WEB-BASED INVENTORY SYSTEM DEVELOPMENT WITH AGILE AT CV DAZRY HARAPAN

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Abstract: Dazry Harapan Household Industry (IRT) is an SME in Jambi City specializing in the production of laundry perfume and previously relied on manual record-keeping using notebooks. This conventional method created several issues, including frequent stock recording errors, difficulties in preparing financial reports, delays in identifying minimum stock levels, and the absence of structured historical data. This study aims to develop a web-based digital recording system to improve efficiency, accuracy, and transparency in inventory management. The system was developed using the Agile (Scrum) methodology through three sprints covering the creation of login modules, stock and transaction recording, reporting, minimum-stock notifications, and interface refinement. System design was formulated using use case diagrams, flowcharts, database modeling, and interface prototypes based on the Laravel framework. User Acceptance Testing (UAT) demonstrated high user satisfaction, with 90% of respondents stating that the system is easy to use, 85% reporting faster administrative processes, and 95% acknowledging improved reporting accuracy. The system also increased recording efficiency by 66% — from 3 minutes to 1 minute per transaction—and reduced stock recording errors from 15% to 2% per month. The results indicate that implementing a web-based digital recording system significantly enhances the operational performance of SMEs.

Keywords: SMEs, digital recording system, Agile, inventory management, Laravel.

Abstrak: Industri Rumah Tangga (IRT) Dazry Harapan merupakan UMKM di Kota Jambi yang bergerak pada produksi parfum laundry dan masih menggunakan sistem pencatatan manual berbasis buku tulis. Metode konvensional tersebut menimbulkan berbagai permasalahan, seperti tingginya kesalahan pencatatan stok, hambatan dalam penyusunan laporan keuangan, keterlambatan identifikasi stok minimum, serta ketiadaan rekap data historis yang terstruktur. Penelitian ini bertujuan mengembangkan sistem pencatatan digital berbasis web untuk meningkatkan efisiensi, akurasi, dan transparansi manajemen persediaan. Pengembangan dilakukan menggunakan metode Agile (Scrum) melalui tiga sprint yang mencakup pembangunan modul login, pencatatan stok, transaksi, laporan, notifikasi stok minimum, serta penyempurnaan antarmuka. Desain sistem dirumuskan menggunakan use case diagram, flowchart, perancangan database, dan prototipe antarmuka berbasis Laravel. Hasil pengujian melalui User Acceptance Test (UAT) menunjukkan tingkat penerimaan pengguna yang tinggi, yaitu 90% menilai sistem mudah digunakan, 85% merasakan percepatan proses pencatatan, dan 95% menilai laporan yang dihasilkan lebih akurat. Efisiensi waktu pencatatan meningkat sebesar 66%, dari 3 menit menjadi 1 menit per transaksi, sedangkan tingkat kesalahan pencatatan menurun dari 15% menjadi 2% per bulan. Penelitian ini membuktikan bahwa implementasi sistem pencatatan digital berbasis web mampu meningkatkan kualitas operasional UMKM secara signifikan.

Kata kunci: UMKM; sistem pencatatan digital; Agile; manajemen stok; Laravel;

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a strategic role in Indonesia's economy, contributing significantly to national employment absorption and the Gross Domestic Product (GDP) [1]. However, many MSMEs still face challenges in manually managing raw material inventories, which often leads to inaccurate stock data, inefficiencies, and the inability to meet market demand in a timely manner [2]. The digitalization of inventory management systems can reduce operational errors, accelerate processes, and enhance overall efficiency [3].

With technological advancements, numerous studies have highlighted how web-based inventory management systems can assist MSMEs in addressing various operational challenges. For example, web-based information systems enable real-time stock monitoring and more accurate inventory control [4]. Other literature emphasizes the benefits of digital management information systems in improving the sustainability and competitiveness of MSMEs in the era of the Fourth Industrial Revolution [5]. Such digitalization is crucial to support operational efficiency, new business models, and broader market reach [6].

From the technological development perspective, the Agile method has proven effective in developing adaptive and collaborative information systems. For instance, research combining Agile and Waterfall approaches in the development of a system for UMKM Toko Jali demonstrated improved operational efficiency and inventory management [7]. Another study in Bengkulu City employed Agile as a framework for developing a web-based MSME data management information system, resulting in a system ready for functional implementation [8]. Agile was selected due to its flexibility and its ability to incorporate rapid user feedback, making it suitable for the dynamic needs of MSMEs [3].

The reviewed literature indicates a research gap in integrating web-based digital recording systems for MSME raw material inventory management with the Agile method as the development approach. Yet, combining digital innovation with a structured methodology is essential for creating effective solutions that are responsive to user needs and capable of sustainable development.

Therefore, this study aims to fill this gap by developing a web-based digital recording system designed and built iteratively using the Agile method. This system is intended to support raw material inventory management in MSMEs—particularly those in production sectors such as laundry perfume manufacturing—through features including transaction recording, minimum stock notifications, and real-time report access via a web-based interface. The focus of the study is to examine how Agile enhances system relevance to partner needs and optimizes inventory management effectiveness.

The objective of this research is to develop a web-based digital recording system using the Agile method and to evaluate its effectiveness in optimizing raw material inventory management. The expected scientific contributions include: (a) an Agile-based model for MSME inventory system development, (b) empirical evidence of the impact of system digitalization on inventory management efficiency, and (c) practical guidance for MSMEs and system developers in the digital transformation era [9].

Through this approach, the study not only produces a practical technologi-

cal solution but also enriches policy discourse and methodologies related to MSME digital transformation, aligned with national agendas for technology adoption, digital literacy, and competitiveness enhancement.

METHOD
Type of Research

This study employs a Research and Development (R&D) approach focused on developing software to support the operational activities of MSMEs. The product developed is a web-based digital recording system designed to optimize raw material inventory management. The development process adopts the Agile method using the Scrum framework, as this approach enables iterative and adaptive system development while involving users directly in each development cycle.

Research Location and Subjects

The research was conducted at the Dazry Harapan Household Industry (IRT), an MSME located in Jambi City that engages in the production of laundry perfume. The research subjects consist of the owner and employees who previously performed raw material stock recording manually.

System Development Method (Agile – Scrum)

System development followed the stages within the Scrum framework, which include:

1. Product Backlog
   Needs identification was carried out through interviews and direct observation of the manual recording process at the MSME. The results of the needs analysis included: recording incoming/outgoing stock, stock reports, transaction reports, minimum stock notifications, and simple financial sum-maries. All identified needs were compiled into a product backlog as development priorities [10].

2. Sprint Planning
   This stage involved preparing a work plan based on the backlog with a sprint duration of two weeks. The initial priorities were the development of the stock recording module, followed by the reporting and notification modules.

3. Sprint Execution (Development)
   System development was conducted through the following stages: *System design*: creating use case diagrams, activity diagrams, and database designs, *Implementation*: the system was built using the Laravel (PHP) framework and MySQL as the database, *Unit testing:* each module was tested to ensure its functionality aligned with the requirements.

4. Daily Scrum
   Routine communication was maintained through daily progress notes to record accomplishments, obstacles, and plans for subsequent actions.

5. Sprint Review
   At the end of each sprint, the system prototype was demonstrated to the MSME partner. The partner provided feedback regarding usability, interface flow, and additional system needs.

6. Sprint Retrospective
   An evaluation was conducted at the end of each sprint to assess the effectiveness of the development process, identify obstacles, and formulate improvements for the next iteration.
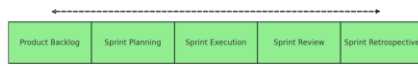
Figure 1. Research workflow using the Agile (Scrum) method

Data Collection Techniques

Research data were obtained using several methods:

1. Observation, to identify weaknesses in the manual recording system used by the MSME.
2. Interviews, to explore the functional requirements of the system from users (business owner and employees).
3. Documentation, including purchase receipts, stock books, and manual financial reports.
4. User Acceptance Test (UAT), to evaluate user acceptance and satisfaction with the system.

Data Analysis Techniques

Data were analyzed using both quantitative and qualitative approaches. Quantitatively, the study compared conditions before and after the system implementation, including:

a. Average time required for recording transactions.
b. Error rate in stock recording.
c. Speed of report generation.

Qualitatively, analysis was conducted through the interpretation of interview results and user feedback regarding the system. These data were used to assess the system's effectiveness in improving the efficiency of raw material inventory management.

RESULTS AND DISCUSSION
Overview of the Partner MSME and Initial Problems

The Dazry Harapan Household Industry (IRT) is an MSME in Jambi City engaged in the production of laundry perfume. Prior to this study, the recording system used was still manual, relying on notebooks. This resulted in several issues, including: (1) errors in recording raw material stock, (2) difficulties in preparing financial reports, (3) delays in identifying minimum stock levels, and (4) the absence of structured historical data. These problems led to low production efficiency and difficulties for the business owner in making managerial decisions.

This study addresses these challenges by developing a web-based digital recording system using the Agile (Scrum) method [11]. The system is expected to minimize recording errors, accelerate administrative processes, and enhance transparency and efficiency in inventory management.

System Design Process: Use Case Diagram (UML)

To illustrate system requirements, a use case diagram was created to represent user interactions with the system.

Main actors: admin (business owner) and staff.

Main use cases: login, input raw material stock, record transactions, generate reports, and receive minimum stock notifications.
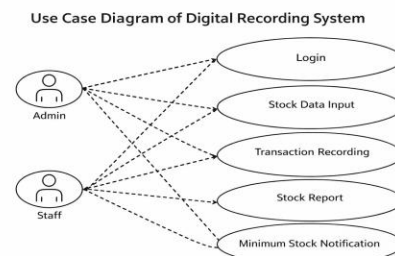

Figure 2. Use Case Diagram of Digital Recording System

System Flowchart

The system workflow is illustrated using a flowchart that shows the recording process from stock input to financial reporting.

1. The process begins with user login.
2. Users can select the stock, transaction, or report menu.
3. If stock reaches the minimum threshold, the system provides a notification.
4. Data are stored in the MySQL database and can be exported into reports.

Database Design

The database structure is designed to store raw material data, transactions, and reports. The main tables include: users: stores user data (admin, staff).

1. input_materials**:** records types of raw materials, stock quantities, and minimum thresholds.
2. transaction: records incoming and outgoing raw materials.
3. report: compiles transaction summaries by period.

System Interface Design

The system is developed using the Laravel framework with a responsive web-based interface design. A simple and intuitive interface is chosen to ensure ease of use for MSME users.
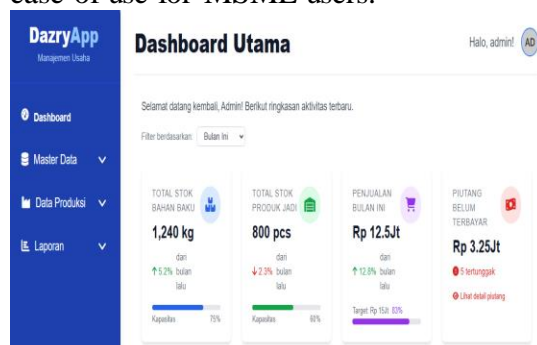

Figure 3. System Dashboard Interface Display

Displays a summary of raw material stock, recent transactions, and minimum stock notifications.

Figure 4. Raw Material Stock Input Form

A simple form used to add, reduce, or update raw material stock.

Figure 5. Stock and Financial Report Display

Automated reports in the form of tables and charts that can be printed.

3. System Implementation Using the Agile Method [12]

The system development process was carried out in three sprints:

Sprint 1: Development of the login module, stock data input, and database.

Sprint 2: Development of the reporting module, minimum stock notifications, and input validation.

Sprint 3: Enhancement of the user interface (UI), module integration, and joint testing with users.

Each sprint concluded with a review session with the MSME owner to

evaluate system usability and gather feedback. The system was developed iteratively, enabling every user input to be incorporated directly into the subsequent sprint.

System Testing Results

User Acceptance Test (UAT)

User acceptance testing was conducted using a Likert-scale questionnaire administered to the MSME owner and staff. The results indicate that 90% of respondents found the system easy to use, 85% stated that the system helped accelerate the recording process, and 95% assessed that the generated reports were more accurate compared to the manual method.

Recording Time Efficiency

Before implementing the system, stock recording required an average of 3 minutes per transaction. After implementation, the recording time decreased to 1 minute per transaction, resulting in a 66% efficiency improvement.

Recording Accuracy

Stock recording errors (e.g., mismatched material quantities), which previously averaged 15% per month, decreased to 2% per month after the system was deployed.
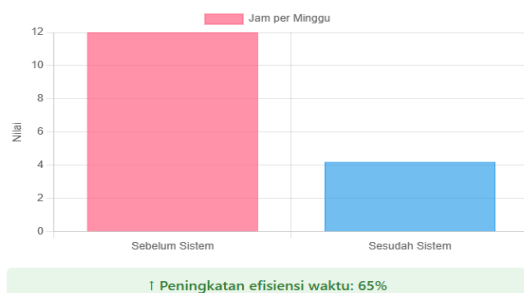
Comparison of Conditions Before and After

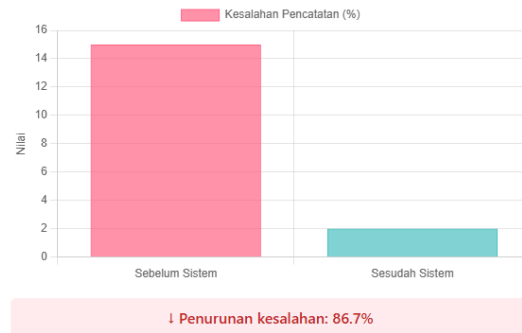Figure 6. Time Efficiency Comparison Chart

Figure 7. Chart of Recording Error Reduction

Discussion of Research Findings

The results of this study indicate that web-based stock management digitalization significantly improves the efficiency and accuracy of record-keeping in SMEs. This finding aligns with the research of Azizah et al., which demonstrated that digital systems accelerate administrative processes in SMEs, as well as the study by Haryanto et al., which emphasizes the role of SOPs and digitalization in enhancing production efficiency.

A major strength of this study lies in the application of the Agile methodology, which enables system development to be more responsive to user needs. The iterative approach ensures that the system is fully aligned with the operational context of SMEs, which typically require practical, simple, and easily adaptable solutions.

Furthermore, the outcomes of this research enrich the literature on SME digitalization by presenting a concrete model of Agile implementation in the context of web-based stock recording systems. This academic contribution is relevant for advancing studies in software engineering for SMEs and supporting the broader digital transformation agenda in the Industry 4.0 era.

This section no longer discusses research design; instead, it focuses on the

outcomes of the study that has been conducted.

CONCLUSION

This research successfully developed a web-based digital recording system to support the optimization of raw material inventory management in SMEs. The system, built using the Agile (Scrum) methodology, effectively addressed the partner's challenges, including error-prone manual recording, delays in stock information, and inefficiencies in processing time.

The system evaluation showed significant improvements, including a reduction in recording time from an average of 3 minutes per transaction to 1 minute, as well as a decrease in recording errors from 15% to only 2%. In addition, the integration of minimum stock notifications helped the partner make production decisions more quickly and accurately.

This, this study not only provides practical contributions to supporting SME digital transformation but also enriches the literature on the application of Agile methods in developing simple and context-appropriate information systems for micro enterprises.

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