satisfaction. Technology infrastructure was the strongest predictor, followed by personalization, customer engagement, and customer data management; therefore, H1, H2, H3, and H5 were supported. In contrast, service quality and trust and security had no significant individual effects, resulting in the rejection of H4 and H6. Nevertheless, these dimensions remain essential service standards. Overall, the findings indicate that E-CRM should be implemented as an integrated strategy combining reliable technology, personalized services, effective communication, and responsible customer data management.

### **4.2 Recommendation**

BKD Sembada should prioritize gradual improvements in user-friendly technological infrastructure, including a structured customer database, consistent digital transaction records, secure backups, automated payment reminders, and systematic WhatsApp Business communication. Customer data should be used responsibly to personalize product information, financing services, and financial education while ensuring fair treatment. The institution should also establish clear standards for responding to inquiries and resolving complaints, supported by regular monitoring of response times, complaint resolution, and customer satisfaction. Although service quality and trust and security were not significant predictors, service accuracy, data confidentiality, transaction verification, and customer protection must remain fundamental priorities. Assistance should also be provided to customers with limited digital capabilities to ensure inclusive and sustainable E-CRM implementation.

### **4.3 Limitation**

This study has several limitations. Its focus on a single microfinance institution limits the generalizability of the findings to institutions with different governance systems, customer profiles, and levels of digital maturity. The cross-sectional, questionnaire-based design captures customer perceptions at one point in time and cannot establish long-term causal relationships. Moreover, the model examined only six E-CRM dimensions without considering other determinants or subsequent behavioral outcomes. Future research should involve multiple institutions and regions, compare customers across demographic and digital-literacy profiles, and employ longitudinal or mixed-method designs. Interviews with customers and managers may also explain the insignificant effects of service quality and trust and security. Future models could incorporate customer experience, institutional reputation, service cost, product quality, ease of technology use, and institutional trust, while examining customer loyalty as an outcome and digital literacy, age, or customer tenure as moderators.

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