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Research Article [OPEN ACCESS]

Sales Management System with Rapid Application Development and PIECES Approach

Nola Ardelia Al-Qadr*, Rice Novita, Tengku Khairil Ahsyar, Zarnelly Zarnelly

ABSTRACT

In this era of rapid technological advancement, the computer business plays a crucial role in providing goods and services to meet societal needs. However, Andalas Computer, despite offering a diverse range of products and services, faces challenges in its sales process and stock management, which still rely on manual methods. This study aims to develop a sales management system to facilitate the company's sales. By employing the Rapid Application Development (RAD) method, system requirements analysis can be addressed with feedback from users. This research utilizes PIECES analysis to identify opportunities from various aspects. The study results in a sales management system tailored to user needs. System testing was conducted using blackbox testing, followed by user acceptance testing to gauge user reception of the system. The results of the testing showed a positive acceptance rate of 90%.

Keyword: Rapid application development, PIECES, sales management system

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Corresponding Author: Nola Ardelia Al-Qadr, Department of Information System, Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia, nolaardeliaa@gmail.com
Authors: Rice Novita, Department of Information System, Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia, rice.novita@uin-suska.ac.id; Tengku Khairil Ahsyar, Department of Information System, Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia, tengkukhairil@uin-suska.ac.id; Zarnelly Zarnelly, Department of Information System, Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia, zarnelly@uin-suska.ac.id

1. INTRODUCTION

In this era of rapidly advancing technology, businesses in the computer sector play an increasingly important role in providing goods and services that meet societal needs. Technological advancements have become an unavoidable aspect of daily life, continually evolving and impacting all areas of life, including social, political, cultural, and economic aspects (Susanto et al., 2020). Andalas Computer is a sole proprietorship that offers computer sales and repair services. The average monthly revenue of Andalas Computer is 50 million rupiahs, with the largest income generated from the sales of monitors, CPUs, and printers.

However, despite having a wide range of products and services, Andalas Computer still faces several operational challenges. One of the main issues is the maintenance of a classic touch in the sales and transaction accounting processes, particularly in the preparation of sales reports. This results in a lengthy report completion time. Additionally, sales transaction data is recorded in notebooks and then transferred to Microsoft Excel. This repetitive process creates opportunities for data manipulation by irresponsible parties. Another issue is that to check the remaining stock, staff must visit the storage area first. The difficulty in checking stock significantly impacts business processes. These challenges lead to inaccurate information being produced by the company.

Previous research highlights the importance of implementing systems to aid sales operations. In the context of businesses, technology and information systems are closely related to management practices (Al Muhtadi & Junaedi, 2021; Hendri et al., 2022). Therefore, developing a sales management system is crucial for Andalas Computer to address challenges and enhance business performance. The use of management systems has been proven to positively contribute to organizations, particularly in company management (Syukron & Purwaningsih, 2020). The issues faced by Andalas Computer indicate the need for an automated system to calculate the number of items sold. This information is vital for managing inventory and making informed decisions regarding stock planning, reordering, and sales strategies. Accurate and timely information is essential for assisting organizations in decision-making processes (Sudjiman & Sudjiman, 2018).

In this study, a sales management system will be developed using the Rapid Application Development (RAD) method. The goal of RAD is to shorten the development time and produce a system that can be quickly and accurately implemented (Panja & Manongga, 2023). RAD focuses on developing the system in a short period by extensively involving users to utilize a series of effective system constructs or prototypes (Susilo et al., 2023). This study aims to build a sales management system that will assist the company in better managing its sales operations. Sahdilla (2021) explains that a sales management system facilitates financial transaction calculations, aids in budget and inventory checks, and simplifies the creation of reports needed by the company. By using RAD, the developed system can generate reports quickly and accurately, as well as streamline the transaction process.

2. MATERIALS AND METHODS

2.1 Software Development Method

This study employs the Rapid Application Development (RAD) approach. RAD refers to a software development process methodology that uses an object-oriented approach (Ramadhan & Purwandari, 2018). This approach combines prototyping techniques and application development methods simultaneously to accelerate the system development process (Mansur & Azahra, 2023). RAD is chosen because it offers several advantages over other software development methods. These advantages include a shorter development cycle, high flexibility, extensive user involvement, and the ability to minimize errors during the development process (Hasanah & Untari, 2021).

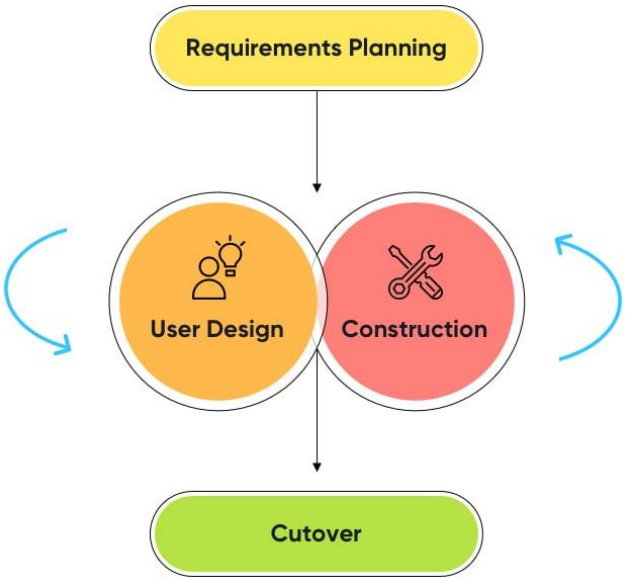

Figure 1. Rapid application development cycle
Source: (Tigosolutions.com, 2022)

Figure 1 illustrates the steps used to develop the system in this study:

1. Requirements Planning
   This stage involves determining the system's needs, including developing objectives, system constraints, and alternative problem solutions. This process requires identifying information needs and the problems faced (Kaban et al., 2022). The goal is to identify system behavior and activities within the system.
2. User Design
   This stage involves creating prototypes that are then validated by users, making them ready for further system development. The main activity in this stage is engaging users to provide feedback on the prototypes.
3. Construction
   In this stage, coding and testing of system components are conducted based on development iterations and user feedback. User Acceptance Testing (UAT) and Blackbox Testing are the methodologies used for testing.
4. Cutover
   This stage involves deploying the operational system that meets user and business needs and planning for ongoing maintenance. Maintenance and improvements are carried out based on user feedback after implementation.

2.2 Data Collection and System Requirement Analysis

Data collection and system requirement analysis are conducted through a systematic series of stages to ensure that the developed system aligns with user needs. Here is a systematic explanation of each step undertaken:

1. Requirements Analysis
   The preliminary analysis stage is performed to identify the service needs that must be met by the system (Foster & Towle, 2021; Thayer, 2002). This is realized in the form of specific inputs and behaviors focused on future-required conditions (Rahmawati & Bachtiar, 2018). In this study, requirement analysis is conducted through interviews with Andalas Computer's management and direct observation to understand ongoing business processes and formulate desired outcomes.
2. System Design
   The system design development process is carried out incrementally until the desired outcomes are achieved (Kustanto & Chernovita, 2021). This activity includes creating UML diagrams such as Use Case Diagrams and Class Diagrams. UML diagrams are used to illustrate the roles and responsibilities of actors directly involved in the system, as outlined in Table 1.

Table 1. Description of actors

No.	Actors	Description
1	Administrator	An administrator has full access to the system. They can monitor financial dashboards and manage user, employee, user account, and item data.
2	Cashier	A cashier is granted access to perform sales transactions (entering ordered items into the cart, processing payments, and issuing receipts), and generating sales reports.
3	Treasurer	A treasurer is granted access to view financial dashboard graphs, manage income and expenditure transactions including their reports, oversee employee salaries, manage receivables and payables, and generate employee payroll reports.
4	Manager	A leader or manager is granted access to view financial dashboard graphs, sales reports, income and expenditure transaction reports, and employee payroll reports.

3. System Implementation
   System implementation explains the process of constructing the entire system based on previously developed designs. In this study, system implementation includes creating login pages, admin pages, cashier pages, treasurer pages, and manager pages.

4. Testing
   Testing is conducted to evaluate whether the previously established functional and data requirements have been met (Anand & Uddin, 2019; Desai & Srivastava, 2016; Honest et al., 2019). This testing also includes UAT to measure the level of user approval for the system developed for Andalas Computer's sales information system.

3. RESULTS AND DISCUSSION

3.1 PIECES analysis

The PIECES analysis aids managers in comprehensively understanding critical aspects that influence the performance and value of an information system. By considering each PIECE'S element, organizations can identify areas where improvements or changes are needed to enhance the benefits of the information system for the company. PIECES analysis considers several aspects:

1. Performance
   Several issues, such as the financial recording and sales processes at Andalas Computer, are suboptimal. The primary issue is the lengthy time required to complete these processes, resulting in delays in presenting income and expenditure reports. Additionally, frequent errors in recording and reporting affect the accuracy and reliability of the financial information presented.
2. Information
   Current manual recording activities inadequately produce quality financial and sales information. The limitations of manual activities lead to less relevant, inaccurate, and often delayed information. Steps to improve information quality include understanding information needs, designing appropriate data structures, and automating transaction recording processes.
3. Economic
   The old system incurs significant costs in compiling sales and financial reports due to manual processes.
4. Control
   Control measures are necessary to enhance system performance, identify errors, and minimize risks. Controls also ensure the security of information and data.
5. Efficiency
   Efficiency involves utilizing resources to reduce paper and book wastage in report generation. The use of computer systems is expected to enhance data processing speed and minimize information delays.
6. Service
   The system development at Andalas Computer aims to improve service by delivering sales and financial information faster, accurately, and with higher quality, meeting user needs.

3.2 As-is and To-be Analysis

System analysis involves dissecting information system components within an organization or company. Its objective is to identify obstacles, establish requirements, and design improved solutions or developments aligned with technological advancements. Observations and interviews were conducted with Andalas Computer's administrators to identify several issues in the sales process and company management. The sales process is still carried out manually, especially in the time-consuming task of generating sales reports. Manual recording of sales transaction data and the use of Microsoft Excel for data transfer create potential for data manipulation. Moreover, manual stock checking complicates access and accurate data retrieval. Consequently, difficulty in obtaining precise information poses a challenge in their operational endeavors.

Based on the current system analysis, several recommendations for developing a new system have been proposed. The proposed sales information system will automate financial management at Andalas Computer, encompassing the management of incoming and outgoing funds as well as company sales transactions. This approach is expected to enhance operational efficiency and improve the effectiveness and

convenience of company management control.

3.3 Functional Requirements

Here are several tasks that can be performed on the suggested system in this study:

1. The system features a login functionality allowing administrators, cashiers, treasurers, and management to enter usernames and passwords. Limiting user access permissions to the system is another use of this feature.
2. Administrators can view financial dashboards, manage product data, account data, employee data, user data, and sales reports. Admins can also change passwords.
3. In addition to performing sales operations (such as adding ordered items to the cart, processing payments, and sending proof of payment for goods), cashiers can also generate sales reports and reset passwords.
4. Treasurers can view financial dashboard graphs, manage income and expenditure transactions up to their reports, manage employee salaries, manage receivables and payables, and generate employee salary reports, as well as change passwords.
5. Managers can view financial dashboard graphs, sales reports, income and expenditure transaction reports, employee salary reports, and change passwords.

3.4 Features of the Developed System

Based on the design process, the Andalas Computer sales system will include the following features:

1. Restricted Access
   The system will have restricted access. Users with access to the database include administrators, cashiers, treasurers, and managers.
2. Data Management by Administrator
   Administrators will be responsible for managing product data, account data, user data, and sales reports.
3. Data Management by Cashier
   Cashiers can perform sales transactions and generate sales reports.
4. Data Management by Treasurer
   Treasurers can manage income and expenditure transactions and their reports, manage employee salaries, manage receivables and payables, and generate employee salary reports.
5. Monitoring by Manager
   Managers can view sales reports, income and expenditure transaction reports, and employee salary reports.
6. Inventory Information
   The system facilitates users by providing a page displaying the available stock quantities in the warehouse.

3.5 Implementation of User Interfaces

Several interfaces are designed according to user needs, considering user-friendliness. Several interfaces that have been created can be seen in Figure 2.

3.6 System Testing

In this study, blackbox testing is conducted. The primary focus of this testing method is on input and output, as well as observing the system's response to user inputs. This approach involves end-users in testing the system's functionality without knowledge of its internal structure, ensuring that the system meets user expectations. Details of the black box testing can be found in Table 2.

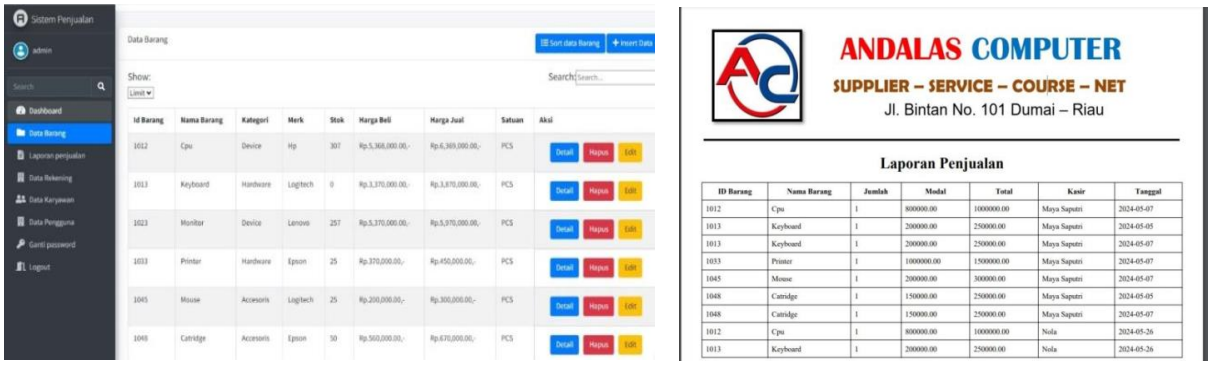

Figure 2. User interface

Table 2. Blackbox testing

Test Case	Expected Results	Description
Login	The Login page is displayed on the user screen, and input error handling functionality has been implemented	Successful
Inventory Data Page	Users can add, edit, and delete inventory data	Successful
Sales Report Page	The system can generate printed report results in PDF format	Successful
Income and Expense Transaction Page	Users can add, edit, and delete income and expense transaction data	Successful
Income and Expense Transaction Report Page	The system can generate printed income and expense transaction reports in PDF format	Successful

Additionally, to assess the user acceptance percentage of the developed system, UAT involving end-users from Andalas Computer is conducted. Users are categorized based on their respective access rights. System users are selected for their good understanding of sales processes and inventory management, capable of providing valuable feedback on user experience with the developed system. Each user is required to answer a series of questions as outlined in Table 3.

Table 3. User acceptance testing

Question	Strongly Agree	Agree	Disagree	Strongly Disagree	No Answer
1. Is the system easy to operate?	4				
2. Does the system provide the needed information easily and effectively?	3	1			
3. Does the system display data quickly and accurately?	4				
4. Does the system run stably and without interruptions?	4				
5. Does the system provide clear and timely notifications?	3	1			
6. Does the system offer a good search feature?	4				
7. Does the system operate according to the given access rights?	3	1			
8. Does the system facilitate easy data input?	4				
9. Does the system display reports in an easily understandable format?	4				
10. Does the system provide clear and comprehensive guidelines?	3	1			
Total	**36**	**4**			

Based on the UAT percentage calculations, it was found that the Andalas Computer sales management system received user approval with a percentage score of 90%. In other words, users have approved the functionality of the developed system.

4. CONCLUSION

The research results indicate that the adoption of the sales management system for the initial phase has been approved by the system users. This is evident from the UAT results provided by the users. With a high percentage of positive acceptance from user testing, the system can contribute positively to the processing of financial and sales data within the company. However, despite the positive reception of the developed system, this study has limitations, such as a limited sample size and a focus on a single company. These limitations may affect the generalizability of the system testing results.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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