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Agile Scrum Integration In Designing Statistics Modules Hpp Reports In Applications (Ta Cashier)

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ABSTRACT

The advancement of information technology, especially in the development of web-based applications, has made a major contribution in improving the efficiency of business operations, including in point-of-sales (POS) systems. Based on observations and interviews conducted at the student cooperative of Muhammadiyah University of Palopo, it was found that the cashier system used did not yet have goods statistics features and cost of goods sold (COGS) reports. Therefore, this study aims to design and develop these two important modules using the Agile Scrum approach. The method used is Agile Development with the Scrum framework, which is divided into several sprints with measurable development targets. The system is developed using the Laravel framework and MySQL database. The two main modules built are (1) Goods statistics which displays the number of products sold per day, week, and month, and (2) COGS report which calculates the total cost of goods sold and profit margin based on purchase and sales data. The development results show that both modules function according to user needs. The Statistics module can display real-time data that is relevant for sales evaluation, while the COGS module is able to calculate the cost of goods sold accurately and present complete financial reports. Validation is carried out through sprint reviews and user acceptance tests (UAT), which show that these features facilitate the business decision-making process. In conclusion, the integration of the Agile Scrum method in POS application development has proven effective in building analytical features that are relevant and adaptive to the needs of MSMEs.

INTRODUCTION

Rapid progress in information technology, computers and the internet, especially in the development of applications and websites, is very helpful in simplifying and lightening the work which was previously done manually (Kudin & Hamid, 2021). The development of computer technology, especially in the field of information systems that continues to grow, creates a need for fast, precise, and accurate information. Based on the latest data, many MSMEs are starting to implement technology, especially website-based cashier applications (Zahara & Widodo, 2025).

Information technology is used to facilitate data collection in companies in order that trading activities can run smoothly without obstacles by implementing a computer system to record every transaction and important trader information. By using information technology, the flow of goods in and out can also be better organized, recorded trade transaction data becomes more accurate. In addition, the use of information technology helps reduce excessive paper use. Therefore, the application of information technology in the trade sector not only facilitates business processes, but also contributes to environmental preservation (Pomo et al., 2022).

In research conducted by (Siswanto et al., 2023)This study can be concluded that the innovation of the cashier application can be used to manage stock data, transactions and sales so that accurate and digitalized data is obtained by MSMEs even though they have different business models, but this study has shortcomings.

After conducting observations and interviews at the Muhammadiyah University of Palopo student comprasi, the researcher discovered a problem, that there were no statistics of goods and reports on the cost of goods sold. So this study aims to develop a cashier application in order to facilitate the admin in terms of managing data transactions and sales reports.

LITERATURE REVIEW

The development of information technology today, entrepreneurs can easily access actual and transparent information. Therefore, many of them utilize information technology. One important aspect to be supported by computer technology is a computerized sales and goods reporting system.(Pangestu & Astutik, 2024). Therefore, by utilizing the right technology and software, MSME companies can be more efficient in managing business information by using financial applications, which can record transactions automatically, produce financial reports quickly, and store data safely without worrying about losing important information.(Muchdi Noor Hidayat, 2022).

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Previous research conducted byHermansyah et al. (2018)developing an Android-based application for family financial management planning. This application is designed to improve financial management through features such as recording income, expenses, budgets, mutations, reports, and evaluations. Meanwhile,Ratna (2021)created a personal financial management application that allows users to record daily income and expenses quickly and accurately, present financial reports, and support savings planning by users. The latest research byTrivaika & Senubekti, (2022)using qualitative Design and Creation methods to develop an android-based financial management application. This application displays financial data, including income and expenses, with an emphasis on creative design.

One of the areas that must utilize information technology is entrepreneurs in order to improve the quality of service. Website-based applications are the main choice for entrepreneurs to provide fast and quality services to their employees.(Muzakki et al., 2024).

Information technology provides a variety of benefits, such as increasing operational efficiency, reducing costs, expanding access to markets, and supporting innovation and adaptation to changing consumer needs.(Erwin Saraswati, 2024).

Point Of Sale (POS) is an activity related to sales and helps the transaction process. Each POS application consists of hardware in the form of (Cash Drawer, Terminal/PC, Payment Terminal, Barcode Scanner, Receipt Printer) and software in the form of (Reporting, Purchasing, Customer Management, Inventory Management, Return Processing, Transaction Security Standards) where both components are used for each transaction process(Santoso et al. 2023)

Scrum is a software engineering method that uses the principles of the AGILE approach, which relies on the power of team collaboration, incremental products and iteration processes to achieve the final result.(Sulastri et al. nd)

Website or site can be interpreted as a collection of pages used to display text information, still or moving images, animations, sounds, and or a combination of all of them, both static and dynamic, which form a series of interrelated buildings, each of which is connected by a network of pages. The relationship between one web page and another web page is called a hyperlink, while the text used as a connecting media is called hypetext.(Aulia, 2012).

METHOD

The method used in this study is agile development with a scrum framework. Agile method is adaptive and responsive to all changes. This method is very suitable for system design and short-term projects because this method is rapid in adapting to changes. While the scrum method is a software development method derived from the agile method that is responsive and provides good value and benefits in system design (Irawan, Triayudi, and Iskandar 2023).

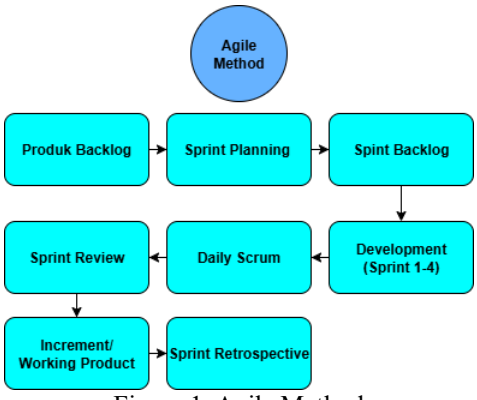


Figure 1. Agile Method

This study uses a software engineering approach with the Agile Development method that applies the Scrum framework. This method was chosen because it is adaptive to changes in user needs and is able to produce products gradually through iterations (sprints). Each iteration lasts for one week, with evaluation and validation carried out at the end of the sprint. The stages in the Scrum method applied in this study include:

1. Product Backlog: Compiling a list of feature requirements to be developed, namely Goods Statistics and COGS Reports.
2. Sprint Planning: Determining priorities and tasks to be completed in a sprint.
3. Daily Scrum: Daily communication to monitor task progress.
4. Sprint Review: Testing and presenting sprint results to users. Sprint Review: Testing and presenting sprint results to users.
5. Retrospective: Internal evaluation of the development team for improvement of the next sprint.

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System Development Stages

Devices Used:

1. Programming Languages: PHP 8, HTML, JavaScript
2. Framework: Laravel 9
3. Database: MySQL
4. Server Environment: XAMPP (Apache, MySQL)

Sprint Structure:

1. Sprint 1: Basic database and backend design
2. Sprint 2: Implementation of Goods Statistics module
3. Sprint 3: Implementation of the COGS Report module
4. Sprint 4: Testing, validating, and refining the view

Design of Goods Statistics Module

The Product Statistics Module aims to display product sales performance periodically, whether daily, weekly or monthly.

Database Design

1. Products – stores product data.
2. Sales_Item – stores sales transaction details per product.
3. Sales – stores key transaction information (date, cashier, total).

Flow and Function

This feature provides data display in the form of:

1. Product name.
2. Barcode.
3. Stock.
4. Number of sales per day, week and month.

Design of Sales Product Price Report Module (HPP)

This feature is used to calculate the total costs incurred for products that have been sold and calculate the profit from each product.

Data Design

Tables used:

1. Stors: Stores initial stock data.
2. Products: Cost price.
3. Selling_price: Records sales transactions of goods.
4. Sales_Item : To record the number of items sold.
5. Spendings: Record purchase returns and purchase allowances.

Report Function

The Hpp report displays:

1. Merchandise inventory (beginning).
2. Purchase.
3. Purchase Freight Charges.
4. Total Purchase.
5. Purchase Returns.
6. Purchase Discount.
7. Total Purchase Discount.
8. Total Net Purchases.
9. Items Available for Sale.
10. Ending Goods Inventory.
11. Cost of goods sold.

System Validation

Validation is done at the end of each sprint through:

1. Sprint Review for testing with users.

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2. User Acceptance Test (UAT) by store owners to ensure functionality is as expected.
3. Sprint Retrospective to identify deficiencies and improvements for the next sprint.

RESULT

The results of this reserch shows that two main modules were successfully developed and tested in a Laravel-based point-of-sales application, namely:

Goods Statistics Module Results

Module Item Statistics successfully displays product sales data based on a certain time period. The main features that have been successfully implemented are:

1. Statistics table containing: Product Name, Barcode, Stock, Sold Today, Sold This Week, and Sold This Month.

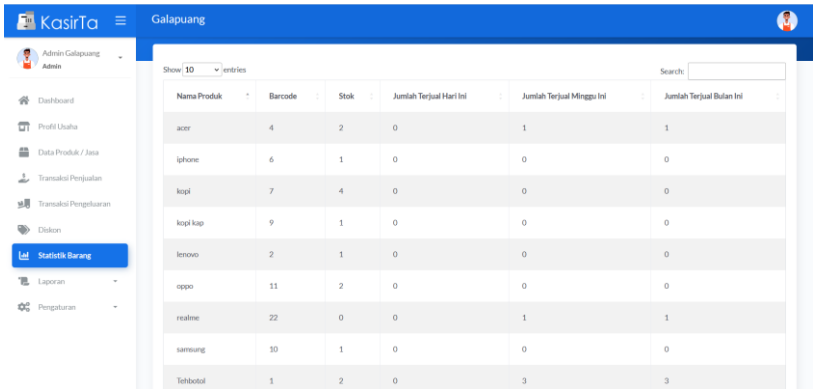


Figure 2. Goods Statistics

Results of the HPP (Cost of Goods Sold) Report Module

This module generates detailed reports related to the calculation of COGS and profits from products sold within a certain time period. Key features that have been successfully generated:

1. COGS calculation is based on initial stock data, incoming purchases, and the number of items sold.
2. Report Table showing: Merchandise inventory (beginning), Purchases, Purchase Freight, Total Purchases, Purchase Returns, Purchase Discounts, Total Purchase Discounts, Total Net Purchases, Goods Available for Sale, Ending Goods Inventory, Cost of Goods Sold.

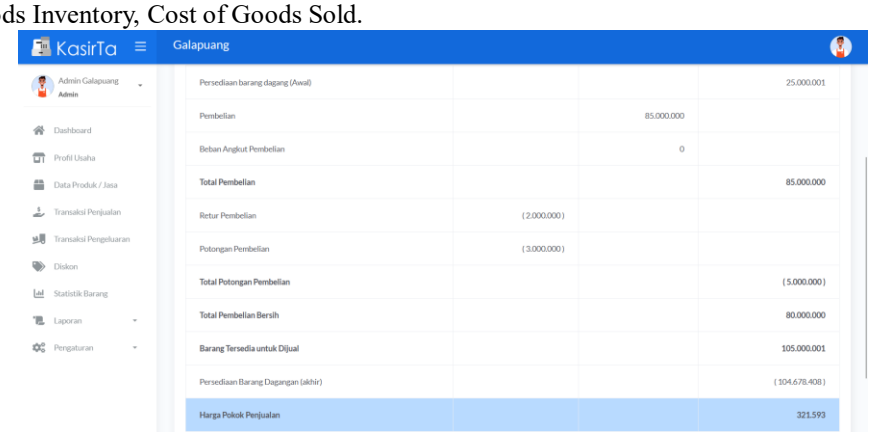


Figure 3. HPP Report

Blackbox Testing

Blackbox testing was done to evaluate the system function based on input and output without looking at the program code. The focus of testing is on two main features: Goods Statistics and Cost of Goods Sold (COGS) Report.

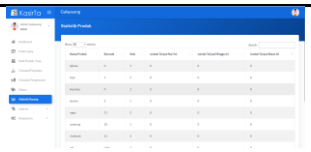
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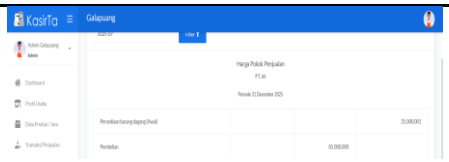
Testing of Goods Statistics Module

Table 1. Goods Statistics

No	Test Scenario	Dashboard	Input	Expected Output	Results
1	Displays all statistical data		Click the "Item Statistics" menu	The table contains product name, barcode, stock, daily, weekly and monthly sales.	Succeed
2	Product search by name		Type "coffee" in the search field	Displaying product rows with the name "coffee"	Succeed
3	Showing products sold this week		Current week transaction data	The "Quantity Sold This Week" column displays the corresponding figures.	Succeed
4	Showing products that are not sold at all		No transactions	All sales columns contain the number 0	Succeed
5	Search for products not listed		Type "xxx" in the search field	Empty table / not showing results	Succeed

Testing of Cost of Goods Sold (COGS) Report Module

Table 2. Cost of Goods Sold Report

No	Test Scenario	Dashboard	Input / Action	Expected Output	Results
1	Calculating COGS with purchasing and stock data		Initial inventory data, purchases, discounts	The COGS value appears and is calculated automatically in the last line of the report.	Succeed
2	Displaying the details of the HPP report		Click the "Reports > Cost of Goods Sold" menu	The complete COGS report table appears (including purchase returns & discounts)	Succeed
3	Displays Total Purchases and Total Net Purchases		Purchase data of IDR 85,000,000 and discount of IDR 5,000,000	Total Net Purchase = Rp. 80,000,000 is displayed according to the calculation logic.	Succeed

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4	Displaying Beginning and Ending Inventory		Data available	The table shows Rp25,000,001 (beginning) and Rp104,678,408 (end)	Succeed
5	Showing final results of HPP		The system is filled with complete data	HPP = Rp321,593 appears at the end of the report	Succeed

DISCUSSION

The results of the development of two main modules in the POS system show that the Agile Scrum approach makes a significant contribution to the successful implementation of features that are in accordance with user needs. In this section, an in-depth analysis of the results obtained, the relationship with previous research, and the limitations of the system will be discussed.

Effectiveness of Agile Scrum Implementation

The Agile Scrum method allows development to be carried out iteratively, so that any changing needs can be directly included in the backlog of the next sprint. This has proven effective especially in adjusting the appearance of the interface and the logic of calculating COGS based on input from the store owner. Scrum also helps the team work more focused through the Sprint Backlog and reflect progress through the Sprint Review. Effectiveness of Agile Scrum Implementation The Agile Scrum method allows development to be carried out iteratively, so that any changing needs can be directly included in the backlog of the next sprint. This has proven effective especially in adjusting the appearance of the interface and the logic of calculating COGS based on input from the store owner. Scrum also helps the team work more focused through the Sprint Backlog and reflect progress through the Sprint Review.

Item Statistics Module Analysis

The item statistics feature provides important insights for store owners to evaluate product performance. The data presented such as daily, weekly, and monthly sales figures are very helpful in making repurchase and promotion decisions.

Analysis of COGS Report Module

Automatically displayed COGS reports based on purchases and sales create efficiency in the bookkeeping process and profit evaluation. With an automatically calculated profit report, business owners can find out which products are the most profitable or actually detrimental.

CONCLUSION

This study shows that the Agile Scrum method can be applied effectively in the user-based software development process, especially in small and medium-scale point-of-sales (POS) systems. Through an iterative and collaborative approach, two main modules were successfully designed and implemented, namely:

1. Item Statistics Module that presents daily, weekly, and monthly sales performance data.
2. Cost of Goods Sold (COGS) Report Module that calculates the total COGS and profit reports from products that have been sold.

The implementation of Scrum allows for structured, evaluative, and fast-adaptive development to change user needs. Each sprint produces measurable output that can be validated through UAT (User Acceptance Test). The final results of both modules show calculation accuracy, ease of use, and real benefits for store owners in supporting business decision making. The main contribution of this study is to prove that the integration of the Scrum method in the development of POS analytics features not only accelerates the implementation process, but also increases the relevance of the feature to the operational needs of end users.

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