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Implementation of a Customer Relationship Management Strategy to Increase Sales at Abon Sewa Kamera Semarang

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ABSTRACT

Efficient customer relationship management is essential for photography equipment rental businesses, yet manual record-keeping often leads to human errors, inefficient data processing, and fragmented customer information. These challenges highlight the need for an integrated digital solution to improve operational efficiency and strengthen customer relationships. This study aimed to design and implement a Customer Relationship Management (CRM) strategy at Abon Camera Rent Semarang by integrating people, processes, and technology. The study employed a systematic CRM development approach encompassing CRM development strategies, foundational building programs, business process reengineering, project implementation, and performance evaluation. The implementation focused on transforming manual record-keeping into a web-based CRM platform to integrate customer data across multiple channels and support more effective customer management. The findings indicated that the web-based CRM system reduced the potential for human error, improved data integration, and facilitated cross-selling and up-selling strategies. The implementation also supported service personalization, inventory optimization, and customer satisfaction and retention initiatives, with a target of increasing sales by 10%. This study contributes a practical framework for applying integrated CRM in photography equipment rental businesses. The findings highlight the importance of aligning human resources, business processes, and digital technology to enhance customer relationship management, improve operational effectiveness, and support sustainable business growth.

1. Introduction

In the era of business digitalization, photography equipment rental providers face increasingly intense competition and growing demands for service speed, accuracy, and operational efficiency. Digital transformation has become important for businesses seeking to improve service delivery, streamline operational processes, and strengthen customer relationships. In the photography equipment rental sector, effective management of inventory, rental transactions, equipment returns, and financial records is essential to ensuring reliable services and maintaining customer satisfaction. However, businesses that continue to rely on conventional record-keeping methods may encounter operational challenges that affect the accuracy of information and the effectiveness of their business processes.

These challenges are evident at Abon Sewa Kamera Semarang, a business specializing in camera and production equipment rental services. Before the implementation of an integrated information system, the business relied on manual, book-based records to manage inventory, rental transactions, equipment returns, and financial reports. This approach created potential operational problems, including human errors in data recapitulation, discrepancies between recorded and actual stock availability, and miscommunication among administrators, business owners, and customers. Suprianto and Agustina (2022) highlighted the importance of digital-based information systems in rental services, particularly in reducing delays in communicating equipment availability and simplifying the customer ordering process. These considerations indicate the relevance of adopting digital solutions to improve the accuracy,

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accessibility, and efficiency of information management in photography equipment rental businesses.

Beyond operational efficiency, effective customer relationship management represents another important challenge for Abon Sewa Kamera Semarang. The absence of integrated data management between physical branches and online platforms limited the business's ability to consolidate customer information and identify rental histories, purchasing patterns, and individual preferences. Without centralized customer data, the business faced difficulties in developing personalized marketing strategies and identifying opportunities to increase revenue from existing customers. Hanaysha and Mehmood (2022) emphasized that customer relationship management (CRM) technology enables organizations to understand changing consumer behavior and establish sustainable competitive advantages through personalized services. Accordingly, CRM provides a relevant approach to integrating customer information, improving service personalization, and supporting more effective customer relationship management.

Although digital information systems and CRM offer potential benefits for operational and customer management, the specific challenge addressed in this study concerns the integration of these functions within the operational context of a photography equipment rental business. The existing conditions at Abon Sewa Kamera Semarang demonstrate the need for a centralized system that connects operational records with customer information and supports relationship-based marketing activities. The research problem therefore concerns how a web-based CRM system can replace fragmented manual processes, improve the management of customer relationships, and support revenue growth through cross-selling and up-selling strategies. The study also addresses the practical need to integrate people, business processes, and technology into a coherent CRM implementation strategy.

This study aimed to design and implement a centralized CRM system at Abon Sewa Kamera Semarang through the integration of people, processes, and technology. Specifically, the research pursued three objectives. First, it sought to transform manual business processes into an integrated, web-based information system to improve operational efficiency. Second, it aimed to strengthen customer relationships to support customer satisfaction and retention. Third, it sought to support revenue growth through automated cross-selling and up-selling features, with a targeted sales increase of 10%. These objectives provide a focused basis for evaluating the role of CRM implementation in addressing the operational and customer management challenges experienced by the business.

The study contributes practically by demonstrating how a web-based CRM system can be applied to a photography equipment rental business to centralize information, improve operational coordination, and support more personalized customer services. The integration of operational and customer data is expected to help business owners and administrators make more informed decisions regarding inventory management, customer engagement, and marketing opportunities. From a conceptual perspective, the study illustrates the application of the people, processes, and technology perspective in CRM implementation within a specialized rental business context. Its contribution lies in connecting operational digitalization with customer relationship management and revenue-oriented marketing functions in a single implementation approach. Thus, this study provides a practical reference for similar rental businesses seeking to improve operational effectiveness, strengthen customer retention, and pursue sustainable business growth through digital transformation.

2. Literature Review

2.1. Conceptual and Theoretical Foundations

2.1.1. Customer Relationship Management

Customer Relationship Management (CRM) is a strategic approach that integrates customer information, business processes, and organizational resources to establish and maintain effective customer relationships. In business operations, CRM supports the management of customer data, service interactions, transaction histories, and customer preferences to improve service delivery and strengthen customer retention. Hanaysha and Mehmood (2022) examined the relationship between CRM and organizational performance, providing a relevant foundation for understanding CRM as a business strategy rather than merely a technological tool.

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In small and medium-sized enterprises, CRM-based digital systems can support the integration of customer-related activities and business operations. CRM-based e-business design for small and medium-sized enterprises, while Tampubolon et al. (2022) addressed web-based CRM implementation for improving customer service efficiency. These studies provide a conceptual basis for applying CRM to businesses that require integrated customer information and more efficient service processes. Similarly, Rahmawati and Handayani (2023) examined CRM implementation for optimizing services and monitoring rental business operations, while Wardati et al. (2024) focused on CRM application in rental businesses to improve customer satisfaction.

For Abon Sewa Kamera Semarang, CRM is operationalized through a centralized, web-based platform that connects customer registration, identity verification, equipment availability, rental transactions, and customer information. The system is designed to improve information consistency, facilitate customer self-service, and support personalized recommendations. Thus, CRM serves as the principal framework for integrating operational efficiency and customer relationship management within the photography equipment rental business.

2.1.2. Business Process Reengineering and Digital Transformation

Business Process Reengineering (BPR) refers to the fundamental redesign of existing business processes to improve operational performance, efficiency, and service delivery. In the context of digital transformation, BPR involves examining existing workflows, identifying operational bottlenecks, and redesigning procedures to make better use of information technology. Pertiwi and Nugroho (2023) examined business process reengineering in the digital transformation of operational information systems for micro, small, and medium-sized enterprises (MSMEs), making their work relevant to the process redesign undertaken in this study.

At Abon Sewa Kamera Semarang, the original workflow relied on manual records and instant messaging to manage customer registration, verify identity documents, confirm equipment availability, and record rental transactions. These procedures created potential delays, inconsistencies in stock information, and risks of human error. BPR provides the conceptual basis for replacing these fragmented activities with a centralized digital workflow.

The redesigned process allows customers to register independently, upload identity documents through the system, and access equipment availability information through an integrated catalog. Meanwhile, administrators and business owners can monitor transactions, equipment returns, inventory status, and rental trends through a centralized dashboard. The relationship between BPR and CRM is therefore complementary: BPR redesigns how operational activities are performed, while CRM integrates the resulting processes with customer information and relationship-oriented services.

2.1.3. Integration of People, Processes, and Technology

The implementation of CRM requires coordination among organizational participants, business procedures, and technological infrastructure. The people dimension concerns the roles and capabilities of business owners, administrators, customers, and technical personnel. The process dimension concerns the procedures used to register customers, manage rental transactions, verify identities, update inventory, and handle equipment returns. The technology dimension concerns the web-based platform, centralized database, security mechanisms, and automated recommendation functions.

Considering CRM within the digital business environment of small and medium-sized enterprises, while Hanaysha and Mehmood (2022) connect CRM with organizational performance. In the present study, these dimensions are reflected in the coordination of stakeholders, staff training, standardized operating procedures, data security, and the development of an integrated CRM platform.

The integration of these three dimensions is important because technology alone does not guarantee operational improvement. The system must correspond to actual business requirements, be supported by clearly defined responsibilities, and be incorporated into daily work practices. Accordingly, the study approaches CRM implementation as an organizational and technological transformation rather than simply the development of a website.

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2.1.4. Cross-Selling, Up-Selling, and Sales Optimization

Cross-selling and up-selling are marketing strategies intended to increase the value of customer transactions. Cross-selling involves offering complementary products or services that correspond to a customer's primary selection, whereas up-selling involves encouraging customers to choose a higher-value or upgraded option. Kotler and Armstrong (2021) provide a foundational marketing perspective for understanding customer-oriented selling strategies, while Fathoni (2019) specifically addressed the application of cross-selling and up-selling strategies in an online sales application.

In the context of equipment rental, cross-selling can be implemented by recommending complementary accessories, such as tripods, additional memory cards, lighting equipment, or lenses, when customers select a camera. Up-selling can be implemented by offering an upgrade to a professional-grade camera body when the customer's rental requirements and preferences make such an option relevant. These recommendations can be incorporated into the online ordering process to provide timely suggestions without requiring administrators to offer every recommendation manually.

Related research by Saputra et al. (2024) examined web-based CRM using cross-selling and up-selling to increase vehicle rentals, while Triana et al. (2023) discussed cross-selling as a customer service strategy for increasing product sales. These studies are relevant to the present research because they connect digital customer management with selling strategies. At Abon Sewa Kamera Semarang, the recommendation engine is designed to increase the average transaction value, encourage the use of complementary equipment, and support the targeted 10% increase in sales.

2.2. Review of Empirical Studies

Previous studies listed in the article's references provide several complementary perspectives on CRM implementation, digital rental systems, business process redesign, and sales optimization.

First, research on CRM in small and medium-sized businesses provides a foundation for integrating customer management with digital business operations. CRM-based e-business design for small and medium-sized enterprises. Tampubolon et al. (2022) focused on web-based CRM for customer service efficiency, while Rahmawati and Handayani (2023) addressed CRM for service optimization and operational monitoring in rental businesses. Wardati et al. (2024) examined CRM implementation in rental businesses with an emphasis on customer satisfaction. Collectively, these studies establish the relevance of CRM to service efficiency, operational monitoring, and customer-oriented business management.

Second, research on rental information systems provides a more direct operational comparison. Suprianto and Agustina (2022) examined the development of an Android- and web-based camera rental information system. Their research is particularly relevant because it concerns the same general business sector as the present study. Whereas rental information systems focus on managing information and supporting rental activities, the present research extends this operational focus by integrating customer relationship management with automated product recommendations and relationship-oriented marketing functions.

Third, business process redesign provides a basis for understanding how digital systems can transform operational workflows. Pertiwi and Nugroho (2023) examined business process reengineering for digital transformation in MSME operational information systems. This perspective is relevant to Abon Sewa Kamera Semarang because the implementation requires more than digitizing existing records: it redesigns registration, stock checking, ordering, and transaction recording into a connected workflow.

Fourth, studies of cross-selling and up-selling provide a basis for connecting digital platforms with sales optimization. Fathoni (2019) addressed these strategies in an online sales application. Saputra et al. (2024) examined their implementation through web-based CRM in a vehicle rental business, while Triana et al. (2023) discussed cross-selling as a customer service strategy for increasing sales. These studies are relevant to the development of an automated recommendation engine that suggests complementary equipment and potential upgrades during the camera rental checkout process.

Finally, Hanaysha and Mehmood (2022) examined CRM in relation to organizational

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performance, providing a broader perspective for connecting customer management with business outcomes. Considered together, these sources establish a conceptual relationship among digital information integration, process efficiency, customer service, and sales-oriented CRM functions.

The reviewed studies address complementary aspects of digital business management. However, their research contexts and primary emphases differ. Studies of general CRM and customer service emphasize customer management and service efficiency, while research on rental information systems focuses on supporting rental operations. Research on cross-selling and up-selling emphasizes transaction value and sales opportunities. The present study brings these concerns together in a single implementation at Abon Sewa Kamera Semarang, linking operational process redesign, centralized customer data, and automated product recommendations within a web-based CRM platform.

2.3. Identification of the Research Gap

Based on the literature cited in this study, three related gaps motivate the research.

First, the reviewed studies address CRM, digital rental information systems, business process reengineering, and sales optimization from different perspectives. Research on CRM examines customer management and service efficiency (Tampubolon et al., 2022; Rahmawati & Handayani, 2023; Wardati et al., 2024), while Suprianto and Agustina (2022) focus on camera rental information systems. Pertiwi and Nugroho (2023) address business process redesign, and Fathoni (2019), Saputra et al. (2024), and Triana et al. (2023) provide relevant perspectives on cross-selling and sales-related strategies. This creates an opportunity to examine how these elements can be integrated into one operational solution for a photography equipment rental business.

Second, the specific operational context of Abon Sewa Kamera Semarang presents a practical problem involving manual customer registration, identity verification, stock confirmation, transaction recording, and fragmented customer information. These conditions require a system that simultaneously addresses operational bottlenecks and customer relationship management. The present research therefore focuses on the application of CRM in a photography equipment rental business rather than assuming that solutions developed for other business contexts can be transferred without adaptation.

Third, the study addresses the practical integration of CRM and BPR with automated cross-selling and up-selling functions. The system is intended not only to centralize information and streamline transactions but also to recommend complementary equipment and higher-grade camera options based on customer selections and rental history. Its performance is examined through functional system testing and the business objectives specified in the research, including operational efficiency, customer satisfaction and retention, inventory utilization, and a targeted 10% increase in sales.

The contribution of this study lies in demonstrating how these components can be incorporated into a centralized web-based CRM implementation tailored to the operational needs of Abon Sewa Kamera Semarang. Because the research focuses on one business and a specific system implementation, its contribution is primarily contextual and practical. The findings are intended to provide an implementation reference for similar rental businesses rather than establish a universally applicable or statistically generalizable model.

2.4. Development of the Conceptual Framework

The conceptual framework is based on the relationship between digital business process transformation, CRM integration, automated selling strategies, and the intended operational and business outcomes.

The first component is the existing operational condition, characterized by manual record-keeping, fragmented customer information, and manual equipment availability checks. These conditions provide the practical basis for redesigning the business workflow through BPR, consistent with the focus of Pertiwi and Nugroho (2023).

The second component is the integration of people, processes, and technology within a centralized web-based CRM system. This system connects customer registration, identity verification, inventory information, rental transactions, and management reporting. Its customer management orientation is consistent with the CRM perspectives discussed by Hanaysha and Mehmood (2022), Tampubolon et al. (2022), and Wardati et al. (2024).

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The third component is the implementation of automated cross-selling and up-selling recommendations. Cross-selling presents complementary accessories relevant to the selected camera, whereas up-selling provides options for upgrading to professional-grade equipment. These functions are grounded in the sales strategy perspectives of Fathoni (2019), Saputra et al. (2024), and Triana et al. (2023).

The framework connects these implementation components with the intended outcomes: improved operational efficiency, more consistent information, better inventory utilization, stronger customer satisfaction and retention, and progress toward the targeted 10% increase in sales. These outcomes represent the objectives and evaluation dimensions of the study; the 10% figure is a target rather than a quantified result independently established by the conceptual framework.

2.5. Hypotheses or Research Propositions

This study employs a qualitative approach combined with system development and implementation. Therefore, research propositions are more appropriate than statistical hypotheses because the research examines the application and practical functioning of a CRM system in a specific business context.

Proposition 1: Integrating people, processes, and technology through a centralized web-based CRM system supports the transformation of manual rental operations into a more integrated and efficient workflow.

This proposition follows the study's focus on CRM implementation and business process redesign, drawing on the perspectives of Hanaysha and Mehmood (2022), Pertiwi and Nugroho (2023), and Tampubolon et al. (2022).

Proposition 2: Integrating customer information, rental histories, and self-service functions into the CRM platform supports more consistent customer management and provides a basis for improving customer satisfaction and retention.

This proposition reflects the customer management and service orientation discussed by Ayuninggati et al. (2021), Rahmawati and Handayani (2023), and Wardati et al. (2024).

Proposition 3: Automating cross-selling and up-selling recommendations within the rental ordering process supports opportunities to increase average transaction value and improve inventory utilization, contributing to the business's targeted 10% sales increase.

This proposition is consistent with the application of cross-selling and up-selling in online sales and rental systems discussed by Fathoni (2019), Saputra et al. (2024), and Triana et al. (2023).

These propositions guide the interpretation of the CRM implementation at Abon Sewa Kamera Semarang. They are examined through the observed changes in business processes, the functioning of system features, the results of black-box testing, and the business evaluation indicators described in the research.

3. Research Methods

3.1. Research Design

This study employed a qualitative approach combined with a system development engineering method to design and implement a centralized Customer Relationship Management (CRM) strategy at Abon Sewa Kamera Semarang. The qualitative approach was selected to obtain an in-depth understanding of the operational constraints associated with manual record-keeping, rental transactions, inventory management, and customer relationship management. The system development component translated the identified operational requirements into an integrated, web-based information system.

The research focused on understanding existing business processes, identifying operational inefficiencies, developing a digital solution, and evaluating the functionality of the resulting CRM platform. This combination of qualitative inquiry and system development was appropriate for addressing the practical challenges of the business while supporting the implementation of technology-based improvements in operational efficiency and sales management.

3.2. Research Context and Setting

The research was conducted at Abon Sewa Kamera Semarang, a business providing camera and production equipment rental services in Semarang, Indonesia. The business was selected because its operational activities previously relied on manual records and communication through instant messaging to manage customer registration,

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equipment availability, rental transactions, equipment returns, and financial reporting.

These operational conditions presented challenges related to data accuracy, transaction processing, stock confirmation, and the integration of customer information. The research setting was therefore relevant for examining how a centralized, web-based CRM platform could support business process transformation and customer-oriented marketing activities in a photography equipment rental business.

The scope of the study covered the analysis of existing operational procedures, the development of CRM requirements, the redesign of business processes, the implementation of the web-based platform, and the evaluation of its technical functionality and intended business outcomes.

3.3. Research Participants

The study employed purposive sampling to select informants for the qualitative data collection. Participants were selected based on their knowledge, experience, and direct involvement in the operational activities and customer management of Abon Sewa Kamera Semarang. This technique was intended to obtain relevant information from individuals familiar with the business processes under investigation.

The research description identifies the business's operational activities and customer management as the basis for participant selection. However, the available methodological information does not specify the total number of informants or provide a detailed breakdown of their demographic characteristics and individual positions. Consequently, these details are not reported here.

3.4. Data Sources and Data Collection

The study used primary data collected through direct observation and in-depth interviews. These techniques were employed to understand the existing business workflow, identify operational problems, and determine the requirements for the proposed CRM system.

Direct observation focused on rental transaction procedures, camera and equipment stock availability checks, and administrative procedures for equipment returns. Observation also supported the identification of inefficiencies in manual recording and potential risks of human error.

In-depth interviews were conducted with informants selected through purposive sampling. The interviews focused on information relevant to business operations and customer management, providing insights into the practical requirements of an integrated CRM system.

The information obtained through observation and interviews was used to identify operational needs and inform the design of the system. The study description does not specify the use of additional data collection instruments, such as standardized interview protocols, questionnaires, or document analysis procedures; therefore, no such instruments are assumed in this methodology.

3.5. Measurement of Research Concepts and Evaluation Indicators

Because this study employed a qualitative approach and a system development method, it did not operationalize variables through statistical measurement scales. Instead, the research examined operational processes, system functions, and business evaluation indicators relevant to the implementation of CRM.

The main research concepts and evaluation indicators were as follows:

a. **Operational efficiency:** The extent to which the system supports more efficient rental processing, reduces dependence on manual recording, and improves the management of transaction information.
b. **Customer relationship management:** The integration of customer registration, customer account management, identity verification, and rental history into a centralized platform.
c. **Inventory management:** The availability and updating of equipment information through an integrated catalog connected to the system's database.
d. **Cross-selling and up-selling:** The functionality of automated recommendations for complementary equipment and higher-grade camera options during the checkout process.
e. **Customer satisfaction and retention:** Intended business outcomes associated with easier access to rental information, more personalized services, and improved customer management.
f. **Sales performance:** Progress toward the business's target of a 10% increase in sales through automated cross-selling and up-selling features.

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These indicators were used to guide system development and performance evaluation. The 10% sales increase represented a target established by the study rather than a statistical measurement scale or an independently verified outcome.

3.6. Data Analysis Techniques

The study analyzed the information obtained from direct observation and in-depth interviews to identify operational constraints and translate them into system requirements. The analysis focused on the existing rental workflow, inventory management procedures, customer registration, transaction processing, and opportunities to improve customer relationship management.

The resulting information was applied throughout the CRM development process, which consisted of five main phases: developing the CRM strategy, building the CRM program foundation, specifying system requirements and selecting partners, implementing the project, and evaluating system performance.

During system evaluation, Black-Box Testing was used to assess whether the principal system functions operated according to the specified requirements. The testing focused particularly on the automated recommendation module and reporting dashboard. The evaluation also considered the intended business indicators, including rental processing efficiency, customer satisfaction, customer retention, inventory utilization, and progress toward the targeted sales increase.

The study did not report the use of statistical software, inferential statistical analysis, or a formal qualitative coding procedure. Accordingly, the analysis is described in terms of qualitative operational assessment, system requirement development, and functional testing rather than statistical hypothesis testing.

3.7. Validity, Reliability, and Trustworthiness

The methodological description indicates that the study drew on direct observation and in-depth interviews to understand the operational conditions of Abon Sewa Kamera Semarang. These techniques provided contextual information for identifying business requirements and designing the CRM system. The study also employed Black-Box Testing to assess whether system functions operated according to the specified requirements.

The functional testing covered key components, including identity document uploads, stock updates, automated product recommendations, and the reporting dashboard. This testing provided a basis for evaluating the technical functionality of the developed platform.

However, the available methodological description does not specify formal procedures for qualitative trustworthiness, such as member checking, investigator triangulation, an audit trail, or independent coding. It also does not report the use of standardized reliability measures. These procedures are therefore not claimed as part of the research methodology.

3.8. Ethical Considerations

The system development process incorporated measures intended to protect customer information. These included encryption mechanisms for identity guarantee documents, such as identity cards and driver's licenses, as well as procedures for managing access to customer data. Standard Operating Procedures (SOPs) were also included to regulate the physical checking of rental equipment.

These measures formed part of the system's security and risk mitigation design. Nevertheless, the available research description does not explicitly document informed consent procedures for interview participants, formal research ethics approval, or specific data retention and deletion policies. Such procedures should be reported separately if they were implemented during the research.

3.9. Research Procedure

The research was conducted through five principal phases of CRM development.

Phase 1: Develop Customer Relationship Management. The first phase involved an operational situation analysis based on direct observation of daily business activities. The analysis identified inefficiencies in manual recording and potential human errors. The next activities involved defining the business vision and priorities, aligning staff training with the proposed centralized platform, establishing data security requirements, and preparing a business case for automated marketing based on transaction histories. Cross-selling and up-selling were incorporated into the proposed strategy to support sales optimization.

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Phase 2: Build the CRM Program Foundation. The second phase involved stakeholder mapping to identify the roles of the business owner, operational or administrative team, vendor or distributor, and IT team. A change management strategy was then developed to support the transition to the centralized platform. Risk management measures included data encryption and the preparation of SOPs for the physical inspection of rental equipment.

Phase 3: Need Specification and Partner Selection. The third phase focused on identifying system requirements and redesigning existing business processes. Business Process Reengineering was applied to transform the traditional transaction workflow, which relied on instant messaging and manual confirmation, into an integrated web-based process. Gap analysis was also used to identify differences between the existing system's capabilities and customer needs, particularly regarding access to real-time equipment catalogs and the speed of customer registration.

Phase 4: Project Implementation. The fourth phase involved designing the architecture and prototype of the centralized, web-based CRM platform. The system incorporated a home and information page, equipment catalog and featured categories, self-registration and customer account modules, and a recommendation engine for cross-selling and up-selling during checkout. The platform was designed to integrate customer information, equipment availability, transaction records, and management reporting.

Phase 5: Performance Evaluation. The final phase involved Black-Box Testing of the system's principal functions, particularly the automated recommendation module and reporting dashboard. The evaluation also considered the study's intended performance indicators: rental processing efficiency, customer satisfaction, progress toward the 10% sales increase target, and customer retention. The results were used to assess whether the implemented system functioned according to the specified requirements and supported the intended operational improvements.

3.10. Methodological Limitations

The study was conducted in a single business setting, Abon Sewa Kamera Semarang. Consequently, the findings reflect the operational conditions and system requirements of this specific photography equipment rental business and cannot automatically be generalized to all rental businesses or other industry sectors.

The evaluation also focused on system functionality and the business indicators defined for the implementation. The methodological description does not provide a detailed quantitative dataset establishing the magnitude of changes in processing time, customer satisfaction, customer retention, or actual sales revenue. Therefore, the 10% sales increase should be interpreted as a target rather than a statistically verified outcome.

Furthermore, the recommendation engine relied on transaction histories and rule-based recommendation scenarios. The study did not describe the implementation of advanced machine learning models or comparative testing against alternative recommendation algorithms. These limitations define the scope of the present findings and indicate opportunities for subsequent research involving broader business settings, more extensive performance measurements, and more advanced recommendation techniques.

4. Results and Discussion

4.1. Research Results

4.1.1. Research Context and Descriptive Overview

This study examined the design and implementation of a centralized, web-based Customer Relationship Management (CRM) platform at Abon Sewa Kamera Semarang, a business specializing in camera and production equipment rental services. The unit of analysis was the business's operational processes and the CRM system developed to support customer management, inventory control, rental transactions, and sales-related activities.

Before implementation, customer registration, identity verification, equipment availability checks, rental transactions, and administrative recording relied on manual records and instant messaging. These procedures created potential communication bottlenecks, inconsistencies in inventory information, and risks of human error. The study addressed these operational conditions by developing an integrated platform that connects customer information, equipment availability, transaction records, and automated product recommendations.

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The research employed a qualitative approach combined with system development engineering. Data were collected through direct observation and in-depth interviews with informants selected using purposive sampling. The available research description does not specify the number or demographic characteristics of the informants; therefore, no numerical sample statistics or demographic distributions are reported.

4.1.2. System Quality and Preliminary Testing

The study evaluated the technical functionality of the developed CRM platform using Black-Box Testing. The testing focused on whether the system's principal functions operated according to the specified requirements, particularly the identity verification module, equipment availability updates, automated recommendation engine, and reporting dashboard.

The reported testing results indicated that the principal system functions operated according to the designed requirements. The identity verification module processed uploaded documents, equipment availability was updated automatically following transaction confirmation, and the recommendation engine displayed suggestions relevant to customers' primary equipment selections.

The testing also covered the reporting dashboard, which was designed to support the monitoring of daily transaction records, equipment return schedules, item conditions, and rental trends. Because the study did not report detailed test-case counts, pass rates, response times, or quantified security-test results, the evaluation is presented descriptively rather than through numerical performance statistics.

4.1.3. Main Analytical Results

The implementation produced an integrated web-based CRM platform that transformed several previously manual operational activities. The principal findings concerned the redesign of business processes, the integration of inventory and customer information, the implementation of automated cross-selling and up-selling functions, and the provision of a centralized management dashboard.

Table 1. Comparison of Business Processes Before and After CRM Implementation

Indicator	Before CRM Implementation	After CRM Implementation
Registration	The admin records customer data and manually checks physical identity in the recap book.	Customers perform self-registration and upload encrypted guarantee documents into the system.
Unit Stock Check	Checking the availability of cameras/equipment is done manually via WhatsApp chat.	The catalog provides stock availability information in real-time and automatically.
Ordering & Workflow	The transaction flow is slow and prone to miscommunication among admins, owners, and renters.	Centralized transactions via a web platform with automatic confirmation and recording.

Source: Author processed

As presented in Table 1, the principal operational changes involved customer self-registration, automated inventory information, and centralized transaction processing. The platform reduced dependence on manual record-keeping by integrating customer registration and equipment availability information into the same system.

The system also incorporated a recommendation engine that generated product suggestions during checkout. The recommendations were based on customers' selected equipment and were intended to support complementary-product offers and equipment upgrades.

Table 2. Implementation of Cross-Selling and Up-Selling Strategies in the CRM System

Marketing Strategic	System Mechanism	Implementation at Abon Sewa Kamera Semarang
Cross-Selling	Offering complementary products or accessories automatically during the	The system recommends renting a tripod, additional memory, or lighting when a customer

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	checkout process.	selects a DSLR camera unit.
Up-Selling	Checking the availability of cameras/equipment is done manually via WhatsApp chat	The system offers a professional-grade camera body upgrade option for loyal customers who use standard cameras.

Source: Author processed

Table 2 presents the two recommendation strategies incorporated into the CRM platform. Cross-selling was designed to offer complementary accessories, including tripods, additional memory, and lighting equipment. Up-selling was designed to provide customers with the option of upgrading to professional-grade camera equipment.

These functions were intended to increase the average transaction value and improve the utilization of equipment that was rented less frequently. The implementation targeted a 10% increase in sales revenue. However, the available results do not provide a numerical comparison of sales before and after implementation that would establish whether this target was achieved.

Table 3. Business Impact Evaluation Post-System Implementation

Business Impact	Work Evaluation	Business Impact
Operational Efficiency	Cutting rental processing time and eliminating data input errors in both transactions and daily reports.	Operational Efficiency
Revenue Increase	Automated recommendations increase the average transaction value for a 10% revenue growth.	Revenue Increase
Stock Optimization & Retention	Maximizing the rental of less popular units through bundling packages and increasing customer retention and loyalty.	Stock Optimization & Retention

Source: Author processed

As summarized in Table 3, the intended business impacts included operational efficiency, revenue growth, inventory utilization, and customer retention. The implementation activities supporting these objectives included customer self-registration, automated inventory updates, centralized transaction processing, and product recommendations.

The table summarizes the intended relationships between system functions and business objectives. However, its final column primarily describes system functionality rather than quantified business outcomes. Consequently, the reported evidence supports the description of the implemented features and their intended contributions, while the magnitude of the resulting business impacts remains unquantified.

4.1.4. Key Findings in Relation to the Research Objectives

The principal findings are organized according to the three objectives established in the study.

First, transforming manual business processes into an integrated web-based information system. The study successfully developed a centralized CRM platform incorporating customer registration, identity verification, equipment catalog access, inventory updates, transaction recording, and management reporting. The implementation replaced several manual procedures with an integrated digital workflow.

Second, strengthening customer relationships to support satisfaction and retention. The platform provided customer self-registration, centralized rental information, and easier access to equipment availability. The recommendation engine also supported more personalized product suggestions. These functions were designed to improve the customer experience and provide a basis for stronger customer retention. Nevertheless, the study did not report quantified customer satisfaction or retention measurements.

Third, supporting revenue growth through cross-selling and up-selling. The system implemented automated recommendations for complementary equipment and professional-grade camera upgrades. These functions were designed to increase the average transaction value and improve the utilization of less frequently rented equipment. The study established a target of a 10% increase in sales revenue, but the available results do not

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establish the actual percentage increase achieved.

Overall, the study achieved its system development objective by implementing the principal CRM functions. The operational and commercial objectives were supported by the system design, although their actual impact requires further quantitative evaluation.

4.1.5. Visual Presentation of Results

Tables 1–3 present the principal results of the CRM implementation. Table 1 summarizes the transformation of operational processes, Table 2 describes the implementation of cross-selling and up-selling, and Table 3 connects the system functions with the intended business impacts.

Together, these tables show how the centralized CRM platform was designed to connect operational process improvements with customer relationship management and sales-oriented functions. The tables also distinguish the implemented system capabilities from the business outcomes that the study intended to achieve.

4.2. Research Discussion

4.2.1. Interpretation of Key Findings

The findings demonstrate that a centralized CRM platform can be configured to address operational problems arising from manual record-keeping in a photography equipment rental business. Before implementation, customer registration, identity verification, equipment availability checks, and transaction recording were managed through separate manual procedures. The new platform integrated these activities into a connected digital workflow.

The first important finding concerns operational integration. Customer self-registration reduces dependence on administrators for initial data entry, while the equipment catalog provides a centralized source of availability information. Automatic transaction recording and the management dashboard also support the coordination of activities among business owners and administrators. These changes address the operational fragmentation identified at the beginning of the study.

The second finding concerns the integration of CRM with sales-oriented functions. The recommendation engine extends the system beyond basic rental administration by offering complementary equipment and upgrade options during checkout. Cross-selling and up-selling are therefore incorporated into the operational workflow rather than being conducted exclusively through separate manual marketing interactions.

The third finding concerns the distinction between system functionality and business performance. Black-Box Testing indicated that the principal system functions operated according to the specified requirements. This finding supports the technical implementation objective. However, functional testing alone does not demonstrate that the system caused a particular increase in sales, customer satisfaction, or retention. Those outcomes require additional measurements based on transaction records and customer feedback.

4.2.2. Comparison with Previous Studies

The findings can be positioned in relation to the studies identified in the research literature. Suprianto and Agustina (2022) examined an Android- and web-based camera rental information system, providing a relevant point of comparison for the digitalization of camera rental operations. The present study shares this operational focus but extends the system design by integrating customer relationship management with automated cross-selling and up-selling functions.

The implementation also relates to the focus on web-based CRM for customer service efficiency described by Tampubolon et al. (2022). The centralized platform developed in this study similarly connects customer information with business operations. Its specific contribution is the integration of these functions into the workflow of a photography equipment rental business.

Furthermore, the redesign of manual registration, stock checking, and transaction recording reflects the business process transformation focus of Pertiwi and Nugroho (2023). The findings show how process redesign can be incorporated into the implementation of an operational information system.

The automated recommendation functions also correspond to the application of cross-selling and up-selling strategies examined by Fathoni (2019), Saputra et al. (2024), and Triana et al. (2023). The present system applies these strategies to camera rental transactions by recommending accessories and equipment upgrades. However, because the study

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does not report quantified changes in transaction value or sales, it cannot establish that the commercial effects are greater than those reported in other studies.

These comparisons demonstrate conceptual and practical alignment with previous research. They should not be interpreted as evidence of statistically superior performance because the present study did not conduct a direct comparative evaluation.

4.2.3. Theoretical Contributions

The study contributes to the application of CRM and Business Process Reengineering (BPR) by illustrating how customer management, operational workflows, and digital technology can be integrated within a specialized rental business. First, the implementation demonstrates the practical connection between CRM and process redesign. CRM is represented not only by the storage of customer information but also by the integration of customer registration, inventory availability, rental transactions, and customer-oriented recommendations. BPR provides the operational transformation through which these functions become part of a connected workflow. Second, the study illustrates the integration of people, processes, and technology in a small-scale business setting. The system requires coordination among owners, administrators, customers, and technical personnel, together with redesigned procedures and an integrated digital platform. The contribution is therefore an applied illustration of CRM implementation as an organizational and technological process. Third, the integration of automated recommendations extends the system's function from transaction administration to sales support. Cross-selling and up-selling are embedded in the checkout process, connecting customer selections with relevant complementary products and potential equipment upgrades.

These contributions are primarily conceptual and application-oriented. The study does not statistically test a theoretical model or establish causal relationships between CRM implementation and business performance. Its theoretical value lies in demonstrating how the relevant concepts can be incorporated into a functioning system within the specific context examined.

4.2.4. Practical and Policy Implications

The findings provide several practical implications for Abon Sewa Kamera Semarang and similar rental businesses. For business owners, the centralized dashboard provides a basis for monitoring transaction records, equipment returns, item conditions, and rental trends. Integrated inventory information can also support decisions about equipment availability and the use of assets that are rented less frequently. For administrators, customer self-registration and automated transaction recording can reduce reliance on repetitive manual data entry. The centralized platform also provides a common source of operational information, potentially reducing inconsistencies among customer records, inventory information, and transaction reports. For customer management, the recommendation engine provides a structured means of offering relevant accessories and equipment upgrades. Businesses can use these functions to develop more personalized rental suggestions while maintaining the relevance of recommendations to customers' equipment selections. For information security, encryption of identity guarantee documents and the use of standardized procedures support the protection of sensitive customer information. Businesses implementing comparable systems should also ensure appropriate access controls and procedures for managing stored identity documents.

Finally, the 10% sales increase target should be evaluated using actual transaction data before and after implementation. Monitoring sales revenue, average transaction value, accessory rental frequency, repeat rentals, and customer satisfaction would provide a stronger basis for determining whether the system delivers the intended commercial benefits.

4.2.5. Integration with the Research Gap

The study addressed the identified need to integrate operational digitalization, centralized customer information, and sales-oriented CRM functions within a photography equipment rental business.

Rather than focusing exclusively on rental information management, the developed platform combines customer registration, identity verification, equipment availability, transaction recording, and automated product recommendations. This integration responds to the operational challenge at Abon Sewa Kamera Semarang, where previously separate manual procedures created information

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fragmentation and communication bottlenecks.

The implementation also demonstrates how cross-selling and up-selling can be incorporated into the rental transaction process. Complementary equipment recommendations and camera upgrade options connect operational information with customer-oriented marketing functions.

The study therefore provides a context-specific implementation example that brings together CRM, BPR, and automated recommendation functions. Its originality lies in the practical integration of these elements within the selected business setting. Further evidence from additional businesses and quantitative performance evaluations would be needed to establish the broader applicability and measurable effectiveness of this approach.

4.2.6. Acknowledgment of Study Limitations

The findings must be interpreted in light of the study's scope. First, the implementation was conducted at a single business, Abon Sewa Kamera Semarang. Differences in inventory scale, customer characteristics, staffing, and operational procedures may affect the suitability of the system for other rental businesses. Second, the reported evaluation focused on system functionality and the intended business impacts. Detailed quantitative measurements of transaction processing time, sales revenue, customer satisfaction, and retention were not provided. Therefore, the magnitude of the system's business effects cannot be determined from the available results. Third, the recommendation engine relied on transaction histories and relatively simple, rule-based recommendation scenarios. The study did not report comparative testing against more advanced recommendation algorithms.

These limitations do not negate the demonstrated implementation of the CRM platform, but they restrict the conclusions that can be drawn about its long-term commercial effectiveness and generalizability.

5. Conclusion

5.1. Summary of Key Findings

This study designed and implemented a centralized, web-based Customer Relationship Management platform for Abon Sewa Kamera Semarang. The system integrated customer registration, identity verification, equipment availability information, rental transaction recording, and management reporting into a connected digital workflow. The implementation replaced several manual procedures with centralized information management and incorporated automated cross-selling and up-selling recommendations into the checkout process. Black-Box Testing indicated that the principal system functions operated according to the specified requirements. The platform was designed to improve operational efficiency, support customer relationship management, optimize inventory utilization, and contribute to a targeted 10% increase in sales revenue. However, the available results do not establish the actual magnitude of improvements in sales, customer satisfaction, or retention. The study therefore demonstrates the implementation of the intended system functions, while the achievement of the broader business outcomes requires further measurement.

5.2. Theoretical Contributions

The study contributes an applied example of integrating CRM and Business Process Reengineering within a photography equipment rental business. It demonstrates how the integration of people, processes, and technology can connect customer information management with operational workflows and sales-oriented recommendation functions. The study also illustrates the application of cross-selling and up-selling within a web-based rental transaction process. Rather than treating these strategies as separate marketing activities, the system incorporates them into the customer checkout experience. The contribution is primarily conceptual and practical. The study does not establish a statistically validated causal model, but it provides an implementation reference for examining how CRM and process redesign can be combined in similar business settings.

5.3. Practical and Policy Implications

For rental business owners, the findings highlight the potential value of centralizing customer records, inventory information, rental transactions, and operational reports within a single platform. Such integration can improve information consistency and support more structured operational monitoring. The implementation also provides a practical basis for introducing automated product recommendations. Complementary equipment

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suggestions and upgrade options can be used to support sales opportunities and improve the utilization of less frequently rented assets. Businesses adopting similar systems should prioritize data security, staff readiness, clearly defined operating procedures, and regular system testing. They should also evaluate performance using actual transaction data, customer feedback, and repeat-rental records rather than relying solely on the successful operation of system functions.

5.4. Limitations of the Study

The study was limited to one photography equipment rental business, which restricts the extent to which its findings can be generalized to other organizations. In addition, the evaluation primarily documented system functionality and intended business benefits rather than quantified changes in operational or commercial performance. The recommendation engine also relied on simple, rule-based scenarios and did not incorporate advanced machine learning techniques. Consequently, the study does not establish whether more sophisticated recommendation methods would provide greater accuracy or produce stronger business outcomes. These limitations should be considered when interpreting the findings and applying the implementation approach to other rental businesses.

5.5. Directions for Future Research

Future research should evaluate the system across multiple rental businesses to determine how differences in organizational size, inventory composition, customer behavior, and operational procedures affect implementation outcomes. Subsequent studies should also compare transaction and operational indicators before and after implementation. Relevant measures include rental processing time, data-entry errors, average transaction value, sales revenue, equipment utilization, customer satisfaction, and repeat-rental rates. Such measurements would help establish whether the targeted 10% sales increase is achieved. Further system development could incorporate machine learning techniques, including Collaborative Filtering, to improve the relevance of product recommendations. Automated payment features could also streamline rental transactions, while Internet of Things (IoT)-based equipment tracking could support inventory monitoring and security risk mitigation. These developments would extend the present implementation by examining not only whether the system functions as designed but also how effectively it supports measurable and sustainable business improvements.

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