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Analysis and Design of Inventory Management Information Systems Using The Rapid Application Development (RAD) Method at PT. Indonesia Gadai Oke

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ABSTRACT

Inefficiencies in the manual inventory management process at PT. Indonesia Gadai Oke have resulted in frequent issues such as data loss, delayed reporting, and difficulties in monitoring goods. This study aims to design and develop a web-based Inventory Management Information System using the Rapid Application Development (RAD) methodology. Data requirements were collected through observation, interviews, and documentation, then validated using relevant literature. The development process followed the four RAD phases: requirements planning, user design, construction, and cutover. The system was built using the Yii2 framework with MySQL database and tested using blackbox and security testing. The implementation results showed that the system successfully handled item data recording, borrowing and returning transactions, automatic reporting in PDF format, and monitoring of goods conditions with role-based user access control. This proves that the RAD approach supports fast, iterative development while ensuring accuracy and efficiency in inventory management at PT. Indonesia Gadai Oke.

1. INTRODUCTION

Inventory is one of the most critical assets for companies, playing a vital role in ensuring operational continuity and supporting organizational performance [1]. Proper inventory management is essential to guarantee the availability of goods, prevent shortages or surpluses, and optimize resource utilization [2]. Ineffective management often leads to issues such as inaccurate data, inefficient reporting, and limited monitoring capabilities, which in turn affect strategic decision-making [3]. For companies operating in competitive industries, like PT. Indonesia Gadai Oke, effective inventory management is no longer optional but a necessity.

Currently, PT. Indonesia Gadai Oke manages its inventory manually using books, spreadsheets, and simple documents. Although this method may seem sufficient for small-scale operations, it poses significant risks in a growing organization [4]. Manual records are prone to human error, data redundancy, loss of documents, and difficulties in tracking asset conditions. Reports generated through manual systems are often delayed and inconsistent, making it difficult for management to obtain real-time information. These inefficiencies not only reduce productivity but can also lead to financial losses, poor resource allocation, and challenges in responding to organizational needs.

The development of information systems has provided companies with solutions to overcome such limitations [5]. Web-based inventory information systems, for example, allow organizations to record, update, and monitor inventory data more efficiently and accurately [6]. Studies have shown that implementing information systems for inventory management can reduce operational costs, improve accuracy, and provide

better support for managerial decisions [7]. Moreover, the integration of such systems with other business processes, such as procurement and reporting, creates a more transparent and accountable workflow.

In order to develop an effective solution, the choice of methodology plays a crucial role. Traditional approaches, such as the Waterfall model, often take longer and are less flexible in adapting to user needs during the development process. For this reason, this study applies the Rapid Application Development (RAD) method, which emphasizes fast prototyping, iterative development, and continuous user involvement [8]. By involving users throughout the design and development process, the system can be tailored to meet real needs and minimize the gap between system output and user expectations. RAD also shortens development time compared to traditional methods, making it suitable for organizations requiring quick and effective solutions [9].

This research focuses on analyzing and designing an Inventory Management Information System for PT. Indonesia Gadai Oke. The system aims to address existing limitations in manual inventory processes, including data loss, recording errors, and delayed reporting. The solution is expected to improve efficiency, provide accurate real-time information, and support better decision-making. Furthermore, this study contributes to the body of knowledge in information systems development by demonstrating the application of RAD methodology in organizational inventory management.

2. METHOD

This research applied a quantitative descriptive approach with a structured methodology to ensure that the results obtained were valid and reliable [10]. The development of the Inventory Management Information System used the Rapid Application Development (RAD) method, chosen for its iterative prototyping approach and its ability to involve users intensively throughout the development cycle [11]. This method allows faster delivery of a functional system while ensuring that user needs are continuously accommodated in each iteration.

Data collection was carried out using three techniques:

1. Observation: Direct observation was conducted on the inventory management activities at PT. Indonesia Gadai Oke, including recording, borrowing, returning, and reporting processes that were still done manually.
2. Interview: Structured interviews were conducted with the administrative staff and system users to obtain detailed information about current problems, user requirements, and expectations of the new system.
3. Documentation and Literature Study: Supporting documents such as transaction records, inventory books, and company guidelines were reviewed to understand the workflow. In addition, references from journals, e-books, and previous studies were used to strengthen the theoretical foundation.

The RAD methodology used in this study consists of four main stages:

1. Requirements Planning: Identification of system requirements was conducted through observation and interviews with users. The main needs identified were inventory data recording, borrowing/return transactions, reporting, monitoring item conditions, and user access control.
2. User Design: Prototypes of the system interface were developed and presented to users for feedback. The design included item management pages, transaction forms, and reporting modules. Feedback from users was used to revise and improve the prototype iteratively.
3. Construction: After the design was validated, the system was built using Yii2 Framework (PHP) and MySQL database. Features were implemented according to user requirements. Testing was conducted using blackbox testing to ensure each function operated correctly, and security testing to validate data protection.
4. Cutover (Implementation and Final Testing): The system was deployed in the operational environment at PT. Indonesia Gadai Oke. This stage included user training, final testing, and evaluation. The system was also tested for its ability to generate PDF reports and manage role-based access control.

The system was developed using:

1. Hardware: Laptop ASUS Vivobook X409MA, Intel CPU 1.10 GHz, 4GB RAM.
2. Software: Windows 11, Visual Studio Code, PHP, Yii2 Framework, MySQL, Navicat, Apache Server, and Mendeley for reference management.

By following these stages, the development process ensured that the resulting system was not only functional but also aligned with user needs, efficient, and secure for implementation at PT. Indonesia Gadai Oke.

3. RESULTS AND DISCUSSION

The research was conducted following the Rapid Application Development (RAD) methodology through four main phases: requirements planning, user design, construction, and cutover. Each phase involved active user participation and iterative evaluation to ensure the developed system met the needs of PT. Indonesia Gadai Oke.

1. Requirements Planning (Before System Implementation)

In the initial phase, the manual inventory management process at PT. Indonesia Gadai Oke was analyzed. This process relied heavily on books and simple documentation, leading to inefficiencies such as:

1. Frequent errors in recording data.
2. Lost or duplicated inventory information.
3. Delays in generating reports.
4. Difficulties in monitoring borrowed and returned items.

Observation and interviews confirmed that staff required a digital system capable of handling item data recording, borrowing/return transactions, automatic reporting, and monitoring conditions in

real time. These findings became the foundation for the next phase of system development.

2. User Design (Prototyping and Feedback)

In this phase, a prototype of the Inventory Management Information System was developed. The prototype included:

1. Item Management Page: for adding, editing, and categorizing items.
2. Transaction Page: for borrowing and returning processes.
3. Monitoring Page: displaying graphs and item conditions.
4. Reporting Module: automatic PDF generation.
5. User and Access Management: role-based control for admin, staff, and general users.

The prototype was presented to users and revised based on their feedback. This iterative process ensured that the interface was intuitive and aligned with staff workflows.

3. Construction (System Development)

The system was then fully developed using Yii2 Framework (PHP) and MySQL as the database. Several features were implemented and tested during this phase:

1. Login and Dashboard for secure access and system overview.
2. Item Data Module to store and update inventory details.
3. Transaction Management to record borrowing and returning with automatic status updates.
4. Report Generation to export inventory data into PDF format.
5. Graphical Monitoring to display usage trends and item conditions visually.
6. Role-Based Access Control to separate privileges between administrators, staff, and general users.

Testing was performed using blackbox testing, confirming that all features functioned correctly according to requirements. Security testing was also carried out to protect against common vulnerabilities, such as SQL injection and unauthorized access.

4. Cutover (Implementation and Final Evaluation)

The final system was deployed at PT. Indonesia Gadai Oke for operational use. User training was conducted to ensure staff could operate the system effectively. During this stage, the following improvements were observed compared to the manual process:

1. Inventory records were more accurate and consistent.
2. Borrowing and returning transactions were faster and easier to trace.
3. Reports could be generated automatically and shared in PDF format.
4. Monitoring of item conditions was clearer through graphical visualization.

5. Comparison and Discussion

The comparison between manual and digital processes clearly illustrates the positive impact of the system:

Table 1 Comparison Between Manual System and Developed Digital System

Feature/Process	Manual System	Developed System	Improvement
Recording Items	Book-based, prone to error	Digital, centralized in database	Accuracy improved
Borrowing/Returning	Manual notes, hard to track	Automated with real-time status	Faster & traceable
Reporting	Delayed, handwritten or Excel	Instant PDF generation	Timeliness improved
Monitoring	Difficult to summarize	Graph-based visualization	Better decision-making
Access Control	None	Role-based user management	Higher security

The results demonstrate that the RAD-based approach enabled fast delivery of a functional system that directly addressed user needs. Unlike the manual process, which often caused delays and inaccuracies, the new system streamlined operations, reduced human error, and provided management with real-time insights into inventory data.

6. Interface of the Inventory Management System

The developed application interface (UI) supports the digital inventory process and provides features for recording, monitoring, and reporting. The system was designed to be simple, user-friendly, and aligned with user workflows at PT. Indonesia Gadai Oke.

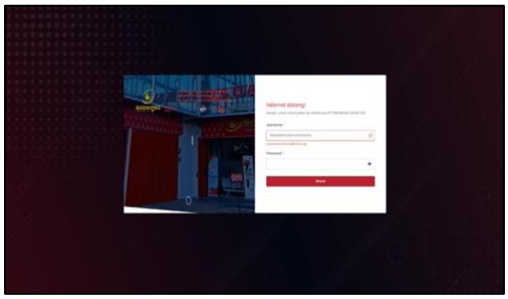

Figure 1 Login Page

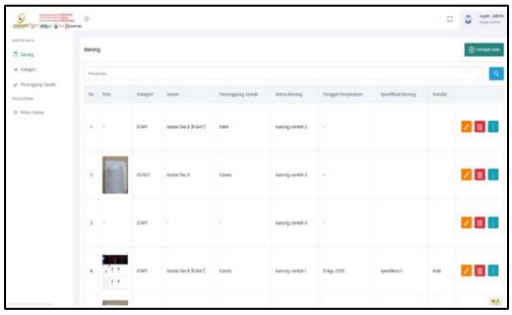

Figure 2 Item Page

Figure 3 Category Page

Figure 4 Transaction Page

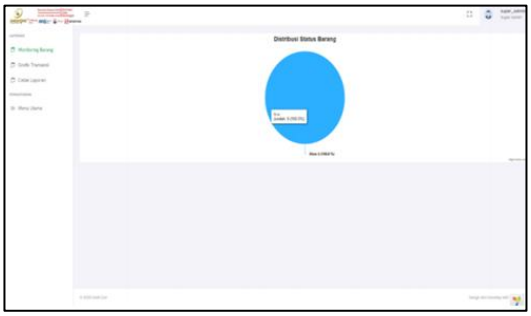

Figure 5 Item Monitoring Page

Figure 6 Transaction Graph Page

Figure 7 Print Report Page

Daftar Barang per Outlet

No	Nama Barang	Outlet	Status
1	barang contoh 2	Gadai Oke 8 (PUSAT)	
2	barang contoh 3	Gadai Oke 3	
3	barang contoh 4	-	
4	barang contoh 1	Gadai Oke 8 (PUSAT)	
5	barang gadai	Gadai Oke 8 (PUSAT)	

Figure 8 Print Report Result Page

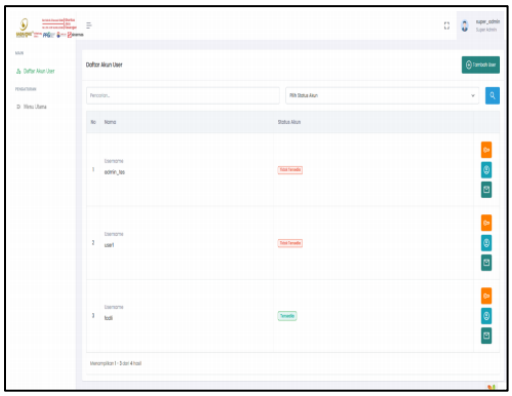

Figure 9 User Page

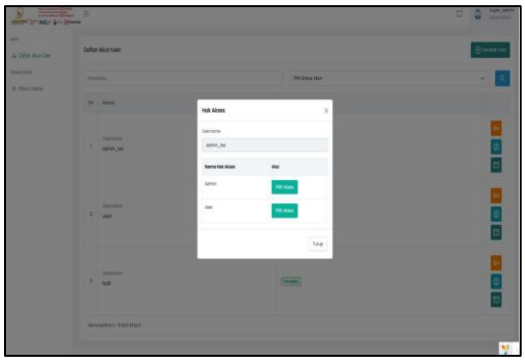

Figure 10 User Access Rights Page

4. CONCLUSIONS

The development of the Inventory Management Information System at PT. Indonesia Gadai Oke using the Rapid Application Development (RAD) methodology has successfully addressed the limitations of the company's previous manual inventory management process. The resulting system provides integrated features for recording item data, managing borrowing and returning transactions, monitoring stock conditions, and generating automatic reports in PDF format. Through the iterative and user-centered RAD approach, the system was developed efficiently while continuously accommodating user feedback to ensure accuracy and usability.

Compared to the previous manual system, the new web-based application significantly improved data accuracy, reduced processing time, enhanced transparency, and simplified inventory monitoring through graphical visualization and role-based access control, thereby contributing to operational efficiency and better decision-making for management. Overall, this study demonstrates that the application of the RAD methodology is effective for developing information systems that require rapid implementation and high adaptability to user needs, as the developed system not only optimizes inventory

management processes at PT. Indonesia Gadai Oke but also provides a practical reference for future implementations of web-based management systems in similar organizational contexts.

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