

Designing a Web-Based Inventory System Using the Agile Method for Management Efficiency in Buduran District

Ratih Sri Yunarti*, Nuril Lutvi Azizah, Ade Eviyanti, Hamzah Setiawan

Department of Computer Science, Universitas Muhammadiyah Sidoarjo, Sidoarjo, Indonesia

*Corresponding Email: yunarti12@gmail.com

Abstract. The rapid development of information technology has had a major impact on various aspects of government administration, including asset and inventory management. In Buduran District, Sidoarjo Regency, inventory data recording is still done manually. This unintegrated system often causes data inconsistencies, difficulties in tracking goods, and inefficiency in the reporting and auditing processes. To overcome these problems, this study designed a web-based inventory information system using the Agile development method. The Agile method allows for gradual system development with user feedback at each iteration, making the system more adaptive to field needs. This system enables digital inventory recording, tracking, and reporting, thereby improving the accuracy, efficiency, and transparency of asset management. Testing using the Black Box method showed that all system features, both from the user and admin sides, worked as expected with a 100% success rate. In addition, the results of the User Acceptance Testing (UAT) showed a user satisfaction rate of 95.6% from five respondents, consisting of two administrators and three staff members. The developed system is expected to improve operational effectiveness and support better decision-making in asset management at the sub-district level.

Keywords: Inventory, Management, Agile, Efficiency, Digitization

1 Introduction

The rapid development of information technology in today's digital era has had a major impact on various sectors of life, including the government sector [1]. Technology is not only used as a medium of communication and information, but has also become a key tool in data management and improving work efficiency [2]. One important aspect of government administration that needs attention is inventory management, namely the management of physical assets owned by government agencies, including at the sub-district level [3].

Several previous studies have discussed the development of inventory information systems in government agencies. These studies have generally succeeded in building systems capable of digitally recording and storing inventory data [4]. However, most still use conventional system development methods such as waterfall, which have limitations in dynamically adapting the system to the needs of users in the field [5].

Therefore, this study aims to address these limitations and offer new insights into inventory system development. As a comparison, a study by Tampubolon & Simanjuntak entitled "Implementation of Inventory Input Applications Using Web-Based Agile Methods" has developed a web-based inventory management system using the Agile approach [6]. However, this study focused more on small businesses and did not accommodate the specific needs of government agencies, such as recording goods transfers, more detailed asset reporting, and reminders of official vehicle tax due dates.

Based on this analysis, it can be identified that there is a gap or gap that has not been fulfilled in previous studies, namely the absence of a system specifically designed for sub-district level government agencies with features that suit their operational needs. This research addresses this gap by developing a Web-Based Goods Inventory Information System in Buduran Subdistrict, which was developed using the Agile method and equipped with additional features such as pop-up notifications for vehicle tax reminders and real-time tracking and reporting of goods movements [7].

The Buduran Subdistrict, as a subdistrict-level government agency in Sidoarjo Regency, still faces challenges in managing its inventory. Items such as tables, chairs, computers, and other administrative tools are still recorded manually using books or simple spreadsheets. This un d system makes it difficult to present data quickly and accurately. As a result, there are often obstacles such as difficulty in tracking the location of goods, data inconsistencies, and the risk of loss or duplication [8]. The internal reporting and audit processes are also slow and prone to errors. On the other hand, the Buduran District already has a Receipt Application in its public services

section. However, to date, there is no specific system for comprehensive inventory management, which has resulted in a lack of effectiveness and efficiency in asset management.

With this approach, the inventory information system that is developed is expected to be more responsive to user needs and capable of improving efficiency and accuracy in data recording [9]. In addition, the system also supports faster, more transparent, and error-free tracking and reporting processes [10]. This is certainly in line with the government's efforts to realize more modern public services [11].

Based on the problems and weaknesses of the previous system, this research was conducted with the aim of designing and developing a Web-Based Goods Inventory Information System in Buduran Subdistrict using the Agile method. With this system, it is hoped that goods inventory management can be carried out more effectively and efficiently, as well as supporting asset data transparency at the subdistrict level.

2 Method

2.1 System Development Method

In this study, the development of a web-based inventory information system was carried out using the Agile method. This method was chosen based on the need for a flexible development process that is responsive to change and oriented towards collaboration with users [5]. Agile is an iterative and incremental approach to software engineering, in which development is carried out in short cycles (iterations) that allow for continuous evaluation and improvement of the system [6].

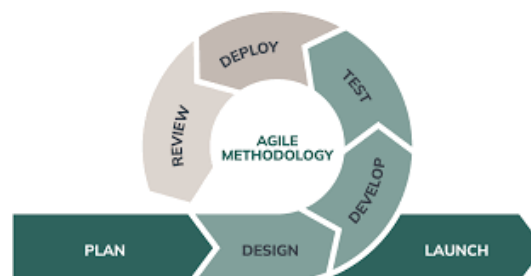


Figure 1. Agile Method

2.2 General Research Flowchart

The flowchart in Figure 2 illustrates the systematic stages in developing an inventory system for Buduran District. The process begins with a literature study aimed at reviewing relevant theories and previous research as a conceptual basis. The next stage is observation and interviews conducted directly with Buduran District officials to obtain empirical data on system requirements. Based on the results of the software requirements analysis, a system design is carried out that includes the structure, user interface, and process flow to be implemented. The implementation stage is carried out by building the system according to the design, followed by testing to ensure that the system functions as it should. Once the inventory system is deemed to meet all the specified criteria, conclusions are drawn to conclude the research process [12].

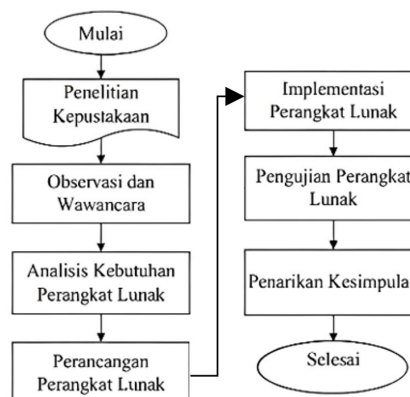


Figure 2. General Research Flowchart

2.3 User Flowchart

Flowchart Figure 3 illustrates the flow of general user activities in the goods inventory system in Buduran District. The process begins with the login page as an authentication stage, which then directs users to the dashboard display if the login is successful. From the dashboard, users can access the Goods Master menu to view and manage goods data, such as the name of the goods, storage location, and other related attributes. In addition, users can also access the transaction menu to record incoming and outgoing goods activities, which continues to the report display. If necessary, users can print reports through a verification process in the print branch. The system also provides a Settings feature for general settings and a Tax Reminder Display to manage information related to goods tax. This flowchart shows how the system supports user activities in a structured and efficient manner in managing goods inventory data [13].

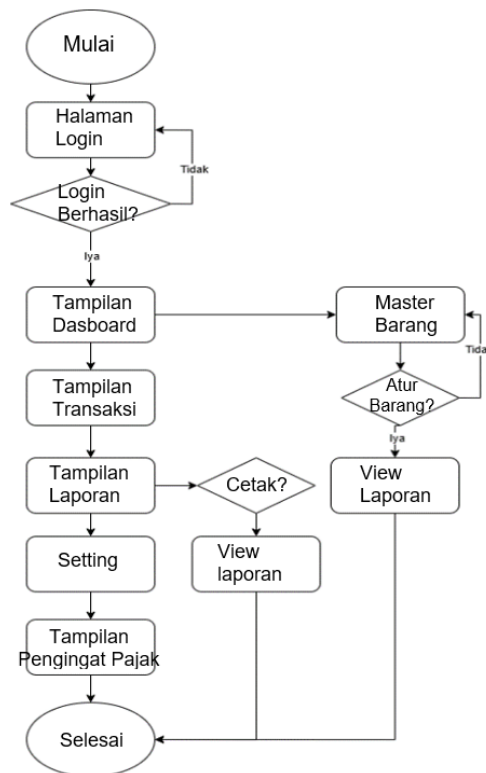


Figure 3. User Flowchart

2.4 Admin Flowchart

The flowchart in Figure 4 shows the process flow carried out by the admin in the goods inventory system in Buduran District. The flow starts from the login page, where the admin must first authenticate. After successfully logging in, the admin is directed to the dashboard display as the access center for various main system features. The admin can manage item master data through the Item Master feature, with options to view or edit data such as item name, unit, storage location, and item condition. In the transaction section, the admin can record incoming and outgoing items and make changes if necessary, through the item transaction display. Furthermore, the report feature allows the admin to view data summaries and print reports as needed. The system also provides a User Management menu that allows administrators to manage other user accounts, including editing user data, as well as accessing tax reminders and system settings. This flowchart illustrates the overall responsibilities of administrators in maintaining the accuracy, completeness, and security of inventory data in the Buduran District [13].

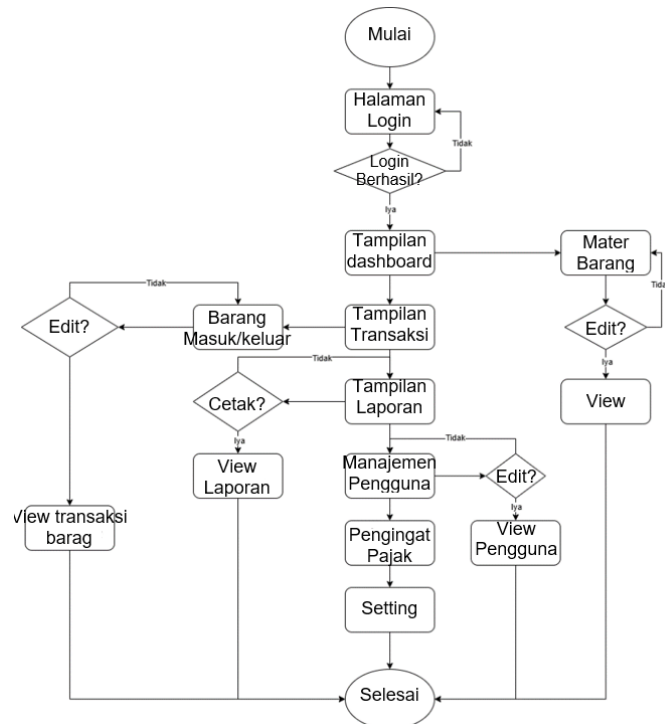


Figure 4. Admin Inventory System Flowchart

2.5 Use Case Diagram

The use case diagram for the Buduran Subdistrict inventory system in Figure 5 illustrates the interaction between two main actors, namely Admin and User, with various functions available in the system. Both actors have access to basic features such as login, logout, and master data management, which includes management of goods, units, locations, status, suppliers, brands, and condition of goods. In addition, both actors can also access the report feature to view information related to inventory data and print reports when necessary. However, there are several features that are specific to the admin, such as user management, which includes managing user data, viewing user data, and verifying accounts. The admin also has full authority over all goods transaction activities, such as recording incoming goods, outgoing goods, transfers, and damaged goods. With a clear division of access rights between administrators and users, this system is designed to maintain security and efficiency in inventory data management in the Buduran District [14].

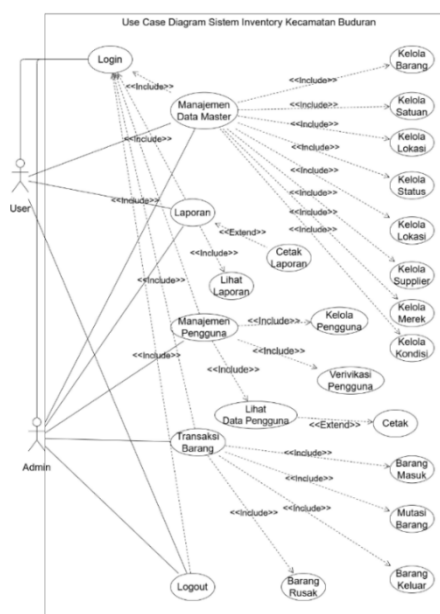


Figure 5. Inventory System Use Case Diagram

2.6 Activity Diagram

Activity diagram Figure 6 in the Buduran District inventory system illustrates the flow of interaction between users and administrators with the system. After successful login and authentication, users can manage inventory, such as adding, editing, deleting, and saving item data, as well as printing reports. Meanwhile, administrators have more complex access, namely managing inventory and users, as well as managing incoming, outgoing, transferred, and damaged item data. After the data is displayed, the admin can print reports or check data via the print button before ending the session by logging out. This diagram shows the systematic process flow, differences in access rights, and responsibilities between users and admins [15].

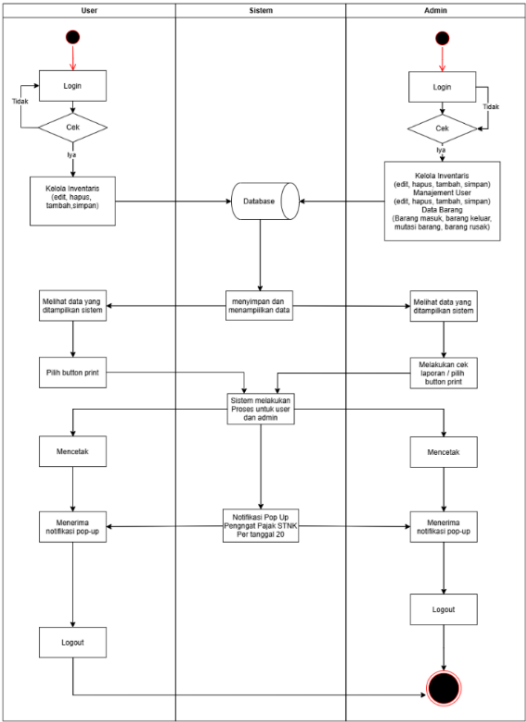


Figure 6. Activity Diagram of the Inventory System

2.7 Data Flow Diagram

DFD Level 0 for the Buduran Subdistrict Inventory System shown in Figure 7 illustrates the data flow between external entities, namely Admin and User, and the core system. Admin has full access to manage various master data, including Goods, Units, Locations, Status, Suppliers, Brands, and Conditions, and can verify users and view user data. Additionally, the Admin handles item transactions such as Item Receipts, Item Issues, Item Transfers, and Damaged Items, and has the right to view and print reports. On the other hand, users can also log in, access master data (with possibly more limited access rights), view, and print reports. Both roles have access to log in and log out of the system, with data flow showing a direct relationship between internal and external processes to maintain consistent data connectivity within the system [16].

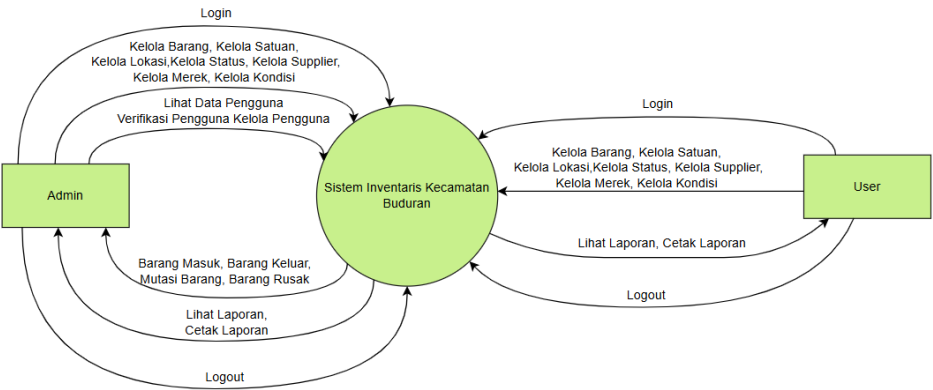


Figure 7. Level 0 DFD

3 Results and Discussion

3.1 Interface Design

The user interface of the Buduran Subdistrict inventory system was designed with the aim of creating a simple, informative, and easy-to-use display for users, especially subdistrict staff in charge of inventory management. The interface was designed based on the principles of user-centered design, which prioritizes user comfort and ease of interaction in accessing various system features. This system interface consists of three main displays, namely the login page, dashboard, and report page.

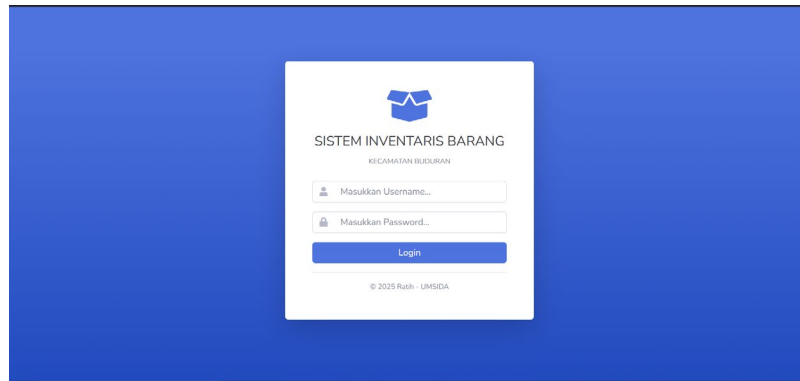


Figure 8. Login Page

The login page in Figure 8 is designed to be minimalist so that users can immediately enter their username and password to access the system, with an additional validation feature in case of input errors.

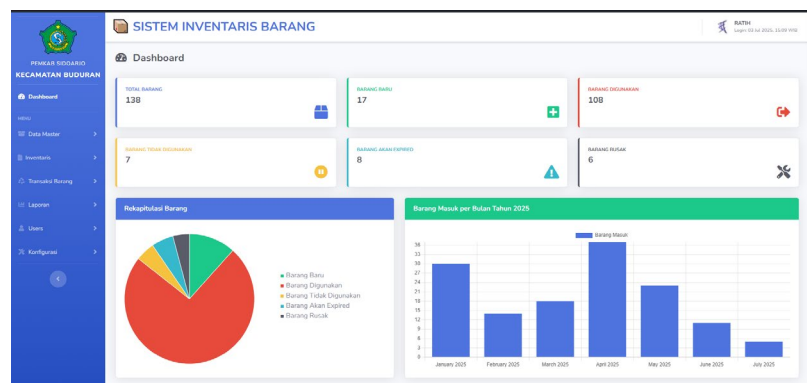


Figure 9 Dashboard Page

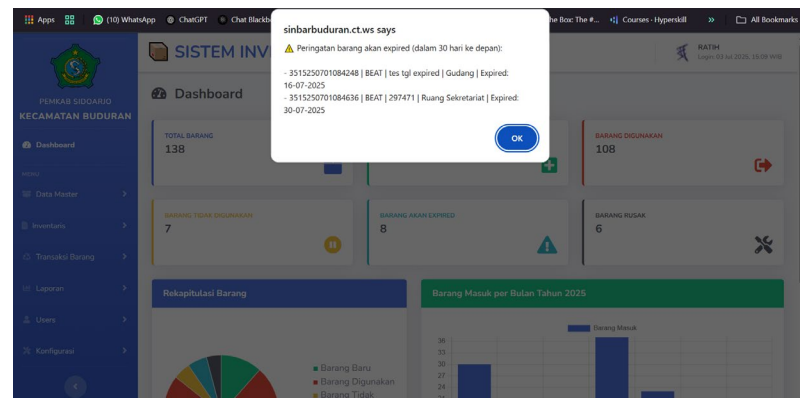


Figure 10. Dashboard Page

In Figure 9, after successfully logging in, users will be directed to the dashboard as the main page that displays a summary of important information such as total stock, incoming and outgoing goods data, and a navigation menu to other features. This dashboard is designed to make it easier for users to monitor inventory conditions in real-time through a concise and informative data display. Additionally, the system is equipped with an automatic

notification feature in the form of a pop-up shown in Figure 10 that appears immediately after login. This notification serves as a reminder for users about items whose validity period is about to expire, including reminders about taxes for official vehicles registered in the Buduran District. This feature helps ensure that there are no delays in renewals or the management of time-sensitive inventory.

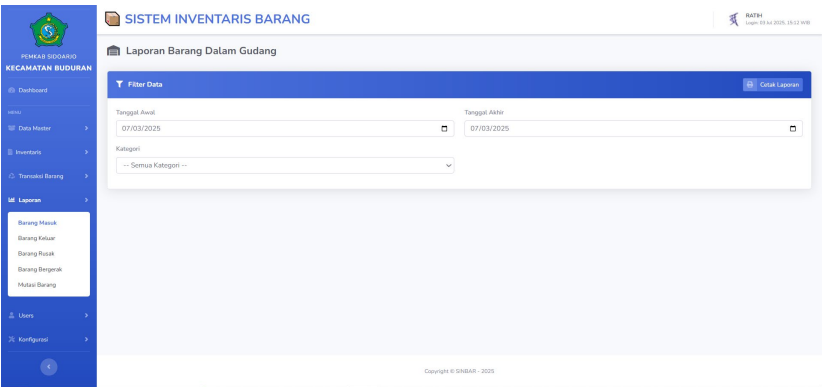


Figure 11. Report Page

In Figure 11, the report page displays a data filter feature that allows users to search based on date range, item category, and transaction type. This feature is very helpful in customizing reports according to user needs, such as reports on incoming goods, outgoing goods, damaged goods, moving goods, and goods transfers. This page is designed with a simple and neat interface, and is equipped with a "Print Report" button to make it easier for users to document search results in physical print or digital file form. Overall, the interface design on this report page supports the inventory management and reporting process effectively and efficiently, and speeds up access to information needed by the Buduran Subdistrict for administrative and decision-making purposes.

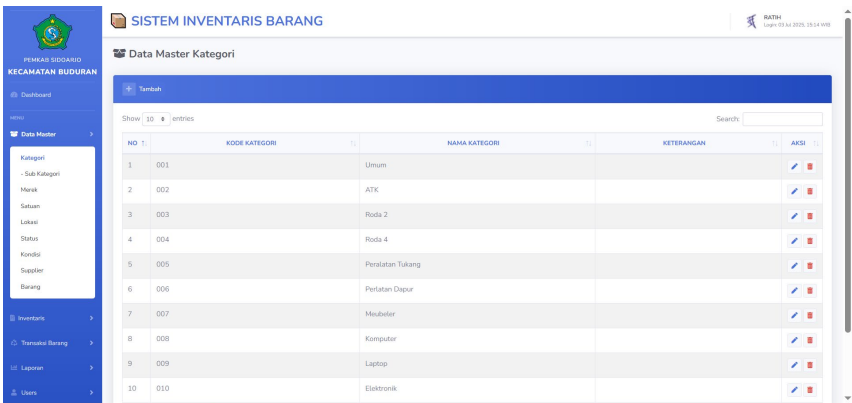


Figure 12. Report Page

The Item Category Master Data Page shown in Figure 12 serves as a center for managing item category data used in the inventory system. As seen in the image, this page displays a list of categories in a table consisting of columns for No., Category Code, Category Name, Description, and Action. At the top of the table, there is an "Add" button that allows users to add new categories according to the agency's needs. Meanwhile, in the action column, there are edit and delete icons that allow administrators to update or delete category data that is no longer relevant. A search feature in the upper right corner is also provided so that users can find categories quickly without having to scroll through the table one by one. This page is an important part of the Master Data menu, which is the foundation of all item data in the system. With structured category grouping, users will find it easier to manage, search, and classify items in the inventory, such as stationery, electronics, tools, computers, and others.

Figure 13. Report Page

The Item Inventory List page in the Buduran Subdistrict Item Inventory System in Figure 13 displays a complete list of all inventory items recorded in the system in the form of an informative table. Each entry contains important information such as the Item QR Code for digital identification, item name, serial number, brand, category, subcategory, unit, condition, usage status, storage location, supplier, and additional information. There is a column filter feature and a search bar to help users filter and find item data quickly and efficiently. In addition, the "Print Item List and QR Code" button allows users to print data and item labels for documentation purposes. This page is designed to support transparent, efficient, and accountable asset management in the Buduran District.

3.2 System Testing Method

System testing aims to ensure that the goods inventory information system developed for the Buduran Subdistrict can operate in accordance with user needs and expectations. Testing is conducted using two main approaches: Black Box Testing and User Acceptance Testing. Testing is carried out in stages through the following main phases:

3.2.1 Black Box Testing

Black Box Testing is a software testing method that focuses on application functionality without looking at the internal structure of the code. This testing is carried out to ensure that every major feature of the system, such as login, data input, edit, delete, search, and print reports, can run according to user needs and without errors [17]. In this study, Black Box Testing was used to evaluate whether the inventory application in Buduran District could be run and used properly from a technical standpoint. The testing was conducted by five respondents, namely two administrators who would be responsible for managing the application and three staff members as users who would use the application in their daily operations. Each respondent tested each of the application's main features. The test results are presented in the following table:

Table 1. Black Box Testing

No	Statement	Result Testing	Status
1	Can the application be run without errors?	Successful	Pass
2	Does the login process work as expected?	Successful	Pass
3	Was the product data successfully added and displayed correctly?	Successful	Pass
4	Do the edit and delete features for product data work properly?	Success	Pass
5	Does the product data search display relevant results?	Successful	Pass
6	Does the process of exporting data to Excel/reports run without errors?	Successful	Pass
7	Can the page/menu be accessed without system failure?	Successful	Pass
8	Does the STNK payment reminder notification appear on the specified date?	Successful	Pass

Table 2. Black Box Testing Admin

No	Statement	Results Testing	Status
1	Can the application be run without errors when logging in as an administrator?	Successful	Pass
2	Does the admin login process work as expected?	Successful	Pass
3	Can the admin add and view product data correctly?	Successful	Pass
4	Does the admin's ability to edit and delete product data function properly?	Successful	Pass
5	Does the product data search feature work accurately when used by the admin?	Successful	Pass
6	Can the data export feature to Excel/reports be performed without errors by the administrator?	Successful	Pass
7	Can all admin pages/menus be accessed without errors or system failures?	Successful	Pass
8	Can the system automatically display STNK reminder notifications on the specified date?	Successful	Pass

The test results show that all scenarios were successfully executed without errors, with a "Pass" status for each test, resulting in a 100% success rate, indicating that the system is technically ready for use in the operational environment of Buduran District.

3.2.2 User Acceptance Testing

User Acceptance Testing is the final testing stage conducted to ensure that the developed system meets user needs and expectations. This test focuses on the aspects of comfort, ease of use, and effectiveness of the system from the end user's point of view. In this test, the participants consisted of five people, namely two administrators and three Buduran Subdistrict staff who will use the system directly in managing inventory. The trial was conducted by distributing a questionnaire containing 8 statements using a 1–4 Likert scale (1 = strongly disagree, 4 = strongly agree) to measure user satisfaction with the functionality and appearance of the system, as shown in Table 3.

1 = Strongly Disagree

2 = Disagree

3 = Agree

4 = Strongly Agree

Table 3. User Acceptance Testing

No	Statement	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5
1	Is the application easy to understand when first used?	4	4	4	4	4
2	Are the menus and buttons easy to recognize and use?	4	4	4	3	4
3	Is the application display comfortable to look at and not confusing?	3	4	4	4	4
4	Can users input data without technical assistance?	4	4	4	3	4
5	Can users easily search and view product data?	4	3	4	4	4
6	Is the logout/login process easy to do?	3	4	4	4	4
7	Are users satisfied with this application?	4	4	4	4	3

8	Is this application suitable for inventory management in Buduran District?	4	3	4	4	4
Total Score per Respondent		30	30	32	30	31
Total Score		153				
Maximum Score		160				
Satisfaction Percentage		95.6				

$$\text{Persentase Kepuasan} = \frac{\text{Total Skor yang Diperoleh}}{\text{Total Skor Maksimal}} \times 100\%$$

$$\text{Persentase Kepuasan} = \frac{153}{160} \times 100\% = 95.6\%$$

Based on the UAT results, the system obtained a total score of 153 out of a maximum of 160, with a satisfaction percentage of 95.6%. This percentage shows that the majority of respondents rated the system as an intuitive, functional application that supports efficient work processes. In addition, this evaluation confirms that the user interface is sufficiently informative and the system navigation is easy to understand for non-technical users. With these results, it can be concluded that the system has met the expectations of end users and is suitable for use in inventory management operations in Buduran District without requiring major revisions to its main features. This UAT is an important reference in the decision-making process for officially implementing the system in the district work environment.

4 Conclusion

The development of a web-based inventory information system in Buduran District has been successfully implemented using the Agile method, which allows the development process to be flexible and tailored to user needs. This system is designed to overcome the problems of manual recording, which often causes data errors and inefficiency in inventory management. Testing using the Black Box method showed that all the main functions of the system performed as expected with a success rate of 100%. Meanwhile, the results of User Acceptance Testing (UAT) showed a user satisfaction rate of 95.6% from 5 respondents consisting of 2 administrators and 3 staff members. Thus, this system is declared fit for use and is expected to support improved operational effectiveness and decision-making in asset management at the subdistrict government level.

5 Acknowledgements

The researchers would like to express their gratitude to all parties who have assisted in the preparation of this research, especially to the Buduran Subdistrict, Sidoarjo Regency, for their cooperation and data support. Thanks are also extended to the supervising lecturer for the guidance and input that were very helpful, as well as to all lecturers of the Informatics Study Program at Muhammadiyah University Sidoarjo for the knowledge that was provided during the study period. The support from family and friends was also very meaningful in completing this research. Hopefully, this research can make a useful contribution to the development of information systems in the field of inventory management.

References

- [1] I. M. Ijfi and M. F. Khalilullah, "DESIGNING A WEB-BASED INVENTORY INFORMATION SYSTEM (CASE STUDY: JAKARTA DÉCOR STORE)," vol. 9, no. 1, pp. 275–283, 2025.
- [2] M. Kholifatu *et al.*, "Integration of RFID technology for the development of an inventory information system," vol. 8, no. 2, pp. 344–355, 2024.
- [3] J. Jurnal *et al.*, "Designing a Website-Based Inventory and Asset Information System: A Case Study of the Mojomanis Village Government," vol. 3, no. 1, pp. 34–43, 2025.
- [4] I. M. Widiarta, Y. Mulyanto, and A. Sutrianto, "Designing an Inventory Information System Using the Agile Software Development Method (Case Study of Nada Store)," *Digital Transformation Technology (Digitech)*, vol. 3, no. March, p. 20, 2023.
- [5] E. D. Sumanik, H. A. Sawor, and D. F. Dacosta, "Web-Based Inventory Information System at SMP YPK Kotaraja," *AKSIOMA : Journal of Economic Science and Education*, vol. 1, no. 1, pp. 47–57, 2024, doi: 10.62335/3b66k647.

- [6] D. Tampubolon and P. Simanjuntak, "Implementation of a Web-Based Inventory Input Application Using the Agile Method," *Computer and Science Industrial Engineering (COMASIE)*, vol. 9, no. 5, 2023, doi: 10.33884/comasiejournal.v9i5.7753.
- [7] H. Handayani, K. U. Faizah, A. M. Ayulya, M. F. Rozan, D. Wulan, and M. L. Hamzah, "Designing a Web-Based Inventory Information System Using the Agile Software Development Method," *Journal of Information System Testing and Implementation*, vol. 1, no. 1, pp. 29–40, 2023, [Online]. Available: <https://journal.al-matani.com/index.php/jtisi/article/view/324>
- [8] Y. Setiawan, L. F. Marini, and L. Y. Baisa, "Web-based SPJ information system using the Agile method at the West Papua Finance Office," vol. 22, no. 1, pp. 133–149, 2025.
- [9] A. Widyantoro *et al.*, "Systematic Literature Review: Comparing Agile and Waterfall Method Approaches in Software Development," vol. 4, no. 1, pp. 183–193, 2025.
- [10] E. Surbakti and V. Lumbanbatu, "MOBILE-BASED USING THE AGILE METHOD," vol. 5, pp. 112–121, 2025.
- [11] W. H. Ibrahim and I. Maita, "Web-Based Public Service Information System at the Kampar Regency Public Works Office," *Scientific Journal of Engineering and ...* vol. 3, no. 2, pp. 17–22, 2023, [Online]. Available: [http://repository.uin-suska.ac.id/70478/1/SISTEM WEB-BASED PUBLIC SERVICE INFORMATION AT THE KAMPAR REGENCY PUBLIC WORKS AGENCY.pdf](http://repository.uin-suska.ac.id/70478/1/SISTEM%20WEB-BASED%20PUBLIC%20SERVICE%20INFORMATION%20AT%20THE%20KAMPAR%20REGENCY%20PUBLIC%20WORKS%20AGENCY.pdf)
- [12] K. Khotimah, E. Krisnanik, and A. Ria, "The Use of Agile Methods in the Design of a Web-Based Raw Material Inventory Application at CV Bintang Harapan Jaya," *Journal of the National Seminar on Computer Science and Its Applications (SENAMIKA)*, pp. 316–326, 2022.
- [13] D. Tampubolon and P. Simanjuntak, "Implementation of an Inventory Input Application Using the Web-Based Agile Method," *Computer and Science Industrial Engineering (COMASIE)*, vol. 9, no. 5, 2023, doi: 10.33884/comasiejournal.v9i5.7753.
- [14] K. Khotimah, E. Krisnanik, and A. Ria, "The Use of Agile Methods in the Design of a Web-Based Raw Material Inventory Application at CV Bintang Harapan Jaya," *Journal of the National Seminar on Computer Science and Its Applications (SENAMIKA)*, pp. 316–326, 2022.
- [15] I. M. Widiarta, Y. Mulyanto, and A. Sutrianto, "Designing an Inventory Information System Using the Agile Software Development Method (Case Study of Toko Nada)," *Digital Transformation Technology (Digitech)*, vol. 3, no. March, p. 20, 2023.
- [16] M. A. Afandi and N. L. Azizah, "Digital-Based Posyandu Service Design in Ganggang Panjang Village," Jul. 05, 2024. doi: 10.21070/ups.4924.
- [17] P. A. T. Subur *et al.*, "Implementation of Agile Software Development in the Design of Management Information Systems Inventory and Finance at," 2025.