

DEVELOPMENT OF A DIGITAL E-CRM AS A SOLUTION FOR CUSTOMER RELATIONSHIP MANAGEMENT AND TRANSACTION ACTIVITIES AT TOKO ZUMA

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Abstract: Toko Zuma faces challenges in optimizing customer relationship management and transaction recording due to conventional manual systems, which hinder real-time loyalty monitoring and sales analysis. This research aims to design a digital Electronic Customer Relationship Management (E-CRM) system as an integrative solution for systematic and centralized management. The design method employs Unified Modeling Language (UML) for requirements analysis, user interface design, and Black-box Testing for validation. Results demonstrate a 100% success rate across all primary modules. The platform features Point Reward, automated transaction management, and live chat for direct interaction. Implementation enables personalized promotional strategies based on accurate data to increase customer retention. In conclusion, the Digital E-CRM system effectively automates business processes, serving as a strategic instrument for transparent and measurable customer relationship management.

Keywords: digital e-crm; relationship management; toko zuma; transaction activities.

Abstrak: Toko Zuma menghadapi kendala dalam optimalisasi manajemen hubungan pelanggan dan pencatatan transaksi karena masih menggunakan sistem manual konvensional. Penelitian ini bertujuan merancang sistem Electronic Customer Relationship Management (E-CRM) digital sebagai solusi integratif untuk pengelolaan basis data dan transaksi secara terpusat. Metode perancangan meliputi analisis kebutuhan menggunakan Unified Modeling Language (UML), desain antarmuka, dan validasi fungsional melalui Black-box Testing. Hasil pengujian menunjukkan tingkat keberhasilan 100% pada seluruh modul utama. Platform ini dilengkapi fitur Point Reward, manajemen transaksi otomatis, dan media interaksi live chat. Implementasi sistem ini memungkinkan strategi promosi personal berdasarkan data akurat untuk meningkatkan retensi pelanggan. Simpulannya, sistem E-CRM digital berhasil mengotomatisasi proses bisnis dan menjadi instrumen strategis dalam manajemen hubungan pelanggan yang transparan dan terukur.

Kata kunci: aktivitas transaksi; digital e-crm; pengelolaan relasi; toko zuma.

INTRODUCTION

The development of information technology in the current era of globalization has brought significant transformations across various sectors of life, particularly in terms of digital data processing efficiency. These advancements demand that every organization adapt to technology to maintain relevance and competitiveness in an increasingly dynamic market. Technological transformation in the economic sector, specifically in retail, has shifted the marketing management paradigm from product-centric to customer-centric. In this context, the use of information systems such as Electronic Customer Relationship Management (E-CRM) is no longer merely operational support but has become a strategic instrument to enhance service effectiveness and strengthen consumer loyalty through an integrated digital approach.

Toko Zuma is a retail business unit that serves as the focal object of this research. As a developing business, Toko Zuma faces serious challenges in customer relationship management due to its continued reliance on manual recording processes in physical ledgers. This condition leads to various operational risks, such as data redundancy, difficulty in tracking the transaction history of loyal customers, and ineffectiveness in responding quickly to customer needs. The urgency of these issues lies in unpredictable sales fluctuations caused by the lack of an information system capable of systematically analyzing customer shopping behavior. Therefore, a digital E-CRM system solution is required to bridge the gap between internal business processes and customer retention strategies.

Several previous studies have provided a foundation regarding the effec-

tiveness of CRM implementation. Previous research [1], titled “Peningkatan Loyalitas Pelanggan Melalui E-CRM Pada Doktorandus Koffie,” states that implementing E-CRM strategies significantly increases loyalty; however, that study still has limitations regarding integrated automated reporting for business owners. Furthermore, research by [2], titled “Implementasi Sistem Pelayanan Pelanggan Menggunakan E-CRM di Kaka Projek,” emphasizes the aspect of service speed, yet the developed system has not optimized point reward features as a long-term retention instrument. Research by [3], titled “Customer Relationship Management (CRM) pada UMKM Indonesia – Literature Review,” explains that the main challenge for MSMEs is low technological adaptation, but the study is limited to a literature review without technical system implementation. Additionally, research by Roisah et al. [4], titled “Implementasi Customer Relationship Management (CRM) Melalui Kepercayaan Pelanggan,” emphasizes the impact of trust on loyalty but does not yet provide direct interaction features (live chat). Finally, research by Ramdhan et al. [5], titled “Peningkatan Loyalitas Pelanggan Dengan Strategi Implementasi E-CRM Pada Toko Gucci Shoes Bunut,” shows the system's success in increasing turnover but lacks transparent automated shipping cost estimation features for customers.

In contrast, this research possesses several advantages that distinguish it from previous studies, particularly in the depth of its operational feature integration. These advantages include the combination of a Point Reward feature that is automatically accumulated into the database for every transaction. Furthermore, the provision of a Live Chat module serves as a crucial added value to support

real-time personal communication between administrators and customers. Another keystone novelty of this research is the transparency of shipping costs integrated directly into a single checkout workflow. This feature provides instant logistics estimations, thereby increasing customer trust and delivering a more comprehensive digital shopping experience.

The inclusion of these features strategically addresses MSME needs. Live Chat provides a human-centric bridge to build trust, while shipping cost transparency eliminates hidden fees, a primary factor in reducing cart abandonment. Unlike standard systems, this research applies a tailored E-CRM strategy encompassing the acquire, enhance, and retain phases to minimize human error and strengthen retention. Through a responsive architecture, this study proves that information technology reinforces efficient and sustainable customer relationship management for retail business actors.

METHOD

This research method is systematically structured using a research framework to ensure that the development of the Digital E-CRM system at Toko Zuma has a solid scientific and technical foundation [6]. This sequence of stages serves as a structured guide in solving the shop's operational problems, ranging from initial identification to final system validation. Visually, the order and interrelationships between the research stages are illustrated in Image 1.

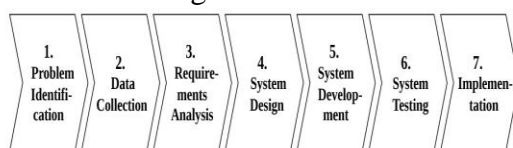


Image 1. Research Framework

The research stages are explained systematically. The process begins with Problem Identification, which serves as a crucial phase for mapping the operational constraints occurring at Toko Zuma. Through initial analysis, it was found that the recording process for customer and transaction data is still conducted conventionally in physical ledgers, resulting in data disorder and a high risk of redundancy. The absence of a digital system makes it difficult for the shop owner to monitor customer shopping history and stock fluctuations in real-time, which hinders the implementation of personalized and efficient marketing strategies in the long term.

Subsequently, the Data Collection stage was conducted through direct observation of daily transaction workflows and in-depth interviews with the shop owner to understand the requirements for loyalty features. This study uses product data samples and transaction history from Toko Zuma throughout 2024 as the basis for system development to ensure that the database design is accurate and aligned with field conditions [7]. These primary data samples, which form the foundation of the system's attributes, are detailed in Table 1 below:

Table 1. Sales Data Samples and System Attributes (Year 2024)

Product Category	Sales Volume (1 Year)	Main Data Attributes in the System
Shoes	627 Units	Product Name, Price, Stock, Brand
Sandals	589 Units	Category, Description, Product Photo
Bags	239 Units	Member ID, Reward Points, Shopping History
Accessories	127 Units	Trans. No., Trans. Date, Total Payment

Following the data collection, the Requirements Analysis phase was conducted to define the system's functional and non-functional requirements, including automated stock management, customer profiling, and periodic sales reports. Furthermore, the system is analyzed for its ability to handle external integrations such as shipping cost APIs for cost transparency. These requirements are then translated into technical modeling during the System Design stage using the Unified Modeling Language (UML) approach, including Use Case, Activity, Sequence, and Class Diagrams [8]. The database structure is designed using an Entity Relationship Diagram (ERD), while the interface design focuses on user-friendly aspects for faster cashier operations.

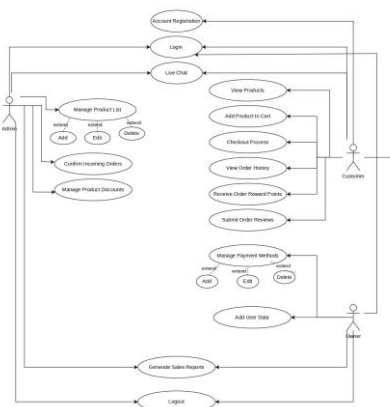


Image 2. Use Case Diagram of E-CRM System

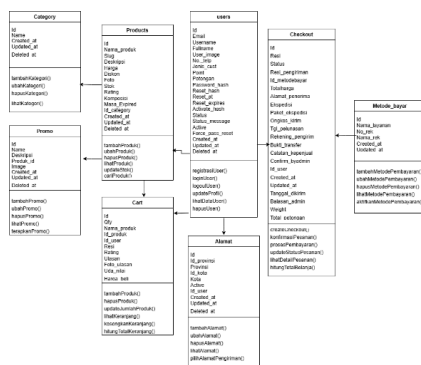


Image 3. Class Diagram of E-CRM System.

The relationship between entities in Figure 3 ensures synchronized and secure data interactions. Integration of 'Users' and 'Checkout' with 'Reward Points' logic allows automated calculation upon transaction completion. This structure eliminates data disorder, providing a reliable digital repository for long-term customer management.

In the System Development stage, the design is implemented using PHP and MySQL within the XAMPP environment [9]. The E-CRM strategy follows three phases: Acquire, Enhance, and Retain [10]. Reliability is ensured through Black-box Testing, focusing on access validation, promo calculations, and automated stock reduction. Finally, Implementation involves deploying the system to Toko Zuma's cashier PC, migrating data, and conducting staff training to support daily business activities [11].

RESULT AND DISCUSSION

The implementation results represent the visualization of the Digital E-CRM system built for Toko Zuma. This system integrates internal business processes with customer services into a single web-based platform. The user interface on the landing page and customer dashboard serves as the primary gateway for customers to interact with the system. The landing page is developed to build an initial impression through shop profile information, while the customer dashboard provides quick access to various core features. Analysis of this interface indicates that ease of navigation enhances customer comfort in searching for products, which is the initial step in the *acquire* phase of the E-CRM strategy [10].

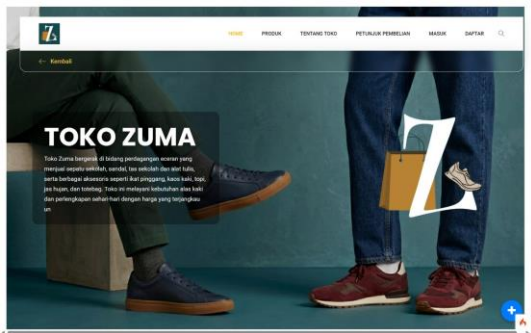


Image 4. Landing Page and Customer Dashboard Interface

Digitalization at Toko Zuma centers on the checkout module, which replaces manual recording. This workflow allows customers to verify shopping lists, effectively minimizing human error in calculations. Unlike the previous manual system prone to data loss, the checkout module ensures automated totals and price transparency. This transparency is crucial for building consumer trust, as real-time cost estimations significantly reduce transaction anxiety and cart abandonment in retail platforms [12].

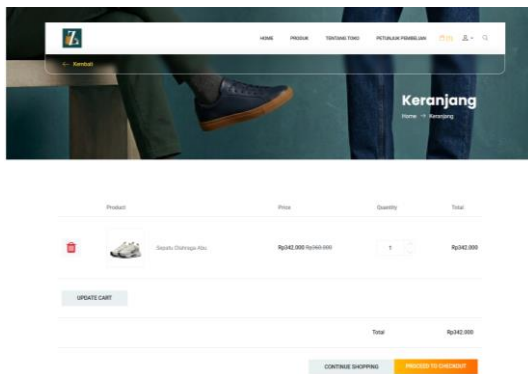


Image 5. Shopping Cart Feature and Checkout Process

The system provides a dedicated admin dashboard to manage all operational data and stock levels centrally. A key technical advantage is its ability to eliminate data redundancy. Unlike manual ledgers where inconsistencies often occurred, this relational database ensures

unique and synchronized data entries. Furthermore, the chat feature serves as a novelty to support personalization. This allows admins to respond to inquiries directly, which is crucial for maintaining loyalty during the retain phase and ensuring customers feel personally attended to by Toko Zuma [8].

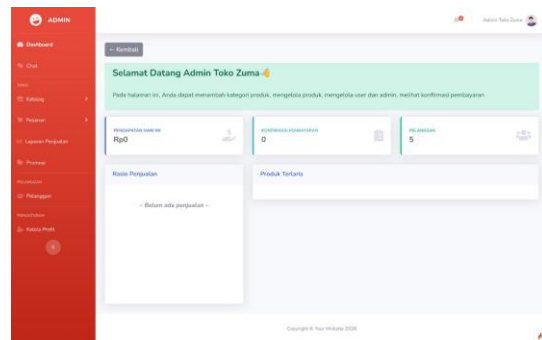


Image 6. Admin Dashboard Page

The final part of the system implementation is the sales report page, providing automated transaction recapitulation for specific periods (daily, weekly, or monthly). Technically, this feature facilitates the owner in analyzing popular products to support rapid strategic decision-making. This digital report simultaneously eliminates the risk of losing physical archives while ensuring high efficiency in enterprise data management [11].

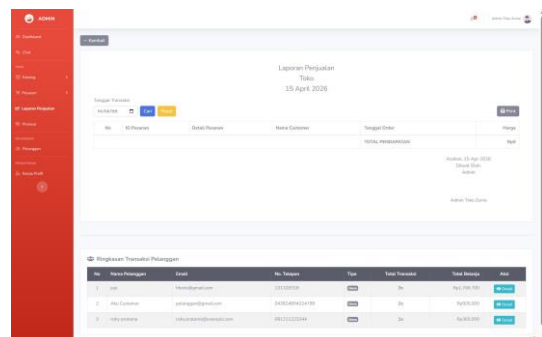


Image 7. Sales Report Page

Based on the implementation results above, all features have successfully transitioned Toko Zuma's

business processes from manual to digital systematically. Furthermore, the system also incorporates a structured reward module to enhance customer loyalty. As shown in Image 6, customers are provided with transparent information regarding the loyalty point criteria, where they earn 10 points for every IDR 100,000 spent. The integration of this module is demonstrated during the checkout process (Image 7), where customers can redeem their accumulated points to reduce their total payment.

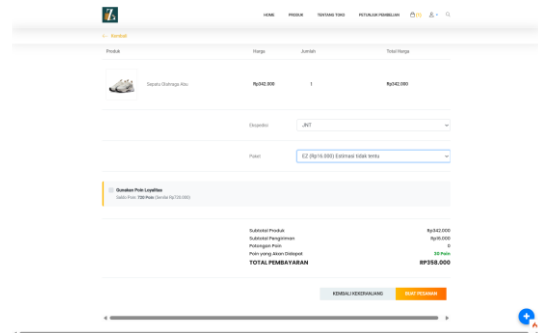


Image 9. Point Redemption during Checkout Process

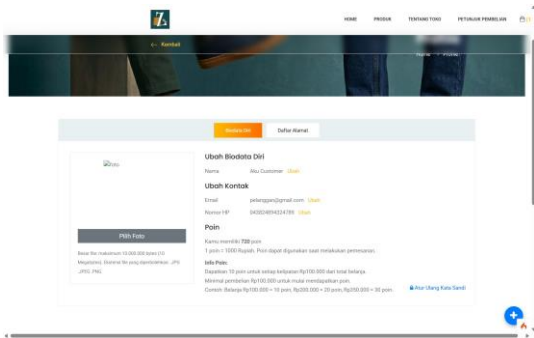


Image 8. Customer Profile and Loyalty Point Information

To ensure functional quality and guarantee the system is free from logical errors, testing was conducted using the Black-box method on the main functions. The test results indicate that all modules—ranging from login, member registration, product data management, checkout transaction process, loyalty point redemption, to the live chat feature and report generation—functioned 100% as expected. The details of these tests are summarized in Table 2 below

Table 2. System Functionality Test Results (*Black-box*)

Test Class	Testing Details	Expected Result	Conclusion
Reward Points	Verifying member point calculation.	Points added based on nominal.	Success
Redemption	Redeeming points for discounts.	Points deducted and price reduced.	Success
Transaction	Sales process and stock updates.	Records sales and reduces stock.	Success
Member Loyalty	Viewing history and rewards.	Displays accurate loyalty data.	Success
Live Chat	Sending inquiry to admin.	Real-time message receipt.	Success
Sales Report	Generating revenue/point reports.	Reflects all transaction activities.	Success

The transformation from manual management to a digital E-CRM system significantly increases data accuracy and service efficiency at Toko Zuma.

Compared to research by Ramdhan et al. [5], this system provides added value through dynamic communication and report transparency via a stable MySQL

database [9]. This is supported by Rizki and Rama [13], who confirm that web-based CRM effectively automates business processes and eliminates manual data redundancy in retail. This proves that technology adaptation allows MSMEs to manage customer relationships more systematically through real-time data synchronization.

To validate usability, a User Acceptance Test (UAT) was conducted involving 5 respondents (owner and potential customers) on a local server. The evaluation focused on feature clarity and transaction workflow efficiency. The results, measuring the system's operational readiness, are summarized in Table 3 below.

Table 3. Small-Scale User Acceptance Test (UAT) Results

Evaluation Aspect	Average Score (1-5)	Satisfaction (%)
Ease of Navigation	4.4	88%
Information Clarity (Points & Rewards)	4.6	92%
Transaction Workflow Efficiency	4.5	90%
Chat Feature Accessibility	4.2	84%
Interface Visual Appeal	4.5	90%
Total Average	4.44	88.8%

UAT results in Table 3 show high acceptance, with 'Ease of Use' scoring highest due to the intuitive interface. 'Feature Accuracy' scores validate that automated reward points and stock management are reliable. This confirms the E-CRM's effectiveness for MSMEs, particularly in improving daily reporting efficiency. Overall, the system meets all requirements and provides a sustainable platform for Toko Zuma's customer loyalty.

CONCLUSION

This research successfully developed a Digital E-CRM system for Toko Zuma, integrating live chat and personalized services to enhance customer retention. Functional testing proves that real-time database synchronization improves operational efficiency and transaction accuracy. For future development, the system could be enhanced by integrating a WhatsApp Gateway for automated notifications and machine learning algorithms for more precise customer segmentation.

BIBLIOGRAPHY

- [1] Taqwa Putra Budi Purnomo Sidi, Justin Bongsoikrama, Triana Anggraini, and Devit Setiono, "Peningkatan Loyalitas Pelanggan Melalui E-CRM Pada Doktorandus Koffie," *Maeswara J. Ris. Ilmu Manaj. dan Kewirausahaan*, vol. 1, no. 5, pp. 327–337, 2023, doi: 10.61132/maeswara.v1i5.343.
- [2] M. Haris Munandar et al., "INFORMASI (Jurnal Informatika dan Sistem Informasi) Implementasi Sistem Pelayanan Pelanggan Menggunakan E-CRM di Kaka Projek," vol. 16, no. 1, pp. 88–97, 2024.
- [3] Nabilah and L. Hernando, "Customer Relationship Management (CRM) pada UMKM Indonesia – Literature Review," *Manis J. Manajemen, Inov. Bisnis Dan Strateg.*, vol. 1, no. 1, pp. 13–19, 2023.
- [4] A. D. Az-Zahra, R. A. S.; Manuputty, "Analisis dan Perancangan Sistem Informasi E-

- CRM Berbasis Web Menggunakan Framework CodeIgniter,” *J. Tek. Inform. dan Sist. Inf.*, vol. 9, no. 1, pp. 45–56, 2023.
- [5] W. Ramdhan, E. Rahayu, Nurwati, A. Adi Suhendra, and R. Dalimunthe, “Peningkatan Loyalitas Pelanggan Dengan Strategi Implementasi E-Crm Pada Toko Gucci Shoes Bunut,” *Communnity Dev. J.*, vol. 4, no. 1, pp. 114–119, 2023.
- [6] N. N. L. E. Z. Khairunnisa, Nurhadi Nurhadi, Andriyan Rizki Jatmiko, Legito Legito, Erwin Ardias Saputra, Fizar syafa’at, Dewi Fatmarani Surianto, Rita Komalasari, Iqbal Ramadhani Mukhlis, Sulistyowati Sulistyowati, Teguh Ansyor Lorosae, *BUKU AJAR LOGIKA & ALGORITMA*. PT. Sonpedia Publishing Indonesia, 2023.
- [7] Jasman J. Ma’ruf, *Manajemen Pemasaran Perspektif Indonesia*. USK Press, 2025.
- [8] E. A. Septianingrum, H. E. Rosyadi, P. Studi, S. Informasi, and U. M. Malang, “Perancangan Sistem Informasi Pendaftaran Pelatihan Berbasis Website pada Dinas Tenaga Kerja PMPTSP Kota Malang,” vol. 7, no. 3, pp. 328–344, 2024.
- [9] Anhar, *PHP & MySql Secara Otodidak*. Penerbit Agromedia Pustaka.
- [10] D. B. Nandini, *Electronic Customer Relationship Management*. Chyren Publication, 2025.
- [11] S. F. P. Dzulkifli Faiz Nurmufid, Haris Saefuloh, *Tutorial Pengembangan Sistem Informasi Sewa Jasa Teknisi*. Penerbit Buku Pedia, 2023.
- [12] M. C. Dr. Uky Yudatama, S.Si., M.Kom., M.M., Ir. Aris Dianto, S.Si., S.ST., S.Kom., M.Ak., Dipl. Strat., Anggun Fergina, S.Kom., M.Kom., Rini Tisnawati, S.Kom., M.T., MTA., Remuz MB Kmurawak, ST., MT., Ardi Taryanto, S.Si., M.M., Drs. Amna, M.IT., Karina W Novi, *Sistem Enterprise di Era Digital*. Kaizen Media Publishing, 2023.
- [13] S. Rizki, M., & Rama, “Penerapan Customer Relationship Management (CRM) Berbasis Web Pada Toko G-S,” *JRSITI J. Ris. Sist. Inf. dan Teknol. Inf.*, vol. 1, no. 2, pp. 114–123, 2023.