TRANSFORMING BANKING OPERATIONS: AUTOMATED TELLER MACHINE & CASH RECYCLING MACHINE OPTIMIZATION STRATEGIES FOR DIGITAL BUSINESS ADVANCES AT PT BNI KC PURWOKERTO

Nabila Zallianty and Daryono

Economic and Business Faculty, Jenderal Soedirman University

Email Corresponding author: nabila.zallianty@mhs.unsoed.ac.id

Abstract

The development of digitalization in business and accounting information systems has encouraged banks to improve operational efficiency by optimizing Automated Teller Machine (ATM) and Cash Recycling Machine (CRM) services. This study analyzes performance data-based ATM and CRM management strategies to improve operational efficiency and customer loyalty. This study was conducted based on internship experience in the Merdeka Belajar Kampus Merdeka (MBKM) program at PT BNI KC Purwokerto. ATM and CRM machine performance data were collected through direct observation and analysis of transaction reports and machine uptime. The results show that data-driven strategies, such as optimal maintenance scheduling and transaction trend analysis, can improve operational efficiency and reduce machine downtime. In addition, the reliability of ATM and CRM services, such as ease of transactions contribute significantly to increasing customer satisfaction and loyalty. Findings include optimizing data-driven monitoring and implementing predictive technology to improve ATM and CRM management sustainably.

Keywords: *ATM & CRM, Digitalization, Customer Loyalty*

A. INTRODUCTION

Digitalization and the innovation that drives it are changing organizations, institutions, and society (Kraus et al. 2021). Centering attention on organizations, digitalization is provoking disruptive changes within firms and their immediate business environment, accelerating the obsolescence of the current business model (Wirtz et al. 2022). Digital technologies play a central role in the creation and reinforcement of disruptions that take place in society and the levels of industry (Aström et al. 2022). Faced with these disruptions, organizations design strategic responses and they use digital technologies to alter pathways to value creation which they had previously trusted for continued competitiveness. To do so, they should implement structural changes and overcome the obstacles to Digital Transformation (DT) that hinder their efforts (Hess et al. 2016). These

disruptions trigger strategic responses among the organizations that occupy a central place in the literature on DT.

The development of digital technology has brought significant changes in the banking industry, driving service transformation towards a more efficient and automated system. Banking digitization allows banks to improve operational efficiency, reduce costs, and provide a better experience for customers. One of the implementations of this digitalization is the use of Automated Teller Machine (ATM) and Cash Recycling Machine (CRM) which play an important role in providing independent banking services to customers.

ATMs and CRMs not only serve as a means of withdrawing and depositing cash but also as a direct interaction point between the bank and the customer. Therefore, the performance and reliability of these machines greatly affect customer satisfaction and loyalty. Effective management of ATMs and CRMs, especially based on performance data analysis, is crucial to ensure optimal service and minimize operational disruptions.

As one of the leading banking institutions in Indonesia, BNI has shown a real commitment to supporting the MBKM program by providing facilities and a work environment that supports student development. In this program, BNI not only provides opportunities to learn but also ensures that students get the right guidance through experienced mentors in their fields. In addition, BNI actively encourages students to engage in various activities relevant to the challenges of the banking world, including the application of digital technology, product innovation, and financial risk management. This step reflects BNI's dedication to producing a young generation capable of making a significant contribution to the Indonesian economy.

The placement of PT Bank Negara Indonesia (Persero), Tbk as an internship site for the MBKM program is based on the strategic relevance between the logistics function in the banking sector and the principles studied in the marketing concentration. Logistics in banking operations, including document distribution management, asset control, and internal supply chain efficiency, are closely related to marketing strategies, especially in ensuring optimal service delivery to customers. Marketing competencies, which include customer relationship management, market needs analysis, and value delivery, can be applied in logistics management to improve customer satisfaction and strengthen the company's image. Thus, this internship experience not only supports the development of students' practical skills but also integrates marketing theory with logistics practice in the context of a dynamic banking industry.

B. IMPLEMENTATION AND METHODS

This independent internship activity was carried out by the author at the company chosen by the Study Program Coordinator at PT Bank Negara Indonesia (Persero) Tbk KCU Purwokerto. The faculty applied for an internship at PT BNI for at least 1 month. The author conducted internship activities for 1 month or 4 weeks from September 9th, 2024 - October 8th, 2024 with the following schedule;

Table 1. Working Schedule

Work Day	Work Hour	Break Time
Monday	08.00 – 16.00	12.00 – 13.00
Tue – Fri	08.30 – 16.00	12.00 – 13.00

During the internship, the author was placed in the Human Capital & Logistics division, where the main activities involved aspects of ATM and CRM management, such as monitoring financial and logistics operations at BNI Purwokerto. Some of the main activities performed include:

1) ATM and CRM Performance Monitoring
   a. Collecting and analyzing ATM and CRM Performance data in the Purwokerto Branch.
   b. Using Service Level Agreement (SLA) as the main indicator to assess machine availability.
   c. Reviewing the machine utilization rate based on the number of daily transactions.
2) Logistics and Financial Management
   a. Monitoring BNI's profit and loss balance sheet to evaluate operational efficiency.
   b. Archiving transaction data and financial reports related to ATM and CRM.
   c. Managing requests for BNI QRIS usage by MSMEs around Purwokerto.
3) ATM and CRM Management Strategy
   a. Observe the process of opening new ATM/CRM in collaboration with vendors and land owners.
   b. Developed and evaluated ATM/CRM deployment strategy in strategic locations.
   c. Participated in control visits to BNI agents in several locations.
4) Performance Evaluation and customer satisfaction
   a. Using the SERVQUAL model to assess the quality of ATM/CRM services.
   b. Reviewed factors that contribute to service efficiency and customer loyalty.

The methods used in this research include:

Table 2. Analysis Methods

Methods	**Implementation**	
	Description	**Relevancy**
Direct Observation	Observed ATM and CRM operations directly at the BNI KCU Purwokerto location. Assess the effectiveness of ATM and CRM distribution based on transaction data.	Utilization of digital systems in real-time monitoring of machine operations to improve the efficiency of banking services.
Operational Data Analysis	Using SLA (Service Level Agreement), number of transactions, and operational	Application of data analytics in ATM management & CRM for cash flow

	costs as key indicators in evaluating ATM and CRM performance. Analyzing efficiency levels based on machine usage and strategic locations.	optimization and customer needs prediction.
Literature Study	Using academic references related to logistics management, human capital, and banking business strategy. Adopting the SERVQUAL model to evaluate the quality of ATM services and CRM in increasing customer loyalty.	Integration of digital banking concept with data-driven service management to improve customer satisfaction.
Discuss with Supervisor	Discussed with Mr. Setia Krisbiantoro, as supervisor of the Human Capital & Logistics division to understand ATM and CRM operational policies. Gained insight into the role of logistics and human resources in ATM and CRM management.	Implementing digital HR system and logistics tracking in ATM & CRM operations to improve resource management efficiency.

C. RESULT AND DISCUSSION

ATM (Automated Teller Machine) and CRM (Cash Recycling Machine) management at PT Bank Negara Indonesia (Persero) Tbk KCU Purwokerto is an important part of efforts to improve operational efficiency and customer loyalty. This management strategy is based on performance data that includes SLA (Service Level Agreement), machine utilization rate, and operational cost efficiency. In this section, the analysis and evaluation are based on the concepts of strategic management, consumer behavior, and operational technology.

David (2017), strategic management is a series of decisions and actions used to formulate and implement strategies to achieve organizational goals. In the context of ATM and CRM management, this strategy includes selecting strategic locations, determining the minimum number of transactions, and analyzing performance data to support decision-making. In contrast, Robbins and Coulter (2007) define efficiency as the ability to achieve maximum results with minimum resources. In ATM management, efficiency can be measured by the number of

transactions, machine uptime, and maintenance costs incurred. If operational activities can run well, it will increase customer loyalty to the Bank. Kotler and Keller (2016), customer loyalty is a customer commitment to make repeat purchases or use a company's services consistently. This loyalty can be influenced by service convenience, ease of access, and reliability of ATM and CRM machines.

ATM (Automated Teller Machine) and CRM (Cash Recycling Machine) machine management is an important aspect of modern banking operations. Shankar & Jebarajakirthy (2019), efficiency in ATM management can increase customer loyalty by providing fast and accessible services.

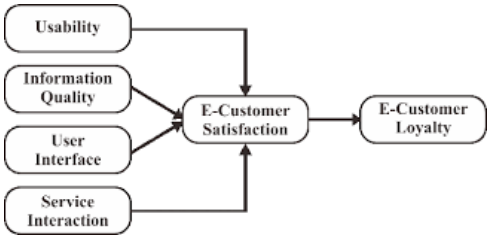

Figure 1. SERVQUAL Model

The SERVQUAL model measures service quality through multiple dimensions that influence customer satisfaction and ultimately drive customer loyalty. Below is an explanation of each variable and its importance:

1. Usability: refers to how easy it is for customers to access and use the bank's services, such as mobile banking, online transactions, and account management.
2. Information Quality: relates to the accuracy, timeliness, and relevance of information provided through digital channels.
3. User Interface: focuses on the design and visual appeal of the banking platform.
4. Service Interaction: measures the quality of customer support and communication between the bank and its customers.
5. Customer Satisfaction: results from high-quality usability, information, user interface, and service interaction.
6. Customer Loyalty: long-term commitment of customers to a bank's digital services.

During the internship, activities such as ensuring ATMs operate according to SLA, bidding for the lease period with the second party, and creating offer letters related to ATM construction, show BNI's proactive efforts in maintaining customer loyalty. This is reinforced by Kotler & Keller's (2016) statement that companies that can provide added value at every point of interaction with customers will be ahead of the competition.

The following table outlines the role of ATM (Automatic Teller Machine) and CRM (Cash Recycling Machine) in improving operational efficiency and fostering customer loyalty at PT Bank Negara Indonesia (BNI):

Table 3. ATM & CRM's Role in Efficiency

Feature	**Role of Efficiency**	
	ATM	**CRM**
Primary Function	Facilitates basic banking services like cash withdrawals, balance checks, and transfers.	Supports both cash withdrawals and cash deposits, ensuring real-time updates.

Operational Efficiency	Reduces queue times at branches by automating transactions.	Enhances efficiency by recycling deposited cash for withdrawals, minimizing replenishment needs.
Customer Convenience	Allows customers to access banking services 24/7 without visiting a branch.	Provides a seamless deposit and withdrawal experience, reducing manual branch visits.
Usability	User-friendly interface with clear instructions and multilingual options.	Intuitive design for deposits, withdrawals, and instant transaction confirmations.
Information Quality	Accurate, real-time transaction summaries, receipts, and balance updates.	Displays detailed receipts and immediate feedback for deposit validation and cash rejection.
Reliability	Machines are regularly maintained to ensure consistent uptime and minimal errors.	Regular maintenance ensures reliability while handling large cash volumes effectively.
Customer Loyalty	Builds trust and satisfaction by providing fast, reliable, and accessible services.	Enhances loyalty by offering comprehensive self-service solutions for both deposits and withdrawals.

Brief Explanation:

a) ATMs focus on improving general transaction services (withdraw, deposit, pay), availability, and ease of access.
b) CRMs are more economical for cash management (recycling) and minimizing manual intervention.
c) Both machines are optimized to increase customer satisfaction through innovative features and attractive loyalty programs.

Table 4. Challenge of Research

Challenge	Description
Limited Access	Confidentiality restrictions constrained performance analysis, requiring reliance on indirect observations.
External Transaction Influences	Weather, customer behavior, and economic factors caused transaction fluctuations, complicating pattern analysis.
Data Variability	Inconsistent transaction volumes across locations and periods required advanced processing for accuracy.
Real-Time Data Integration	Synchronizing digital transaction data with predictive analytics remained challenging for optimization.
Theoretical-	Some academic models lacked direct applicability,

Practical Gap	necessitating contextual adaptation.
Confidentially in Interviews	Internal policy restrictions limited insights, requiring data cross-validation.
Expert Opinion Bias	Subjective perspectives necessitated careful interpretation and triangulation with quantitative data.

By understanding both the results and challenges of each method, ATM and CRM management strategies based on digitalization can be refined to enhance operational efficiency and customer loyalty in the banking sector.

D. CLOSING

As a financial institution that continues to grow in the digital era, banks are required to optimize technology-based services to improve operational efficiency and customer satisfaction. Digitalization in banking information systems, especially in ATM and CRM management, has had a significant impact in ensuring faster, safer, and more efficient services for customers. Based on the results of this study, it can be concluded that performance data-based ATM and CRM management strategies play an important role in improving service reliability and customer loyalty.

Conclusion

Performance data-driven Automated Teller Machine (ATM) and Cash Recycling Machine (CRM) management is an important strategy in improving operational efficiency and customer loyalty in the banking industry. By implementing Service Level Agreement (SLA), machine usage rate analysis, and operational cost optimization, banks can improve the reliability of ATM and CRM services, thus better meeting customer needs.

The quality of ATM and CRM services also has a direct impact on customer satisfaction, which in turn affects loyalty to banking services. By maintaining reliability, transaction speed, and ease of use, banks can enhance long-term relationships with customers and improve competitiveness in an increasingly competitive financial industry.

The fusion of digitalized accounting, ATM networks, and CRM systems through data performance optimization unlocks unprecedented value. Organizations adopting this integrated approach can achieve cost savings, regulatory agility, and customer-centric innovation. Future advancements in AI and decentralized technologies will further blur the lines between financial management and customer engagement.

Recommendation

To improve the efficiency of ATM management and CRM, banks need to adopt more sophisticated data analytics systems. The use of Artificial Intelligence (AI) and Machine Learning technologies can help analyze machine performance in real time, allowing banks to detect potential problems before they impact customer service. In addition, the application of predictive analytics can optimize cash availability by predicting balance requirements based on customer transaction patterns, thus minimizing the risk of empty balances.

Optimization of ATM infrastructure and location as well as CRM are also important factors in improving service efficiency. Machine placement should

be based on analysis of customer transaction data to be more strategic and in line with customer demand. In addition, innovations in service features such as cardless transactions and payments using QR codes need to be implemented to increase convenience and ease of access for customers in the digital era.

Improving human resource competencies should also be a major concern in ATM and CRM management strategies. Banks need to conduct regular staff training responsible for machine maintenance and logistics management so that they have better skills in handling technical issues. In addition, closer coordination between the Human Capital & Logistics divisions will ensure faster response to operational issues, thus minimizing downtime.

Regular evaluation and customer feedback should also be part of the ATM and CRM service improvement strategy. Regular customer satisfaction surveys can provide greater insight into customer expectations and need for banking services. In addition, the implementation of automated monitoring systems will help banks identify and resolve problems before customers experience disruptions in transactions.

By implementing this strategy, banks can ensure that ATM and CRM services run more efficiently and are responsive to customer needs. Better operational efficiency will not only reduce costs incurred by banks but also increase customer satisfaction and loyalty to more modern and innovative banking services.

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