Jurnal Ekonomi
Volume 13 , Number 02, 2024, DOI 10.54209/ekonomi.v13i02
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

Optimizing Customer Engagement: Agile CRM Development In The Restaurant Industry

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Article Info
Keywords:
CRM,
Extreme Programming,
Agile,
Restaurant.

ABSTRACT
This study examines implementing Agile methods in Customer Relationship Management (CRM) development for the restaurant industry, focusing on optimizing customer engagement. The development stages include system requirement analysis, application development using Extreme Programming (XP) method, and functional testing and user evaluation. The study aims to enhance operational efficiency and customer interaction in the context of the restaurant business. The Agile method emphasizes team collaboration, rapid iterations, and continuous testing to produce an adaptive and responsive CRM application. The user evaluation results provide valuable feedback for system improvement and quality enhancement before the official launch. This research significantly contributes to information technology development and supports more effective and competitive business strategies in the restaurant industry.

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INTRODUCTION

The restaurant industry is one of the highly dynamic sectors in the global economy, continually evolving in line with changing consumer trends and technology. In this context, marketing strategies and customer management play an increasingly crucial role in ensuring the sustainability and success of restaurant businesses. In particular, optimizing customer engagement has become a primary goal for stakeholders in this industry. Customer Relationship Management (CRM) has emerged as a reliable approach to building and maintaining effective customer interactions(Khan & Ghouri, 2018; Omar et al., 2016; Wang et al., 2017). CRM enables restaurants to understand customer preferences, respond quickly to feedback, and create personalized and satisfying consumer experiences. However, successful CRM implementation requires a flexible and adaptive approach, especially considering the rapid dynamics in the restaurant industry.

Agile methods have proven effective in software development in addressing challenges related to changing needs and fast-paced requirements(Al-Saqqa et al., 2020; Dingsoeyr et al., 2019; Dingsøyr et al., 2012; Santos et al., n.d.; Serrador & Pinto, 2015; Shrivastava & Rathod, 2014). By emphasizing strong team collaboration, shared responsibility, and rapid iterations, the Agile approach remains relevant in CRM development for the restaurant

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industry. The main objective of this research is to explore and analyze how the application of Agile methods in CRM development can optimize customer engagement in the restaurant industry. By understanding best practices, challenges faced, and benefits gained from using Agile methods in this context, this research aims to contribute valuable insights to the literature and practices of adaptive software development.

The decision to select the restaurant industry as a case study is highly relevant considering the complexity associated with interactions among customers, employees and unique operational processes in restaurant environments. Responsive and adaptive CRM is expected to help restaurants enhance customer engagement, strengthen business relationships, and achieve competitive advantage in a competitive market. While existing research highlights the benefits of Agile method implementation in software development in general(Abusaeed et al., 2023; Altuwaijri & Ferrario, 2022; Behutiye et al., 2022; Dingsøyr & Lassenius, 2016; Gutierrez et al., 2019; Hinderks et al., 2022; Kantola et al., 2022; Ouriques et al., 2023; Persson et al., 2022; Sarhadi et al., 2022), there still needs to be more information regarding its application, specifically in CRM development for the restaurant industry. Therefore, this research adds significant value in filling this knowledge gap. By better understanding how Agile methods can be optimized in the context of CRM development for restaurants, this research is expected to provide valuable guidance for practitioners and academics in improving adaptive and responsive software development strategies to changes.

METHODS

This research consists of three main stages, as shown in Figure 1: user needs analysis, application development using Extreme Programming (XP) method, functional testing, and user evaluation. The research begins with an in-depth analysis of CRM system requirements for the restaurant industry, including identifying key features such as customer management and data analysis. Subsequently, application development uses the Extreme Programming (XP) methodology, emphasizing team collaboration and continuous testing. The final stage involves functional testing to verify system performance and user evaluation to ensure the usability and responsiveness of the developed CRM application. Thus, this research aims to optimize customer engagement by developing an adaptive and responsive CRM system for the restaurant industry.

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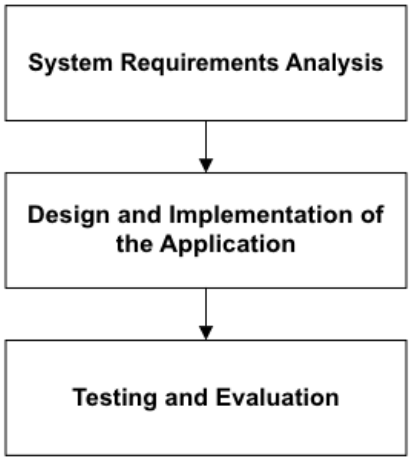

Figure 1. Research Stages

System Requirements Analysis

In the system requirements analysis stage, the primary focus is to deeply understand the need to develop a CRM system for the restaurant industry. The initial step involves a literature review encompassing recent research and best practices in CRM development. Intensive interviews are also conducted with restaurant owners, managers, and relevant staff to gain a comprehensive perspective on system needs. The requirements analysis process includes identifying essential features and functionalities such as customer management, order tracking, customer data analysis, and integration with other systems existing in the restaurant.

Application Development

Once the system requirements are identified, the next stage is to develop the CRM application using the Extreme Programming (XP) approach. The development team collaboratively works and follows Agile methodology, focusing on iterative development and sprint-based approaches. Creating user stories and sprint planning is crucial for XP to ensure focused and efficient development. Unit testing is continuously performed throughout the development process to ensure code quality and early detection of potential bugs or issues.

Functional Testing and User Evaluation

After the CRM application is developed, the next step is to conduct functional testing and user evaluation. Functional testing aims to verify if the system functions according to the predefined specifications, while integration testing ensures the system integrates with other systems in the restaurant. User testing involves restaurant staff and management testing the usability of the CRM application and providing feedback on user experience and system performance. Careful user evaluation identifies areas for improvement and ensures that end users can effectively use the application.

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RESULTS AND DISCUSSION

System Requirements

CRM system requirements analysis involves identifying critical functional and non-functional requirements to optimize customer engagement. Identified functional requirements include efficient and responsive customer management, accurate order tracking, customer data analysis for valuable insights, seamless integration with other systems like order management systems, and an intuitive and user-friendly interface. Additionally, identified non-functional requirements include high data security, maximum system availability, responsive performance, and reliable scalability to support restaurant business growth and development.

Thus, the system requirements analysis stage results provide a solid and detailed foundation for developing a CRM system that can deliver significant value to the restaurant industry. An in-depth understanding of customer needs, best practices in software development, and potential challenges helps ensure that the developed system can optimize customer engagement, improve operational efficiency, and strengthen the restaurant's competitive advantage in a competitive market.

Table 1 provides a clear overview of the requirements to be addressed in developing a CRM system for the restaurant industry, the challenges in meeting these requirements, and the expectations and desires of each stakeholder regarding the system to be developed.

Table 1. Data Collection Results

Stakeholder	Key Needs Addressed	Challenges Addressed	Expectations and Desires
Restaurant Owner	Efficient and responsive customer management	Limited time and resources for customer management	Expectations for a system that enhances customer loyalty, boosts sales, and provides valuable insights for strategic decision-making
Restaurant Manager	Accurate order tracking	Complexity of order processes and inventory management	Expectations for a system that simplifies order and inventory management, improving operational efficiency
Related Staff	In-depth customer data analysis	Limited access and data analysis skills	Expectations for a system that provides useful insights for strategic decision-making in customer service and marketing
System Integrator	Seamless integration with other systems	Technical compatibility between different systems	Expectations for a system that seamlessly connects with other systems without technical hindrances
End Users	Intuitive and user-friendly interface	Lack of user training and interface complexity	Expectations for a smooth and intuitive user experience in using the CRM system

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Application Development

The project planning stage is a vital foundation in application development using the Extreme Programming (XP) methodology. The development team collaborates with stakeholders to establish a clear product vision, elaborate detailed user stories, and design a structured development plan based on sprints. In the context of the restaurant industry, a comprehensive product vision should encompass fundamental operational needs and emphasize personalized and responsive customer experiences.

Clear role assignments and responsibilities within the development team are crucial in the XP approach. This includes the role of the Product Owner, responsible for developing a product that meets stakeholder needs; the Scrum Master, facilitating collaboration and communication within the team; and the Development Team, actively involved in iterative development and unit testing. Strong collaboration and effective communication among team members ensure alignment in achieving project goals.

Sprint-based development in XP allows the team to quickly respond to changing needs and rapidly deliver added value to users. In CRM development for the restaurant industry, iterations focus on developing features that can enhance operational efficiency, such as integration with ordering systems or in-depth customer data analysis. Each sprint allows developers to test and adapt new features, directly responding to user feedback.

The application features are presented in Table 2, outlining the functionalities available in the restaurant inventory management application to assist users in efficiently and effectively managing inventory.

Table 2. Features

Application Feature	Application Function
Customer Management	Manage customer information, purchase history, preferences, and other activities to enhance customer relationships.
Order Tracking	Track order statuses from placement to delivery, ensuring timeliness and customer satisfaction.
Data Analysis	Analyze customer and transaction data to provide valuable insights for decision-making.
System Integration	Integrate with other systems such as order systems, inventory, or payments for data coherence.
Notifications	Send notifications to customers about offers, promotions, or order updates to enhance engagement.
Performance Analysis	Monitor and evaluate restaurant performance based on sales data, customer satisfaction, and other metrics.
Reporting	Generate reports on business performance, sales trends, and data analysis for development strategies.

Table 2 encompasses key features in application development using the Extreme Programming (XP) methodology, along with the functions and roles of each feature in supporting the development of an adaptive and responsive CRM application for the restaurant industry.

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The Entity-Relationship Diagram (ERD), depicted in Figure 2, illustrates the complex data structure for developing Customer Relationship Management (CRM) in the restaurant industry. Major entities such as Restaurant, Customer, Reservation, Table, Order, Menu, Order Item, and Feedback are interconnected through foreign keys, enabling the storage of in-depth information regarding restaurant operations and customer interactions. For instance, through the Reservation entity, the system can track customer reservations, assign available tables, and monitor reservation status. Similarly, the Order entity represents customer order details, including ordered items and total order price. Information stored from the Customer entity, such as registration and last visit dates, can provide valuable insights into customer habits and preferences. By leveraging a well-organized ERD structure, the CRM system can optimize customer experience, operational management, and marketing strategies in the restaurant industry.

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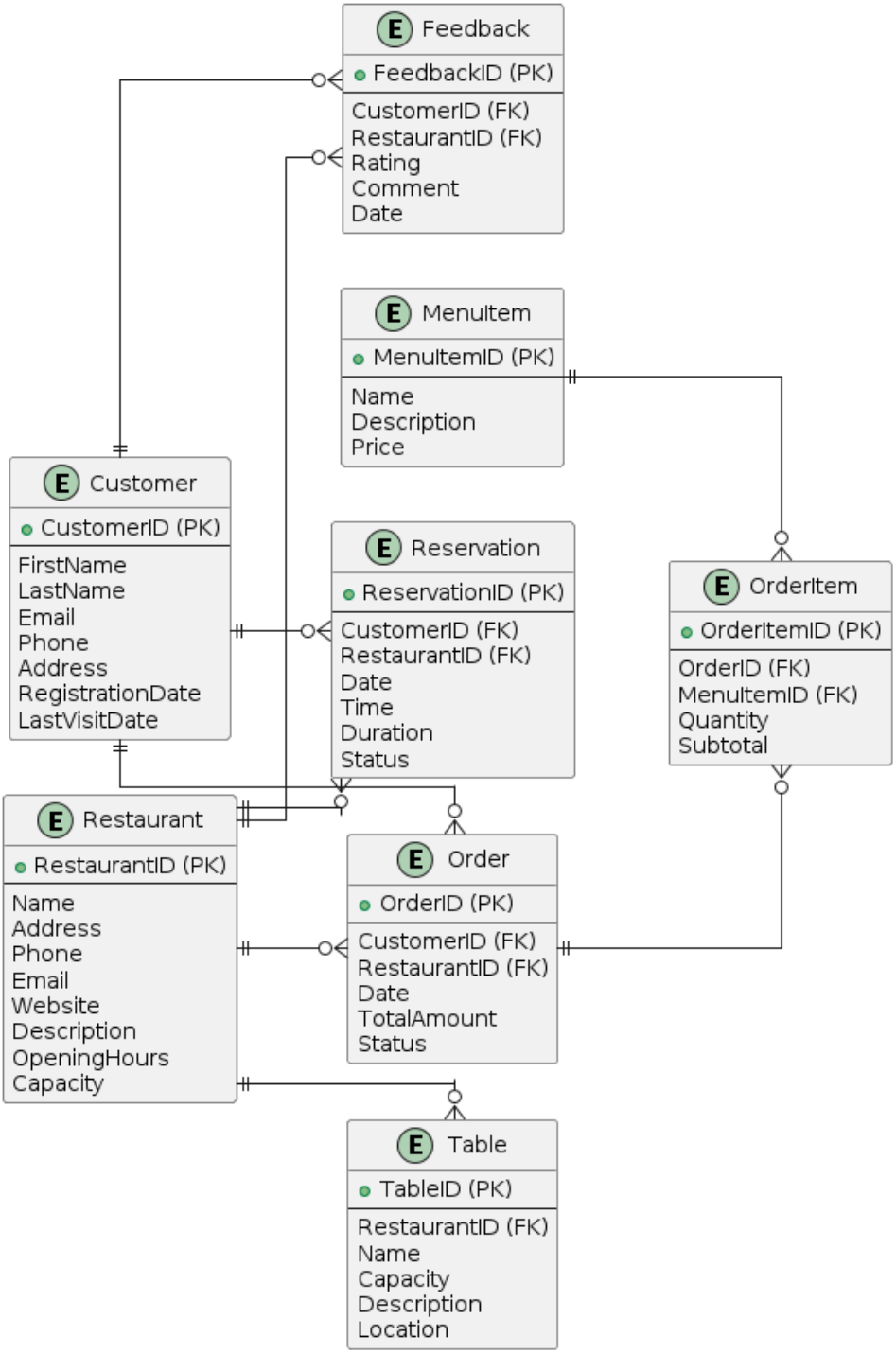

Figure 2. ERD

User Acceptance Evaluation

After the CRM application has been developed, the subsequent crucial phase is the user acceptance evaluation and functional testing phase. Functional testing is conducted to verify the system's performance against predefined specifications, including key features such as

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customer management, order tracking, and customer data analysis. Additionally, integration testing is also a significant focus, where the CRM system is tested to ensure smooth integration with other systems within the restaurant, such as order management systems or payment systems, to ensure efficient and accurate data flow. The next stage involves user testing, involving participation from representative users such as restaurant staff and management. They will test the CRM application in real-world scenarios, providing feedback on user experience, interface navigation, and overall system performance. User evaluation is then conducted to analyze and understand the feedback provided, identify areas for potential improvement, and ensure that end users can effectively use the CRM application. The results of this phase will serve as the basis for refining and enhancing the quality and usability of the CRM application before its official launch to end users.

CONCLUSION

This study involves the development stages of a CRM application for the restaurant industry using Agile methodology. System requirement analysis was conducted to identify critical features and functionalities needed to optimize customer engagement. Application development used Extreme Programming (XP) methodology, emphasizing team collaboration, rapid iterations, and continuous testing. Functional testing and user evaluation phases were conducted to verify system performance, integration with other systems, and CRM application usability. Research findings indicate that implementing Agile methodology in CRM development for the restaurant industry can enhance operational efficiency, improve customer interactions, and provide a better user experience. User evaluation provided valuable feedback to enhance system quality and usability before its official launch. Thus, this study significantly contributes to information technology development for the restaurant industry, supporting adaptive and responsive business strategies.

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