

Enhancing Service Quality And Operational Efficiency In Restaurants Through Agile-Based Vendor Management Systems

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Article Info	ABSTRACT
<p>Keywords: Vendor Management, Extreme Programming, Service Quality, Operational Efficiency.</p>	<p>This research addresses the development of Agile-based vendor management systems within the context of the restaurant industry. The main problem discussed is the challenges in vendor management that affect service quality and operational efficiency in restaurants. The research methodology includes system requirement analysis, application design and implementation, and system testing and evaluation. The research findings indicate that a deep understanding of the needs and challenges in vendor management can result in a responsive and effective system. Integrating key features such as vendor registration, vendor performance tracking, inventory management, and reporting functions has improved restaurant service quality and operational efficiency. The contribution of this research lies in a better understanding of the development of Agile-based vendor management systems and their application in enhancing overall restaurant performance.</p>
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INTRODUCTION

The restaurant industry possesses unique service provision and operational management characteristics. In this context, service quality and operational efficiency are two crucial factors that significantly impact the success and competitiveness of restaurants. High service quality can enhance customer satisfaction, strengthen loyalty, and generate positive recommendations (Muller, 1999; Omar et al., 2016; Santiago et al., 2024; Suginochi & Mizuyama, 2022; Wang et al., 2017). On the other hand, efficient operational management helps restaurants manage resources more effectively, increase productivity, and reduce operational costs (Hakim et al., 2021; Pilar Opazo, 2012; Staley & Jucker, 2021).

However, vendor management is the main challenge restaurants face in enhancing service quality and operational efficiency. Vendor management encompasses the selection, management, and evaluation processes of suppliers or service providers that contribute to the restaurant's operations. In this context, developing a vendor management system ensures consistent service quality and efficient operations. The Agile approach has proven effective in software development and information systems across various industries (Abusaeed et al., 2023; Altuwaijri & Ferrario, 2022; Leong et al., 2023; Pérez-Piqueras et al., 2023; Sarhadi et al., 2022; Senabre Hidalgo, n.d.; Udvaros et al., 2023; Wiechmann et al., 2022). This

methodology emphasizes strong collaboration between development teams and stakeholders, rapid iterations, and responsiveness to changing requirements. However, the application of Agile in developing vendor management systems for restaurants still needs to be improved and requires further research (Almeida et al., 2022; Bomström et al., 2023; Dingsoeyr et al., 2019; Najihi et al., 2022; Rindell et al., 2021).

Given this background, this research aims to investigate the potential use of the Agile approach in developing vendor management systems to enhance service quality and operational efficiency in restaurants. By leveraging Agile principles, it is expected to create a responsive system that is easily adaptable to changing needs and capable of delivering significant value to restaurants. This research is also significant considering the rapid advancement of information technology, especially in the context of cloud-based applications, data analytics, and system integration. Integrating Agile-based vendor management systems with cutting-edge technologies can give restaurants a significant competitive advantage in the increasingly competitive culinary industry.

Furthermore, this research is expected to contribute theoretically and practically to Agile-based software development. By applying Agile principles in the vendor management context, this research can significantly contribute to understanding the best practices for managing and enhancing service quality and operational efficiency across various industry sectors. Within the Agile framework, critical aspects such as rapid iterations, adaptation to changing requirements, effective communication between development teams and stakeholders, and continuous testing will be the primary focus in developing restaurant vendor management systems. Thus, this research provides practical guidance for restaurants in implementing Agile-based vendor management systems to enhance their service quality and operational efficiency.

METHODS

The three main stages in developing an Agile-based vendor management system for restaurants include system requirement analysis, application design and implementation, and testing and evaluation, as shown in Figure 1. The system requirement analysis phase aims to gather in-depth information from restaurant owners, managers, and staff to design the system's functionalities and features. Subsequently, the application design and implementation stage involves creating a robust architectural design and implementing the application based on the established requirements, using Agile methodologies to ensure responsive development focused on user needs. The testing and evaluation phase is conducted to ensure the quality and performance of the developed system through unit testing, integration testing, and user acceptance testing involving real users from restaurants. The results from this phase serve as the basis for making improvements and iterations before conducting a comprehensive evaluation of the system's effectiveness in enhancing service quality and operational efficiency in restaurants.

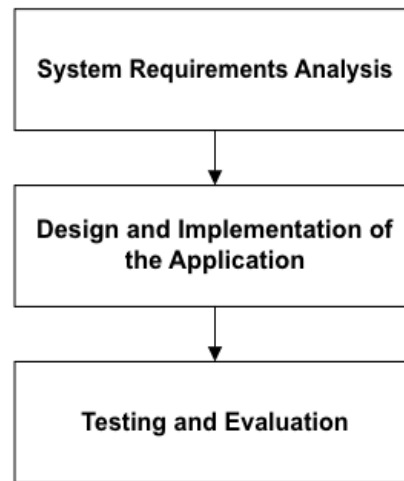


Figure 1. Research Stages

System Requirement Analysis

System Requirement Analysis During this phase, thorough information about the vendor management system's restaurant needs is collected. Interviews and surveys are carried out with restaurant owners, managers, and staff to understand the existing vendor management processes and identify issues that must be addressed. The gathered data is then analyzed to generate user stories and detailed use cases, which will be the foundation for designing the system's functionalities and features.

Application Design and Implementation

Application Design and Implementation Once the system requirements are clearly defined, the next step is to design and implement the application based on those requirements. An architectural design is created to ensure the system has a solid structure and can evolve effectively. Using Agile methodologies such as Scrum or Kanban, development tasks are organized into focused sprints, allowing for gradual and responsive system development to accommodate changing needs. Throughout this process, the development team collaborates with stakeholders to ensure the system can deliver solutions that meet expectations and fulfill user needs effectively.

Testing and Evaluation

Testing and Evaluation After the application is implemented, the next stage involves comprehensive testing and Evaluation. Unit testing is conducted to ensure each system component functions individually and appropriately. Integration testing is performed to verify the overall system performance and interface interactions with other systems. User acceptance testing (UAT) involves real users from restaurants to evaluate the system's performance in scenarios similar to real-world situations. The results of these tests are used as a basis for iterating and improving the system before conducting a comprehensive evaluation of its effectiveness in enhancing service quality and operational efficiency in restaurants.

RESULTS AND DISCUSSION

User Needs Analysis

During the System Requirement Analysis phase, a series of activities were conducted to comprehensively understand the vendor management system's needs within the context of the restaurant industry. The first step involved interviews and surveys with restaurant owners, managers, and staff to systematically gather detailed information regarding inventory management, purchasing processes, supplier relationships, and system integration requirements. Subsequently, existing vendor management processes and systems were thoroughly evaluated to identify potential issues and areas needing improvement. The findings from this analysis formed the basis for creating user stories and use cases, which were used to delineate the system's functionalities and features in greater detail. During this stage, close collaboration with stakeholders was paramount to prioritize requirements, formulate a clear system vision, and ensure system development could deliver significant value aligned with stakeholder expectations and needs. Thus, the System Requirement Analysis phase played a pivotal role in laying a solid foundation for developing an effective and responsive vendor management system tailored to the needs of the restaurant industry.

The stakeholder analysis for the development of vendor management systems in the restaurant industry reveals a diverse range of needs, challenges, and expectations that must be considered as shown in Table 1. Restaurant owners seek efficiency in inventory management to address discrepancies, while restaurant managers aim for simplified procurement workflows and improved supplier management. Restaurant staff require efficient communication channels with suppliers, and customers expect consistent product availability and assured quality. The IT team seeks a scalable and adaptable system architecture, while the finance team prioritizes cost-effective procurement and vendor management. Overall, this analysis underscores the importance of understanding stakeholders' varied needs and expectations in developing an effective and responsive vendor management system tailored to the needs of the restaurant industry.

Table 1. Data Collection Results

Stakeholder	Key Needs Addressed	Challenges Addressed	Expectations and Desires
Restaurant Owners	Efficient inventory management	Identifying and rectifying inventory discrepancies	Improved inventory tracking and reduced operational inefficiencies
Managers	Streamlined purchasing processes	Managing multiple suppliers and orders	Simplified procurement workflows and better supplier management
Staff	Seamless supplier communication	Coordination and communication gaps	Clear and efficient communication channels with vendors
Customers	Consistent product availability and quality	Varied demand and supply fluctuations	Enhanced customer experience through reliable supply and quality products

Stakeholder	Key Needs Addressed	Challenges Addressed	Expectations and Desires
IT Team	Scalable and adaptable system architecture	Integration complexities and system scalability	Flexible and scalable system architecture to accommodate future needs
Finance Team	Cost-effective procurement and vendor management	Budget constraints and cost fluctuations	Efficient cost management and optimization of vendor relationships

Design and Implementation

The Design and Application Implementation phase outcomes involve several crucial steps in developing an Agile-based vendor management system using Extreme Programming (XP) methodology for restaurants. Firstly, an architectural design is developed, considering scalability, flexibility, and integration with other restaurant systems. This design aims to create a system capable of handling increasing demands, adapting to changing requirements, and seamlessly integrating with existing restaurant systems to support smooth operations. Next, wireframes, mockups, and prototypes are created to visualize the system's user interface (UI) and user experience (UX). This step is essential to ensure the system's interface is intuitive, user-friendly and aligns with user expectations and industry standards. Extreme Programming (XP) methodology organizes development tasks into short iterations (sprints) and prioritizes feature implementation based on user feedback and stakeholder input. This approach allows for iterative system development, focusing on continuous improvement and ensuring the system meets evolving user needs. Close collaboration with developers, designers, and stakeholders is maintained to implement the system iteratively, focusing on delivering functional software incrementally. This collaborative effort ensures the system is developed efficiently and aligns with stakeholder requirements and expectations. Lastly, essential features such as vendor registration processes, vendor performance tracking, inventory management, and reporting functionalities are integrated into the system, as shown in Table 2. This step aims to ensure that the system provides comprehensive vendor management capabilities and effectively meets restaurants' operational needs.

Table 2. Features

Feature	Function
Vendor Registration	Allows the registration of new vendors into the system, inputting information such as name, contact details, product category, and collaboration terms.
Vendor Performance Tracking	Provides mechanisms to track vendor performance based on criteria such as product quality, delivery time, and compliance with contracts.
Inventory Management	Enables efficient inventory management, including addition, subtraction, and monitoring of available product stock.
Reporting Functionality	Provides the capability to generate reports related to vendor performance, inventory, purchases, and other relevant metrics to restaurant operations.

Feature	Function
Purchase Order Management	Facilitates the management of purchase orders to vendors, including order creation, status monitoring, and confirmation of goods receipt.
Supplier Communication	Provides efficient communication channels between the restaurant and vendors, including order notifications, information requests, and transaction clarifications.
Invoice Management	Enables management of vendor invoices, including receipt, verification, and electronic or manual payment as needed.

Table 2 displays the features of the restaurant reservation system, highlighting six key features, including reservation management, customer notifications, payment integration, performance reporting, table management, and data analysis. These features provide convenience in reservation management, customer communication, payment transaction efficiency, operational performance analysis, table usage optimization, and data-driven decision-making. Thus, the restaurant reservation system enhances internal efficiency, improves customer experience, and supports more strategic management based on solid data and analysis.

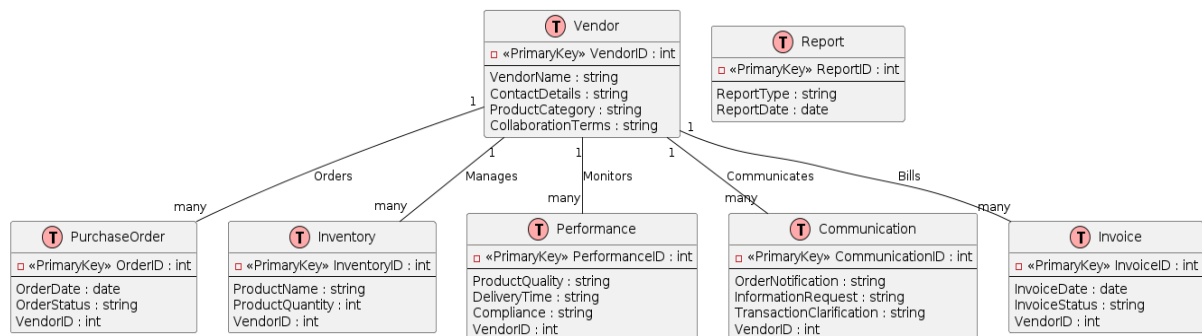


Figure 3. ERD

The ERD, as shown in Figure 3, illustrates the structured relationship among entities in an Agile-based vendor management system tailored for the restaurant industry. The Vendor entity is a central point linked in a "1 to many" relationship with purchase order, Inventory, Performance, Communication, and Invoice entities, showcasing the multifaceted interactions with vendors. Core functionalities include Purchase Orders managing purchase orders, Inventory tracking product inventories, Performance monitoring vendor metrics, Communication facilitating vendor communication, and Invoice managing billing processes. Data integrity measures are ensured with primary keys in each entity and well-defined foreign vital relationships, maintaining referential integrity. This ERD enables efficient tracking, reporting, and management of vendor-related activities critical for optimizing restaurant operations and vendor relationships.

User Acceptance Evaluation

The testing and evaluation phase results are crucial in examining and assessing an Agile-based vendor management system. Initially, unit testing is conducted to ensure the functionality of each component and module individually, aiming to guarantee the quality and

integrity of the system's functionality as a whole, with results that work as intended. Subsequently, integration testing is performed to validate the interaction and interoperability of various modules within and with external systems. User Acceptance Testing (UAT) involving actual users from restaurants becomes a pivotal step in evaluating usability, functionality, and system performance in a realistic environment, ensuring that the system meets users' expectations and requirements effectively. Following the UAT session, user feedback and identified issues serve as the basis for iterative improvements towards a more optimal system. A comprehensive evaluation of the system's effectiveness in enhancing service quality and operational efficiency is conducted by comparing critical metrics before and after system implementation, subsequently documented to provide insights for further improvements and future iterations of the Agile-based vendor management system.

CONCLUSION

This research has yielded a profound understanding of developing Agile-based vendor management systems for the restaurant industry. The stages of system requirement analysis, application design and implementation, and testing and evaluation were conducted using a structured methodology responsive to user needs. The results of the system requirement analysis indicate that a comprehensive understanding of the needs and challenges in vendor management in the restaurant industry can form a solid foundation for developing a responsive and effective system. Stakeholder analysis also provides a clear overview of their needs, challenges, and expectations regarding the system under development. Moreover, integrating key features such as vendor registration, vendor performance tracking, inventory management, and reporting functions into the system ensures significant benefits in improving service quality and operational efficiency in restaurants. Furthermore, comprehensive testing and evaluation have validated the quality and performance of the system, with user acceptance testing (UAT) ensuring that the system meets user expectations and needs. Evaluating the system's effectiveness by comparing critical metrics before and after implementation provides valuable insights for further improvements and future Agile-based vendor management system iterations. In conclusion, this research significantly contributes to developing responsive and effective vendor management systems to enhance service quality and operational efficiency in the restaurant industry.

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