

WEB-BASED INFORMATION SYSTEM PROJECT FOR OPTIMIZING OFFICE STATIONERY MANAGEMENT IN THE MATERIAL STORE DEPARTMENT OF PT BOGASARI

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Abstract— The rapid development of organizational processes requires effective digital solutions, particularly in inventory management. At PT ISM Bogasari Flour Mills, the request and distribution of Office Stationery (ATK) are still managed manually, resulting in inefficiencies, delays, and reporting difficulties. This research aims to develop a web-based ATK Management Information System to optimize request, approval, distribution, and reporting processes. The novelty of this study lies in applying the Rapid Application Development (RAD) methodology within the context of a large-scale manufacturing company, ensuring iterative development with active user involvement. The system was developed using ASP.NET technology, following four stages of project management: initiation, planning, implementation, and closing. The results show that the system improved efficiency, reduced recording errors, accelerated request processing, and provided structured data for monitoring and reporting. This study confirms the effectiveness of RAD in organizational contexts and contributes practical benefits for PT Bogasari, particularly in creating more transparent and efficient operations.

Keywords: information system project, information system, web-based, inventory, rapid application development (RAD)

Abstrak— Perkembangan pesat dalam proses organisasi menuntut solusi digital yang efektif, khususnya dalam pengelolaan persediaan. Di PT ISM Bogasari Flour Mills, proses permintaan dan distribusi Alat Tulis Kantor (ATK) masih dilakukan

secara manual sehingga menimbulkan inefisiensi, keterlambatan, dan kesulitan dalam pelaporan. Penelitian ini bertujuan mengembangkan Sistem Informasi Pengelolaan ATK berbasis web untuk mengoptimalkan proses permintaan, persetujuan, distribusi, dan pelaporan. Kebaruan penelitian ini terletak pada penerapan metode Rapid Application Development (RAD) dalam konteks perusahaan manufaktur berskala besar, dengan melibatkan pengguna secara aktif pada setiap tahap pengembangan. Sistem dikembangkan menggunakan teknologi ASP.NET melalui empat tahap manajemen proyek: inisiasi, perencanaan, implementasi, dan penutupan. Hasil penelitian menunjukkan bahwa sistem mampu meningkatkan efisiensi, mengurangi kesalahan pencatatan, mempercepat proses permintaan, serta menyediakan data terstruktur untuk pemantauan dan pelaporan. Penelitian ini menegaskan efektivitas metode RAD dalam konteks organisasi dan memberikan manfaat praktis bagi PT Bogasari dalam menciptakan proses kerja yang lebih transparan dan efisien.

Kata Kunci: proyek sistem informasi, sistem informasi, berbasis web, persediaan, rapid application development (rad)

INTRODUCTION

The rapid advancement of science, technology, and human work methods has significantly transformed organizational processes. With the use of advanced tools, tasks that were previously carried out manually and required

considerable time can now be completed more quickly and efficiently. One example is the inventory system for office stationery (ATK) in a business or institution. To provide reliable information for management and assist them in making better decisions, computerization requires systematic data processing using computer programs (Rachmat, 2023).

PT ISM Bogasari Flour Mills is the largest integrated wheat flour milling company in Indonesia operating in a single location, and it is also the country's first and largest flour producer. In carrying out its operational activities, each department within PT Bogasari requires supporting facilities, one of which is ATK. To fulfill these needs, the Material Store Department, particularly the ATK Management Section, is responsible for managing ATK requests and distribution across all departments.

Several previous studies highlight the importance of digitizing inventory management. (Ramanda and Abdullah, 2022) demonstrated that a web-based ATK inventory system can provide real-time stock information and generate accurate reports. Similarly, (Umar et al., 2020) found that a web-based inventory system facilitates monitoring and accelerates inventory management processes. Other studies emphasize that the Rapid Application Development (RAD) method is effective for building information systems quickly and iteratively by directly involving users throughout the development process (Putra & Kurniawan, 2022).

Beyond ATK management, related research on information systems has also been conducted in other sectors. At BNI Regional Office 15 Unit BMW-Funding, the development of a web-based archiving system using Laravel and MySQL successfully addressed the limitations of manual processes, such as inefficiency, recording errors, difficulties in document retrieval, and weak data security. The new system accelerated the management of incoming and outgoing letters, improved data security, and enhanced administrative effectiveness through more accurate and integrated information. Likewise, a study by (Eva Argarini Pratama et al., 2021) at the Rempoah Village Office showed that a web-based inventory system developed using the RAD method, CodeIgniter, PHP, and MySQL effectively replaced manual records in Excel, which were prone to errors, difficult to access, and slow for reporting. The system improved the efficiency of village staff, provided structured asset data, and enhanced the speed and accuracy of record keeping.

However, previous studies have primarily focused on inventory management in government institutions or small-scale organizations, with limited discussion on large-scale manufacturing contexts where the complexity of departmental

requests and distribution processes is much higher. Furthermore, few studies have integrated stock management policies such as FIFO, FEFO, minimum-maximum stock levels, and reorder points directly into the system. This research fills the gap by applying the RAD method in developing a web-based ATK management system specifically for PT Bogasari, a large-scale manufacturing company. The ATK request process at PT Bogasari is still handled manually, often causing delays, recording errors, and reporting difficulties. Therefore, this study aims to design and implement a system that provides easy access for all departments, accelerates and improves the accuracy of requests, and optimizes the organized management of ATK transactions and distributions using RAD and ASP.NET technology, thereby contributing both practically to operational efficiency and theoretically to the literature on information systems in industrial settings.

MATERIALS AND METHODS

This study employed a software engineering approach using the Rapid Application Development (RAD) method, selected for its suitability in developing systems within a relatively short time frame (Niqotaini et al., 2023). RAD was also chosen because it enables direct user involvement at every stage, ensuring that the resulting system aligns closely with operational needs in the field. This method is particularly suitable for projects that require rapid development with iterative improvements, which aligns with the needs of PT Bogasari to quickly transition from manual processes to a digital system. The RAD stages applied in this research include:



Source: (Sari, Hidayat, Hakim, & Hidayatulloh, 2025)

Figure 1 The RAD Stages

1. Requirement Planning: Users and analysts conduct meetings to identify system objectives and the information needed to achieve them. Active involvement of both parties is crucial in this stage.
2. System Design: Users actively participate in system design. Adjustments and improvements are made iteratively if

discrepancies are found between the design and user requirements.

3. Implementation: Programmers develop the system based on the approved design, followed by testing to ensure the system is free from errors before deployment.

The research was conducted in the Material Store Department of PT ISM Bogasari Flour Mills, which manages the request and distribution of office stationery (ATK). Data were collected through direct observation of the ATK request and distribution processes, interviews with relevant staff, literature reviews from journals, and questionnaires distributed before and after system implementation to identify user needs, challenges, and limitations of the existing system (Hafni Sahir, 2021).

Each data collection technique was aligned with the RAD phases: observation and interviews supported the requirement planning stage, literature review guided the system design, while pre- and post-implementation questionnaires were used to evaluate the effectiveness of the implemented system. The research subjects focused on the ATK request and distribution process. The population included all administrative staff from various departments at PT Bogasari who submit ATK requests through the Material Store, as well as Material Store staff responsible for storage and distribution. The departments served include Material & Waste Management, IT, Line Maintenance, Workshop, Production Utility, Product Group, Customer Packing, Quality Control, Human Resource, Purchasing, and the Mill units (M, H, D, and A). From this population, a sample of 50 ATK transactions was selected using *simple random sampling*, representing requests from different departments.

Based on interviews and observations, the Material Store Department applies ATK management policies using a combination of FIFO, FEFO, minimum-maximum stock, and reorder point (ROP) methods. Research data were obtained from monthly transaction records and direct interviews with warehouse staff. The system was developed using ASP.NET with the C# programming language under the .NET framework, and SQL Server as the database.

Data Analysis: Qualitative data from interviews and observations were analyzed using thematic analysis, where responses were categorized into themes such as request workflows, distribution challenges, and user expectations. These findings were then aligned with system requirements in the requirement planning stage of RAD. Quantitative data from questionnaires (pre- and post-implementation) were analyzed using descriptive statistics, calculating frequencies and

percentages for each response category. The pre-implementation results were used to identify main problems and system needs, while the post-implementation results evaluated improvements in usability, system functionality, and alignment with user needs

RESULTS AND DISCUSSION

The project implementation stages for the Web-Based ATK Management Information System in the Department of Material Store at PT Bogasari were carried out systematically through five main phases of project management (Yoraeni et al., 2023):

1. Project Initiation is the stage that provides an overview of the project to be developed, including the project scope which covers key features such as ATK request submissions by department users, approvals by the Head of Department, request status monitoring, and real-time transaction reports. The main objective of the project is to develop a web-based information system that supports the digital management of ATK transactions.
2. Project Planning involves determining the required effort, resources, and time allocation for building the software system. The project was carried out over a period of 99 days and was successfully completed on schedule with a total cost of IDR 92,000,000.

Table 1 Time Estimated and Cost Estimated

No	Tasks	Duration (day)	Cost (IDR)	Total (IDR)
1	Kick-Off Meeting Project			
	Meeting Project	1	500.000	500.000
2	Business Requirement			
	Gathering bussiness process	1	500.000	500.000
	Document business process	2	500.000	1.000.000
	Signoff document	1	500.000	500.000
3	Document Design/ Functional Specification Document			
	Mapping business process	4	500.000	2.000.000
	Create document design apps	6	500.000	3.000.000
	Signoff document design apps	2	500.000	1.000.000
4	Development Apps			
	Develop apps	30	500.000	15.000.000
	Develop testing & bug fixing	12	500.000	6.000.000
5	System Internal Test			
	Internal system testing	3	500.000	1.500.000
	Internal bugs fixing	2	500.000	1.000.000
6	Preparation Hardware	–		

No	Tasks	Duration (day)	Cost (IDR)	Total (IDR)
	Deployment Installation	–		
	Preparation hardware & supporting software	2	500.000	1.000.000
	Installation apps	2	500.000	1.000.000
	Internal test running apps	2	500.000	1.000.000
7	Training			
	Training User	3	500.000	1.500.000
	Signoff User Accept Test	1	500.000	500.000
8	Define Data Master & Configuration Setup/User			
	Prepare Migration/Input data master & data User	2	500.000	1.000.000
	Process migration/Input data master & data setup/User	2	500.000	1.000.000
	Confirmation/signoff data master & setup	2	500.000	1.000.000
9	Testing			
	User testing	3	500.000	1.500.000
	Signoff User Test	2	500.000	1.000.000
10	Go Live Production			
	Go Live/Input data production with apps	3	500.000	1.500.000
11	Support System			
	Support System	11	500.000	5.500.000
	Total	99 Days		92.000.000

Source: (Sari, Hidayat, Hakim, & Hidayatulloh, 2025)

3. Project Execution

RAD method includes the following:

A. Requirement Planning

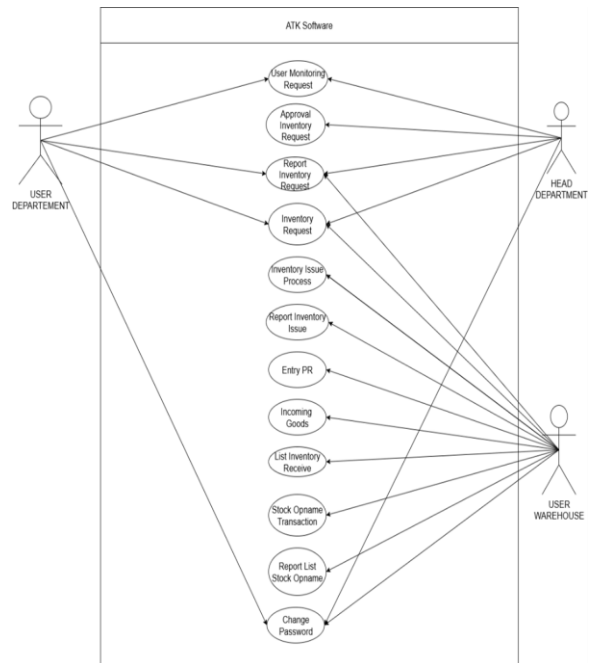
At this stage, users and analysts held discussions to identify the main objectives of the system and define user roles along with their responsibilities. The system involves four primary roles:

- 1) Head Department: Responsible for approving inventory requests, monitoring request status, generating request reports, and managing personal credentials.
- 2) Department User: Submits ATK requests, monitors the status of requests, views request reports, and changes passwords.
- 3) Warehouse User: Manages master data (inventory, units of measurement, inventory types, cost centers, budget allocations, and prices), handles inventory transactions (purchase requests, incoming goods, stock opname, and issuing inventory), and generates detailed reports related to stock, costs, and transactions.
- 4) Administrator: Oversees system configuration, including user management, group access, company setup, and master data. The administrator also has access to comprehensive

reporting features to monitor inventory requests, stock levels, and transactions across departments.

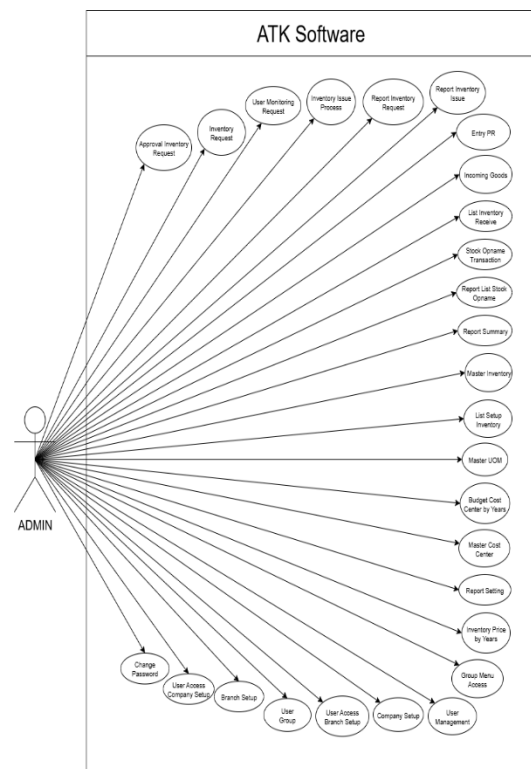
B. System Design Process

- Use Case Diagrams



Source: (Sari, Hidayat, Hakim, & Hidayatulloh, 2025)

Figure 2 Use Case Diagram User Dept., Head Dept., Warehouse



Source: (Sari, Hidayat, Hakim, & Hidayatulloh, 2025)

Figure 3 Use Case Diagram Admin

- *Activity Diagram*

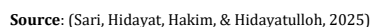


Figure 4 presents the activity diagram that models the workflow of ATK request and approval. The process begins with the user submitting a request, followed by verification and approval by the Head of Department. Once approved, the request is forwarded to the Warehouse Staff for validation and distribution. The system then updates the stock and

- *Entity Relationship Diagram (ERD)*



Figure 5 shows the ERD, which defines the database structure of the system. The main entities include User, Department, ATK Item, Request, Approval, and Transaction Report. The relationships between these entities ensure data consistency and support features such as request history, stock monitoring, and reporting. The ERD was crucial in the system design stage to guide database implementation using SQL Server.

Source: (Sari, Hidayat, Hakim, & Hidayatulloh, 2025)

Figure 6 Design Login Page

Figures 10–13 present the implementation results of the Web-Based ATK Management Information System at PT Bogasari. Figure 10 shows the login page, where users must enter their credentials to access the system according to their assigned role (Department User, Head Department, Warehouse User, or Administrator). This ensures security and role-based access to system features. Figure 11 illustrates the inventory request page, which allows Department Users to submit requests for office stationery by specifying item details and quantities. This digital form streamlines the submission process, reduces errors, and automatically records requests into the system database. Figure 12 displays the inventory issue page, used by Warehouse Users to validate approved requests, manage stock levels, and record the distribution of items to departments. This feature helps maintain accurate stock data and ensures transparency in the distribution process. Figure 13 presents the report summary page, which provides real-time information on requests, approvals, issues, and stock availability. Reports can be generated and filtered by department, item, or period, supporting managerial decision-making and inventory control. Overall, these implementation results demonstrate that the system effectively replaces the manual process with a structured, transparent, and efficient digital workflow.

4. Project Monitoring and Control

To evaluate whether the developed system met user needs, a questionnaire was distributed to various user roles such as operators, foremen, staff, and others from all departments using the application.

The post-implementation system evaluation showed high user acceptance: 90% found the application easy to recognize and use, 100% confirmed it met user needs, Search, reporting features, and interface received positive feedback, It simplified distribution, reduced input errors, and accelerated approvals. Overall, the system successfully addressed PT Bogasari's ATK management needs, which were previously handled manually.

To measure the effectiveness of the system, questionnaires were distributed before and after

implementation. The comparison is presented in Table 2.

Table 2 Before and After implementation

Aspect	Before Implementation	After Implementation
Request Recording	95% of respondents stated requests were not well recorded	90% rated the system easy to use, 100% confirmed suitability with user needs
Stock Accuracy	5% reported inaccurate stock data	Search and reporting features rated 4–5 by 90% of respondents
Productivity Impact	85% stated work productivity was disrupted	90% reported the system accelerated the request process
System Needs	85% indicated an ATK system was needed, 100% willing to use it	100% confirmed the developed system met their needs

Source: (Sari, Hidayat, Hakim, & Hidayatulloh, 2025)

This comparison highlights that the system addressed critical weaknesses of the manual process, particularly in request recording, stock accuracy, and productivity.

5. Project Closing

This is the final phase in the project life cycle where all project activities are completed and objectives are achieved. Documentation was finalized (meeting minutes, handover documents), the project team was disbanded, a post-project evaluation was conducted to identify lessons learned for future improvements, and results were communicated to relevant stakeholders.

The implementation of the web-based ATK Management Information System at PT Bogasari demonstrated significant improvements in request processing, distribution, and data reporting. The adoption of an ASP.NET-based system with the RAD method accelerated ATK request flows, reduced recording errors, and simplified validation by warehouse staff. Moreover, the integration of stock management policies such as FIFO, FEFO, minimum–maximum stock levels, and reorder points ensured item availability and reduced the risks of overstocking or stockouts, supporting inventory management theory which emphasizes the role of automated stock control in improving operational efficiency (Heizer & Render, 2017).

These findings not only confirm previous research but also extend them in important ways. Ramanda & Abdullah (2022) and Umar et al. (2020) highlighted that digital inventory systems provide real-time stock information and facilitate monitoring, but their scope was limited to cooperative and institutional settings. In contrast, this study demonstrates the applicability of such systems in a large-scale manufacturing context, where the volume and complexity of departmental requests are significantly higher. Similarly, while the studies at BNI Regional Office 15 (2022) and

Pratama et al. (2021) in Rempoah Village proved the effectiveness of RAD in building digital systems, this research shows that RAD not only accelerates development but also ensures user-driven functionality in environments with complex workflows such as PT Bogasari.

Thus, the contribution of this study is twofold: theoretically, it reinforces and expands the literature by showing that RAD-based digitalization is effective across diverse organizational scales, including large manufacturing industries; practically, it provides PT Bogasari with a robust solution that enhances efficiency, transparency, and accountability in ATK management. These results also suggest that integrating domain-specific policies (such as stock control mechanisms) into digital systems can significantly improve their effectiveness, a point that has been underexplored in earlier research.

CONCLUSION

Based on the findings, it can be concluded that the development of a web-based ATK management information system at PT Bogasari successfully addressed the issues of the previous manual process. The pre-development questionnaire identified user needs, obstacles, and system weaknesses, which then defined the project scope. Post-implementation evaluation showed that the system is user-friendly, easy to operate, has a convenient interface, reliable search features, and effectively meets user requirements. The system has proven to enhance data accuracy through digital recording, accelerate the request process, provide transparency with real-time status monitoring, and generate automated reports that support managerial decision-making. Thus, the system improves efficiency, effectiveness, and data security in ATK management at PT Bogasari.

To ensure continuous improvement, management commitment is required to encourage employees to consistently use the application, supported by the development of new SOPs aligned with the digital system to avoid overlap with manual processes. The company should also provide training for employees and conduct regular evaluations of the User Interface and User Experience to enhance usability. In the future, the system can be expanded with additional features such as automatic notifications for request status and minimum stock levels, integration with the company's general inventory system, and the development of a mobile version for easier access. Furthermore, future research could explore alternative development methods such as Agile or integrate Artificial Intelligence (AI) technology to enable more accurate predictions of ATK demand.

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