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Implementation of Prototyping and System Usability Scale In The Point of Sales Information System at CV Kharisma Lestari

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ABSTRACT

CV Kharisma Lestari is a retail business that faces obstacles in its sales and inventory management systems due to its continued use of manual processes. This study aims to develop a Point of Sales (POS) Information System by applying the prototyping method to improve the operational efficiency of CV Kharisma Lestari. The prototyping method was chosen for its ability to actively involve users from the early stages, so that the resulting system can meet their needs and expectations. This study uses a Research and Development (R&D) approach with prototyping stages : communication, quick plan, modeling quick design, construction of prototype, and deployment delivery and feedback. The results of the study show that the POS system developed successfully automates the sales transaction process, manages inventory data in real-time, and generates accurate inventory and sales reports. The implementation of this system has a significant impact on reducing transaction time by up to 70% and increasing inventory data accuracy. The System Usability Scale (SUS) test on the system resulted in a score of 85.8, which indicates a very high level of user acceptance (usability). Thus, the prototyping method has proven to be effective in producing an information system that is not only functional but also easy to use, as it is able to capture user needs and feedback.

INTRODUCTION

The era of digitalization has transformed the retail sector, requiring Micro, Small, and Medium Enterprises (MSME) to adapt in order to remain competitive. Point of Sale (POS) systems not only function as transaction tools, but also serve as important components in managing sales data, inventory, and financial reports, which directly impact the customer experience (Prasetiyo, 2020). However, in reality, many MSM still rely on manual processes using notebooks and calculators. This method is prone to human error, time inefficiency, and a lack of real-time data visibility regarding inventory and sales (Angellin et al., 2023). The implementation of an effective POS system can be a catalyst for increased productivity, more data-driven decision making, and the creation of added value for customers.

CV Kharisma Lestari, a retail store that sells daily necessities, experienced similar problems. The manual process of recording sales and updating inventory often resulted in data discrepancies, difficulties in tracking inventory changes, and slow report generation for store owners. These problems hindered strategic decision-making and had the potential to cause financial losses. Therefore, the development of a computerized POS system became a significant necessity.

Choosing the system development methodology is crucial to the success of an information system project. Traditional system development methodologies, such as the Waterfall model, follow a linear and sequential process where each phase must be completed before the next begins. This structure provides clarity and control but makes it difficult to accommodate changes once requirements are set, leading to inflexibility in projects with evolving or unclear user needs (Hossain, 2023). In contrast, the prototyping approach to system development involves creating an initial model (prototype) that can be evaluated and refined repeatedly based on user feedback. This process allows users to see, try, and provide input on the system before the final product is built, so that user needs and expectations can be better understood and accommodated (Riyanti et al., 2024). Thus, the risk of the system not meeting user needs or expectations can be minimized.

Inaccurate developer assumptions, lack of understanding of context and user diversity (Chauhan et al., 2024), lack of user involvement, and focus on feature completion rather than user benefits (Kusuma et al., 2024) cause a mismatch between user needs and the resulting system product. Often, systems that have been built at considerable cost and time are not used because they are considered complicated, incompatible with workflows, or unable to accommodate specific business needs. Unlike the rigid traditional waterfall model, prototyping allows developers and users to visually interact, evaluate, and refine system concepts before the final version is constructed in its entirety. Prototyping facilitates system adjustments to changing user needs or input during the development process, resulting in more targeted final specifications (Taufik & Ichwani, 2024).

This research focuses on the implementation of the prototyping method to develop a POS Information System that meets the needs of CV Kharisma Lestari. The objectives are to: (1) Analyze the functional and non-functional

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requirements of the POS system for CV Kharisma Lestari; (2) Design and build a POS system using a prototyping approach; (3) Test the functionality and user acceptance (usability) of the resulting system. The research gap identified in this study is the lack of in-depth exploration of the end-to-end prototyping implementation process in the context of complex POS system development, which not only includes the sales module but also its integration with inventory management and reporting. In addition, previous studies tend to lack emphasis on the managerial aspects and organizational changes that must be addressed during prototyping iterations, as well as how the prototype is validated not only in terms of technical functionality but also in terms of its operational and strategic impact on the business performance of MSME such as CV Kharisma Lestari.

Based on the above description, this study proposes to comprehensively analyze the implementation of prototyping in Point of Sales Information Systems by taking a case study at CV Kharisma Lestari. This study aims to document, analyze, and evaluate all stages of prototyping, its impact on system requirements alignment, and the effectiveness of the resulting POS system in solving problems.

LITERATURE REVIEW

A Point of Sales (POS) system is a combination of hardware and software used to process sales transactions, record sales data, manage inventory, print receipts, and generate financial reports in real-time (Dewi et al., 2021). Modern POS systems not only function as cash registers, but are also integrated with databases to facilitate the recording, searching, and reporting of transaction data (Efrans Christian & Widiatry, 2023).

Prototyping is a software development paradigm that allows developers and users to interact with simplified system models before significant investment is made in final coding (Pressman & Maxim, 2020).

Prototyping is widely recognized for its ability to clarify and capture ambiguous or incomplete requirements at the start of a project. By providing a tangible or visual representation of the system, prototypes allow stakeholders to interact with and evaluate early versions, making it easier to identify, specify, and refine requirements that may be unclear or misunderstood in written documents. (Bjarnason et al., 2023). The prototyping stages generally include: (1) defining the prototype objectives (2) defining the prototype functionality (3) developing the prototype (4) evaluating the prototype. The prototyping method involves creating an initial model of the system that is tested and evaluated together with users, then refined iteratively until it meets requirements. This process accelerates feature adjustments, minimizes the risk of errors, and ensures that the system is truly relevant to business operations.(Rahmadhani & Maryam, 2024).

The prototyping process in system and product development is typically structured into a series of key stages, each with a distinct purpose and set of activities

Table 1. Main Stages of Prototyping (Saari et al., 2020)(Bjarnason et al., 2023)

Stage	Description
Establish prototype objectives	Define the goal, scope, and intended outcomes of the prototype.
Define prototype functionality	Specify the features, functions, and requirements to be included in the prototype.
Develop prototype	Build the prototype, which may involve design, coding, and assembling the necessary components.
Evaluate prototype	Test and review the prototype with stakeholders or users, gather feedback, and assess objectives.

There are various methods that can be used to evaluate usability, one of which is the System Usability Scale (SUS). SUS is a method of measuring the usability or usefulness of a system based on a questionnaire with 10 statements that are assessed by users after using the prototype or system (Gustiara et al., 2024). This method provides a score that reflects how easy and effective a system is to use. SUS is often applied after the prototyping stage to measure satisfaction and ease of use from the user's perspective. SUS is the most widely used standard questionnaire for assessing perceptions of ease of use (Setiawati et al., 2023).

The System Usability Scale (SUS) is widely used in measuring user satisfaction because it has the advantage of being quick and inexpensive to administer. SUS is one of the most efficient ways to collect statistically valid data and provide clear and fairly accurate scores. The SUS questionnaire has been used as part of a reliable usability measurement technique (Setiawati et al., 2023)(Dr.Tenia Wahyuningrum, S.Kom., 2021).

METHOD

This research is an applied study using the Research and Development (R&D) method with a mixed methods approach (qualitative and quantitative). The qualitative approach is used for needs analysis and prototype evaluation, while the quantitative approach is used for usability testing and system performance measurement. The system development method used is prototyping, which consists of five stages :

Communication

This stage involves requirement gathering activities. This stage is carried out through in-depth interviews with the owner and cashiers of CV Kharisma Lestari, as well as direct observation of the ongoing business processes. The

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data collected includes functional requirements, such as transaction input, stock updates, and non-functional activities, such as ease of use and response speed. The essence of this stage is to understand the needs and expectations of CV Kharisma Lestari regarding the POS system to be produced.

1. System planning after the communication phase is completed.
   Next, steps are taken to create a quick and concise plan for prototype development. Based on the requirements gathered, an initial plan for the prototype to be produced is designed.
2. Rapid design modeling.
   At this stage, the initial prototype design is created, including the user interface and system architecture, which are presented in the form of mockups.
3. Construction of prototype.
   At this stage, the prototype modeling that has been done is implemented in the form of an actual prototype. At this stage, the process of building the system in its core functionality, integrating it with the database, and testing the functionality of the resulting prototype is carried out.
4. Distribute the prototype to users (CV Kharisma Lestari) for testing and feedback.
   After the final prototype is approved, the prototype is then tested on a limited basis within CV Kharisma Lestari. Data on all input is documented for improvement in the next iteration.

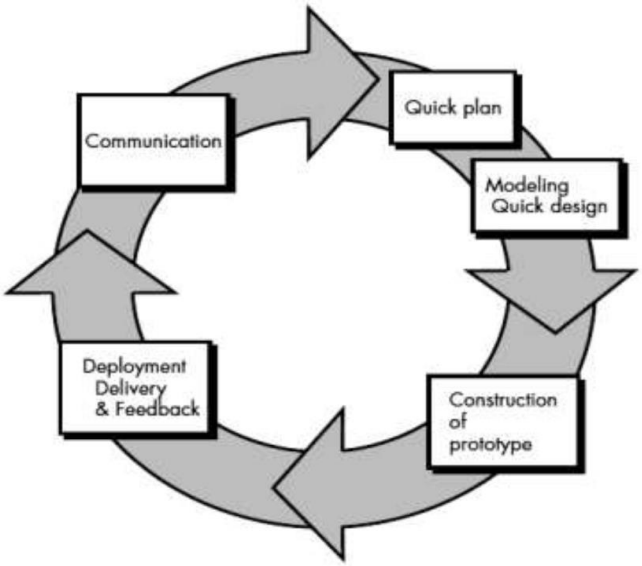


Figure 1. Prototyping Paradigms (Pressman & Maxim, 2020)

The research was conducted at CV Kharisma Lestari Pontianak. The research was conducted from January to September 2025 with the primary data sources being the owner of CV Kharisma Lestari and two cashiers as the main users. Data collection instruments included observation sheets, interview guides, and a Usability Test questionnaire using the System Usability Scale (SUS). Quantitative data was analyzed descriptively, while qualitative data was analyzed through data reduction, data presentation, and conclusion drawing.

RESULT

Based on interviews and observations, the system requirements for CV Kharisma Lestari are:

1. Functional, features for user login, product data management, customers, sales, sales transaction processes, automatic total calculation, automatic stock updates, sales note printing, and the ability to generate daily sales reports and stock reports for sales.
2. Non-functional requirements: a simple and easy-to-learn interface, responsive, and secure.

Prototyping and System Implementation Stages :

1. Stages 1, 2, and 3 (Communication, rapid planning, rapid system design modeling). Wireframes are produced for login, main menu, sales transactions, customer management, sales, and product management. The initial prototype only contains basic transaction functionality.
2. Phase 4 (Prototype Development).
   In this phase, the prototype is developed based on the requirements identified in the previous phase.
3. Phase 5 (Final Product).
   The final POS system is built with core modules such as: login access security, main menu, product data management, customer management, sales management, sales transactions, sales reports, sales inventory reports, and periodic sales reports.

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UML modeling is used to document the developed system design. This modeling visualizes functional requirements and system architecture design. Based on the use case diagram and activity diagram above, three main areas for efficiency improvement have been identified: (1) elimination of manual processes, calculations, and recording, which were previously manual but are now automated. (2) Real-time validation, stock checking, and transaction validation occur instantly. (3) Parallel processing, database updates, and note printing run simultaneously.

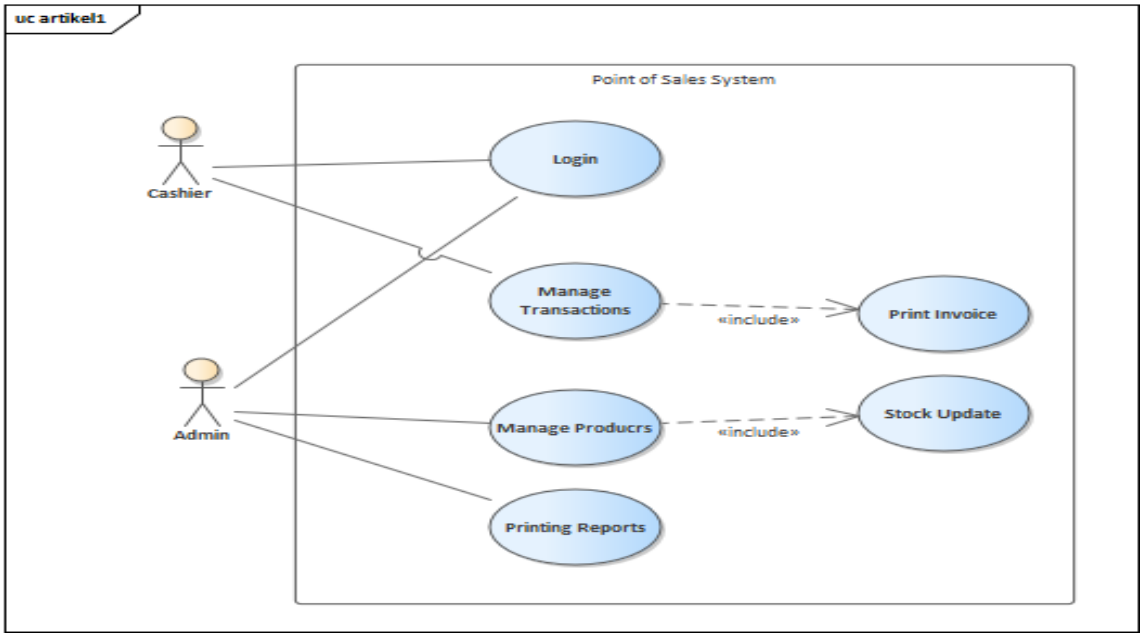


Figure 2. Use Case Diagram Point of Sales System

The use case diagram illustrates the workflow of the point of sale system at CV Kharisma Lestari. A use case diagram illustrates the functionality of a system. The use case diagram shown in Figure 2 shows the cashier and admin actors, who are the main actors of the Point of Sale system. The cashier and admin can log in to the system based on their access rights. The cashier's tasks are to manage transactions in the form of inputting sales transactions, changing sales transactions, and printing sales invoices. The admin's tasks are to manage product data, update inventory data, and print reports, especially sales reports.

Activity diagrams describe business processes in detail. Figure 3 is an activity diagram of transaction management by a cashier. The process begins with the cashier opening the sales form. The cashier selects the Add button. The system will generate a new transaction number by taking the last transaction number stored in the database and adding one to it to generate a new transaction number. Then, this transaction number data is displayed on the screen. Next, the cashier will select the area ID. This area ID indicates the customer's location. Next, the system will display the region information on the screen. The cashier enters the customer ID, and the system will check the customer data and display the customer's name and address on the screen. The cashier continues by selecting the sales ID, and the system will also display the salesperson's name. The most important part of the transaction is filling in the item transaction details, where the cashier will select or enter the product ID. This product ID will then be searched in the system to display the product data (name, price). The cashier then enters the quantity of items. The system will check the availability status of the items. If the items are available, the system will calculate the transaction and display the calculation results on the screen. If the transaction is invalid, a rejection notification will be displayed. Next, the cashier will select the Save button to save the transaction that has been entered. The system will then save the transaction data and automatically update the inventory based on the saved transaction.

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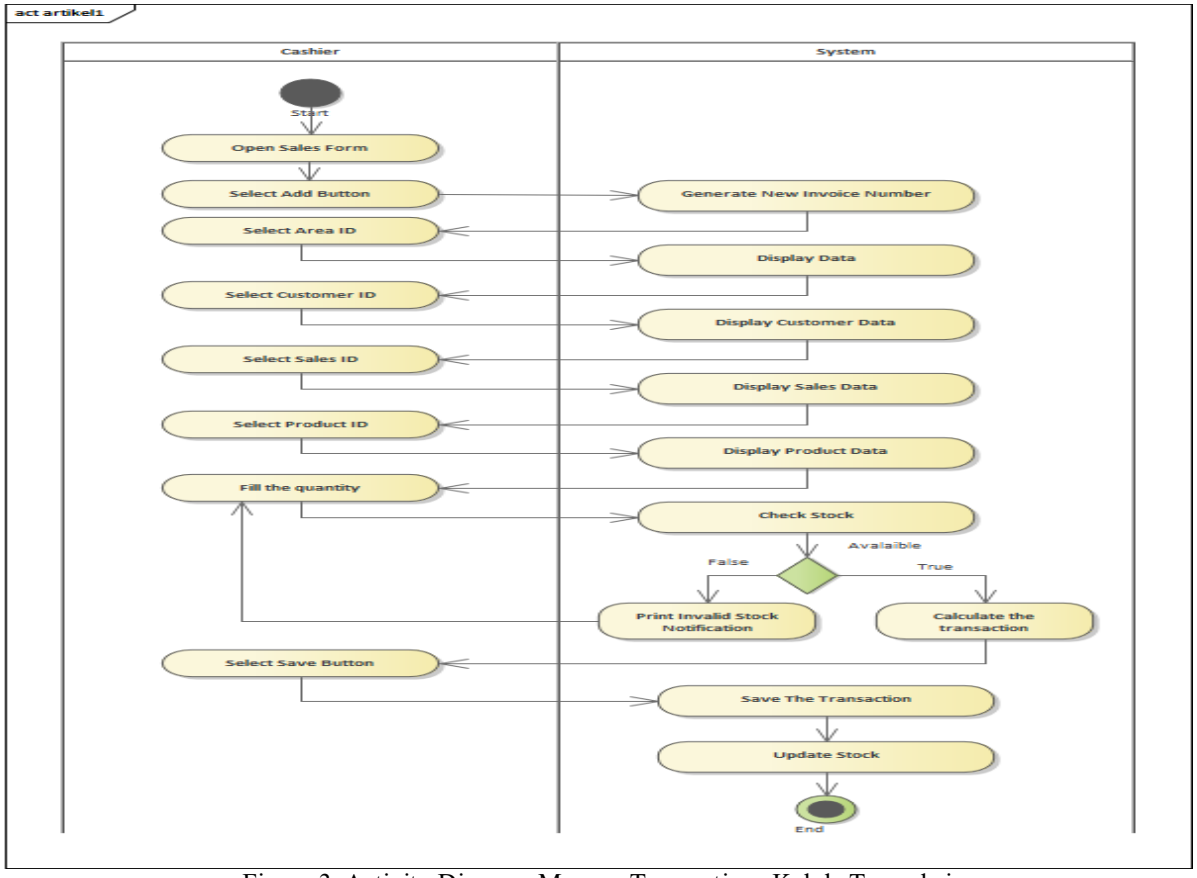


Figure 3. Activity Diagram Manage Transactions Kelola Transaksi

Figure 4 shows the main menu user interface of the generated application. The application focuses on managing sales data and printing sales invoice data. This user interface display consists of a main menu at the top and a toolbar to assist cashiers or administrators in the form of quick buttons that can be used for frequently used processes. The main menu is divided into: file menu, transaction menu, report menu, utility menu, system menu, and exit menu. The main menu in the cashier process for sales is the transaction menu with the sales submenu or the 8th icon in the toolbar bar. From this toolbar or menu selection, the display in Figure 5 Sales Transaction User Interface will be shown.

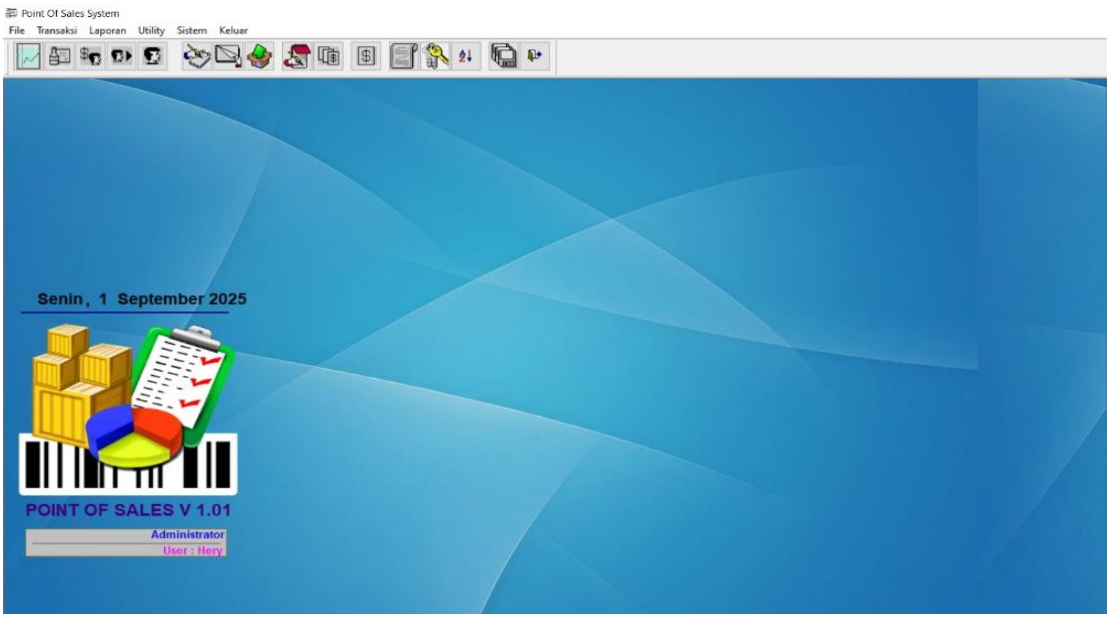


Figure 4. User Interface Application

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Figure 5 shows the sales transaction user interface. The region data input process is adjusted to the customer service region. Customer name and address automation will be displayed according to the customer code input. The same applies to the sales code and item code. The system also automatically calculates the quantity and selling price, along with the subtotal, DPP, and tax (11%) in accordance with government regulations. The default due date is set at 14 days and can be adjusted along with the delivery note if there is a previous delivery note.

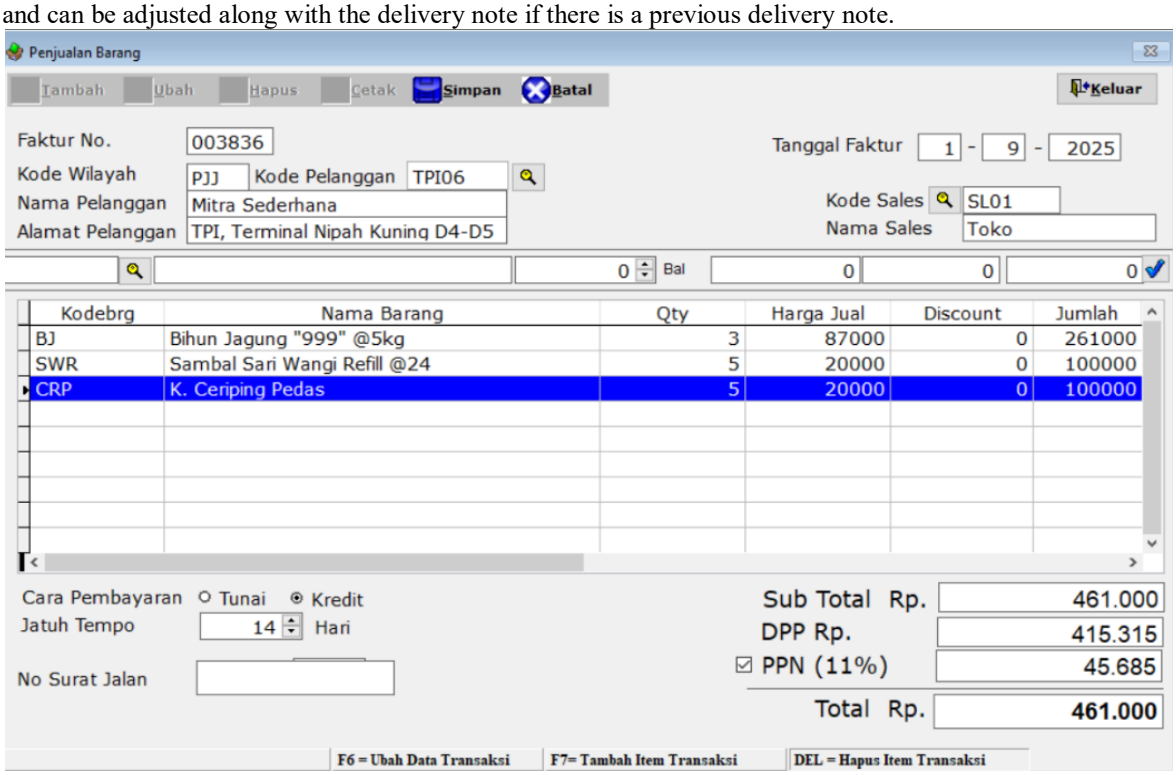
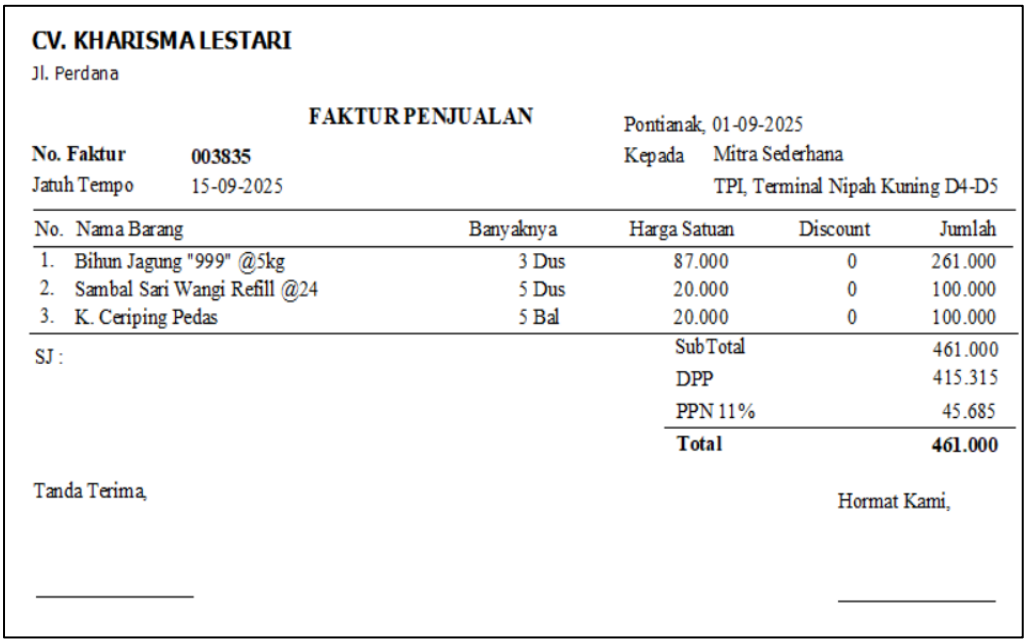


Figure 5. Sales Transaction User Interface

Figure 6 shows the generated sales invoice. The invoice displays the Value Added Tax (VAT) details in accordance with government regulations and user requirements. This invoice serves as proof of transaction between the customer and CV Kharisma Lestari, as well as proof of billing by sales for credit transactions.



CV. KHARISMA LESTARI
Jl. Perdana

FAKTUR PENJUALAN

Pontianak, 01-09-2025
No. Faktur **003835**
Kepada Mitra Sederhana
Jatuh Tempo 15-09-2025
TPI, Terminal Nipah Kuning D4-D5

No.	Nama Barang	Banyaknya	Harga Satuan	Discount	Jumlah
1.	Bihun Jagung "999" @5kg	3 Dus	87.000	0	261.000
2.	Sambal Sari Wangi Refill @24	5 Dus	20.000	0	100.000
3.	K. Ceriping Pedas	5 Bal	20.000	0	100.000
			SubTotal		461.000
SJ :			DPP		415.315
			PPN 11%		45.685
			Total		**461.000**

Tanda Terima,

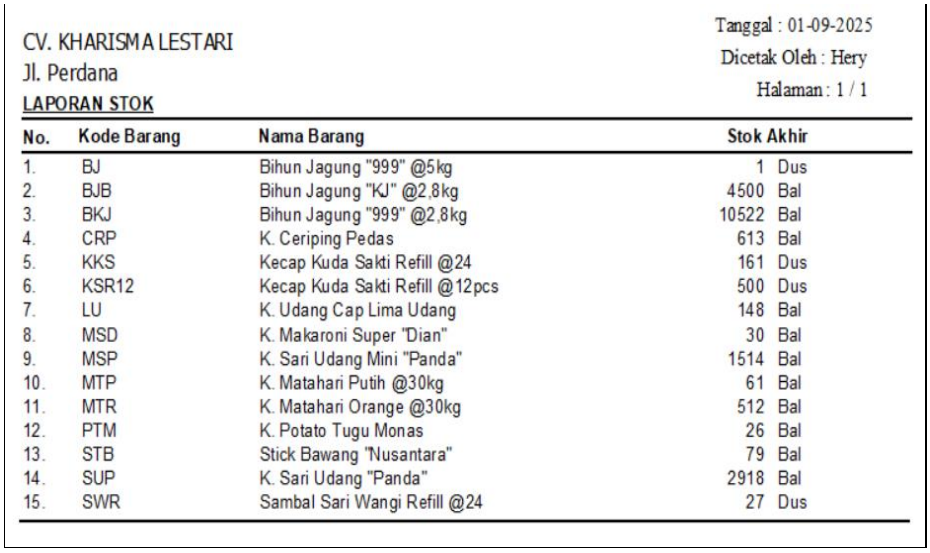
Hormat Kami,

Figure 6. Sales Invoice Application User Interface

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Next, the system will display a report of available inventory as shown in Figure 7. This feature can be accessed by the admin in the report menu section. Data will be displayed in real time according to the latest transactions that have occurred. After this prototyping process is carried out, testing of the system will be conducted.



CV. KHARISMA LESTARI
Jl. Perdana
LAPORAN STOK

Tanggal : 01-09-2025
Dicetak Oleh : Hery
Halaman : 1 / 1

No.	Kode Barang	Nama Barang	Stok Akhir
1.	BJ	Bihun Jagung "999" @5kg	1 Dus
2.	BJB	Bihun Jagung "KJ" @2,8kg	4500 Bal
3.	BKJ	Bihun Jagung "999" @2,8kg	10522 Bal
4.	CRP	K. Ceriping Pedas	613 Bal
5.	KKS	Kecap Kuda Sakti Refill @24	161 Dus
6.	KSR12	Kecap Kuda Sakti Refill @12pcs	500 Dus
7.	LU	K. Udang Cap Lima Udang	148 Bal
8.	MSD	K. Makaroni Super "Dian"	30 Bal
9.	MSP	K. Sari Udang Mini "Panda"	1514 Bal
10.	MTP	K. Matahari Putih @30kg	61 Bal
11.	MTR	K. Matahari Orange @30kg	512 Bal
12.	PTM	K. Potato Tugu Monas	26 Bal
13.	STB	Stick Bawang "Nusantara"	79 Bal
14.	SUP	K. Sari Udang "Panda"	2918 Bal
15.	SWR	Sambal Sari Wangi Refill @24	27 Dus

Figure 7. Inventory Report User Interface

The system that has been built has been functionally tested and all functions are running as expected. Usability testing with the System Usability Scale (SUS) completed by three users (one owner and two cashiers). The following is a list of questions asked to respondents regarding the acceptance testing of the point of sale information system prototype:

Table 2. List of Questionnaire Questions

Number	Question
1	I find this system easy to use
2	I find this system too complicated
3	I find this system easy to operate
4	I feel I need help from an expert to use this system
5	I feel that the various functions in this system are well integrated
6	I feel that there are too many inconsistencies in this system.
7	I imagine that most people will quickly learn how to use this system.
8	I feel that this system is very troublesome to use.
9	I feel very confident when using this system.
10	I need to learn a lot before I can operate this system

Table 3. Results obtained from filling out the questionnaire

Number	Question	Resp 1	Resp 2	Resp 3
1	I find this system easy to use	5	5	4
2	I find this system too complicated	4	4	4
3	I find this system easy to operate	5	4	5
4	I feel I need help from an expert to use this system	2	1	2
5	I feel that the various functions in this system are well integrated	5	5	4
6	I feel that there are too many inconsistencies in this system.	1	2	1
7	I imagine that most people will quickly learn how to use this system.	5	4	5
8	I feel that this system is very troublesome to use.	1	1	1
9	I feel very confident when using this system.	5	5	5
10	I need to learn a lot before I can operate this system	1	1	2

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Step 1: Convert scores for odd questions (1,3,5,7,9). The score is converted using the formula score - 1

Table 4. Convert Score for Odd Questions.

No.	Resp 1	Resp 2	Resp 3
1	5-1=4	5-1=4	4-1=3
3	5-1=4	4-1=3	5-1=4
5	5-1=4	5-1=4	4-1=3
7	5-1=4	4-1=3	5-1=4
9	5-1=4	5-1=4	5-1=4
Total	**20**	**18**	**18**

Step 2 : Convert score for even questions (2,4,6,8,10). The score is converted using the formula 5 - score.

Table 5. Convert Score for Even Questions.

No.	Resp 1	Resp 2	Resp 3
2	5-4=1	5-4=1	5-4=1
4	5-2=3	5-1=4	5-2=3
6	5-1=4	5-2=3	5-1=4
8	5-1=4	5-1=4	5-1=4
10	5-1=4	5-1=4	5-2=3
Total	**16**	**16**	**15**

Step 3 : Calculate total score for each respondent

Table 6. Total Score for Each Respondent

Respondent	Total Score
1	20 + 16 = 36
2	18 + 16 = 34
3	18 + 15 = 33

Step 4 : Conversion to SUS Score (x 2.5)

Table 7. Conversion to SUS Score

Respondent	Total Score
1	36 x 2.5 = 90
2	34 x 2.5 = 85
3	33 x 2.5 = 82.5
Total	257.5
Average	257.5 : 3 = 85.83

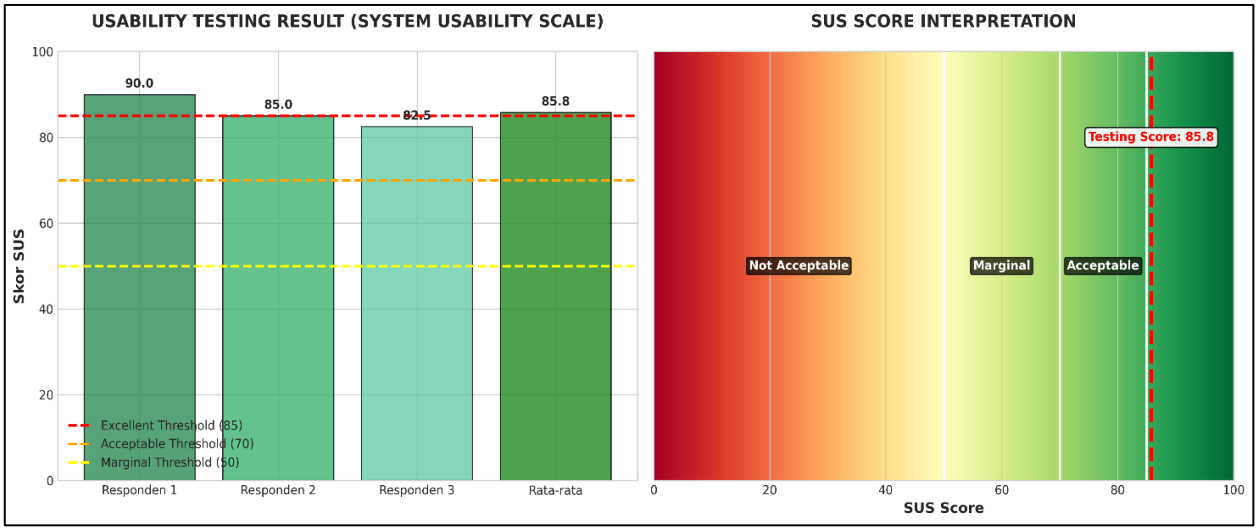


Figure 8. Usability Testing Result and SUS Score Interpretation

The result of SUS is average score is 85.83, which falls into the Excellent (Grade B) and acceptable categories. (Najaf et al., 2024) The impact of the system implementation on CV Kharisma Lestari's operations is significant. Based on the questionnaire results, the developed POS system received very positive responses from users. The most

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appreciated aspects were ease of use, good function integration, and the level of user confidence in operating the system. Several minor suggestions can be given for interface improvements, but overall the system already meets very good usability standards. The high level of usability (SUS score of 85.8) is inseparable from user involvement from an early stage. Users feel a sense of ownership and familiarity with the system because they have seen and tried its development from a very simple version. This reduces resistance to change and accelerates the learning curve.

Transaction time was observed by comparing the manual process with the process using the POS application. Measuring transcation time efficiency covers five aspects: price search and inputting transaction items, calculating transactions and discounts, updating stock, calculating taxes and transaction totals, and printing transaction invoices and completing transactions. Table 7 shows the observation results :

Table 8. Manual Transaction Sample Data

Manual Transaction Sample			POS Transaction Sample		
No.	**Number of Items**	**Duration (seconds)**	**No.**	**Number of Items**	**Duration (seconds)**
1	4	185	1	4	48
2	2	160	2	2	35
3	5	210	3	5	52
4	3	175	4	3	42
5	6	240	5	6	58
6	1	140	6	1	28
7	4	190	7	4	47
8	3	170	8	3	41
9	2	155	8	2	36
10	5	205	9	5	51
	Total	1830	10	Total	438
	Average	**183**		**Average**	**43,8**
		3.05 minutes			**0.73 minutes**

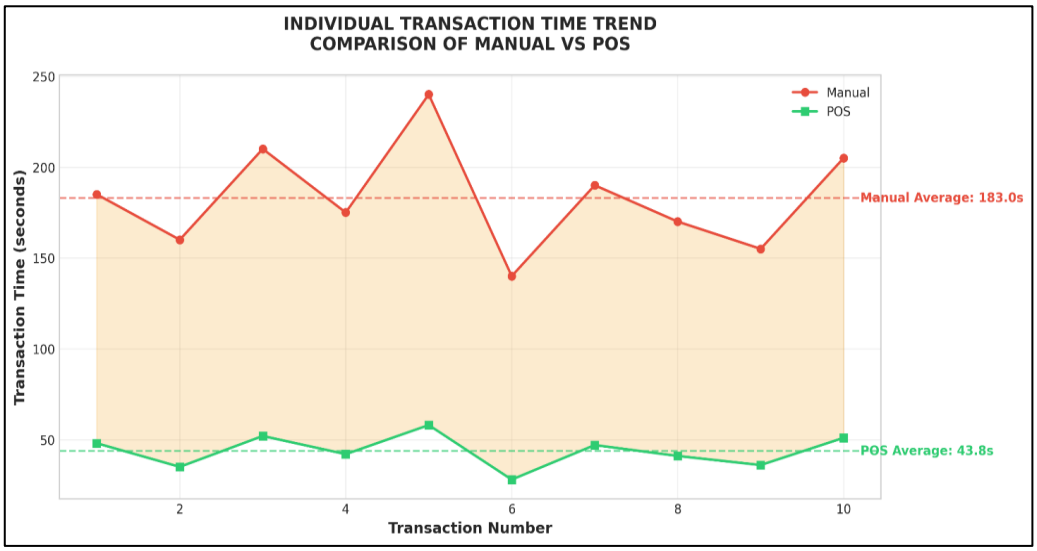


Figure 9. Individual Transcation Time Trend Comparison of Manual Systems Versus POS

This can be seen from the following aspects:

1. Time Efficiency.
   The average transaction time can be reduced from 3 minutes (manual system) to less than 1 minute, an efficiency improvement of 70% as shown in Figure 9.
2. Data Accuracy.
   Errors in stock recording and sales data calculation, which previously occurred frequently, can be eliminated because the system is automatically updated.
3. Decision Making.
   The owner of CV Kharisma Lestari can now easily access daily sales reports and summaries to identify product or sales data in real time, enabling them to plan better purchasing and sales strategies.

The successful implementation of this system proves the effectiveness of the prototyping method in the context of system development for MSME. The iterative cycle between developers and users (store owners and cashiers)

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ensures that the system built truly solves their real problems. Features such as discounts, weight estimates in delivery orders, and sales reports were generated based on feedback during prototype evaluation

From the tests conducted, transaction time was divided into five groups, namely: price search and item input, transaction and discount calculation, stock update, tax and total calculation, and receipt printing and completion. From testing the transaction samples, it was found that the manual system and the POS system had significantly different time trends. The manual system takes an average of 183 seconds, while the POS system takes 43.8 seconds. This results in a time reduction of 139.2 seconds (76.1% increase in efficiency) as shown in Figure 10 below.

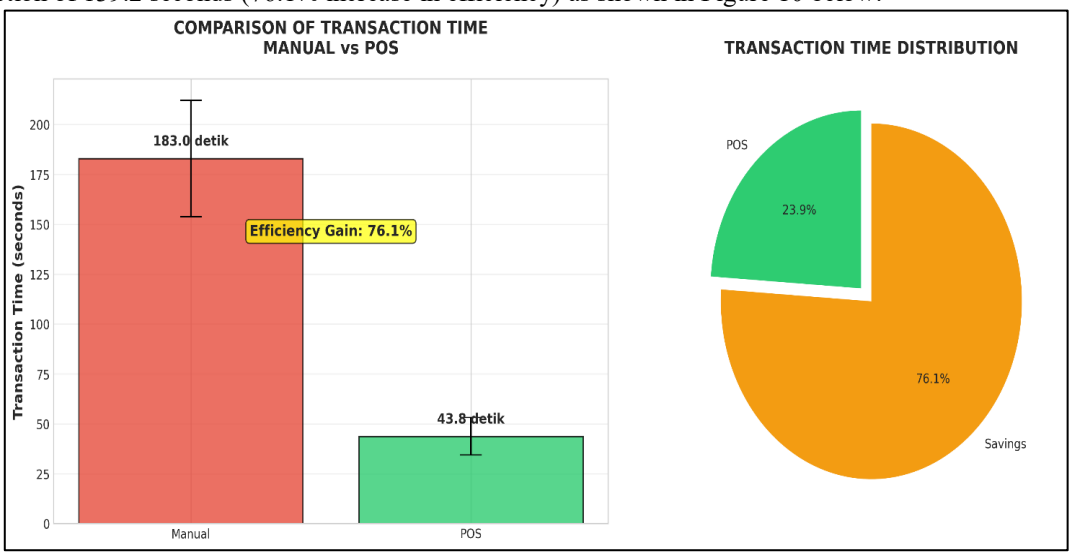


Figure 10. Comparison of Manual Processing Time and Using POS

Next, a step-by-step breakdown analysis is performed. Table 9 below shows the breakdown of transaction time per process stage.

Table 9. Breakdown of Transacation Time Per Process Stage

Process Component	Manual	POS	Reduction	%Reduction
Price Search	35 seconds	12 seconds	23 seconds	66%
Calculation & Discount	45 seconds	5 seconds	40 seconds	89%
Stock Update	40 seconds	15 seconds	25 seconds	63%
Tax & Total	35 seconds	5 seconds	30 seconds	86%
Print Invoice & Finishing	25 seconds	17 seconds	8 seconds	32%
Total	180 seconds	54 seconds	126 seconds	70%

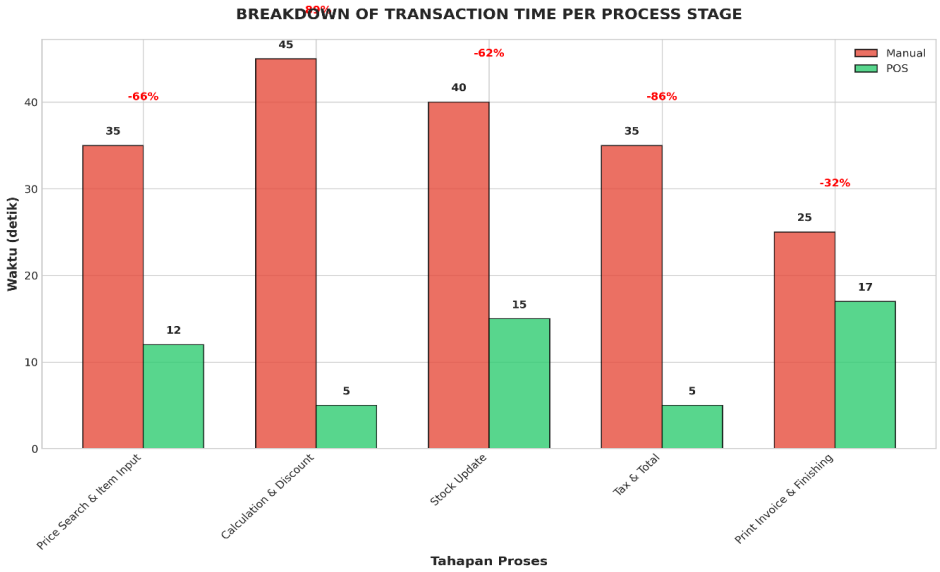


Figure 11. Breakdown of Transaction Time Per Process Stage

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Next, a paired t-test was conducted to compare the transaction times of the manual system and the POS system. The data used consisted of 10 transaction samples for each system (before and after) that had been collected. A paired t-test was conducted to test for significant differences between transaction times for the manual system and the POS system. Table 10 shows transaction time statistics.

Table 10. Transaction Time Statistics

System	Minutes (seconds)	Standard Deviation	Minimum	Maximum
Manual	183.0	29.1	140	240
POS	43.8	9.37	28	58

The test results showed a statistically significant difference with pair t-test result = 21.11, $\rho < 0.001$. This indicates that the POS system is significantly faster than the manual system. To determine the magnitude of the effect of these differences, Cohen's d was calculated. The value of Cohen's d was found to be 6.67, which falls into the category of a very large effect size. This shows that the implementation of the POS system has a very large impact on reducing transaction time. The 95% confidence interval for the difference in average transaction time is [124.28, 154.12] seconds. This means we are 95% confident that the actual reduction in transaction time lies within this range. Since this interval does not include the number 0, the observed difference is significant. Table 11 shows the overall results of the paired t-test statistical analysis.

Table 11. Pair t-Test Statistical Analysis

Parameter	Value	Description
Pair t-test result (*t-hitung*)	21.11	-
degree of freedom	9	-
t-tabel (α=0.05)	2.262	-
ρ -value	< 0.001	Very significant
Average difference	139.2 detik	-
Standard deviation of difference	20.858	-
95% confidence interval	[124.28, 154.12]	-
Cohen's *d*	6.67	Very large affect size

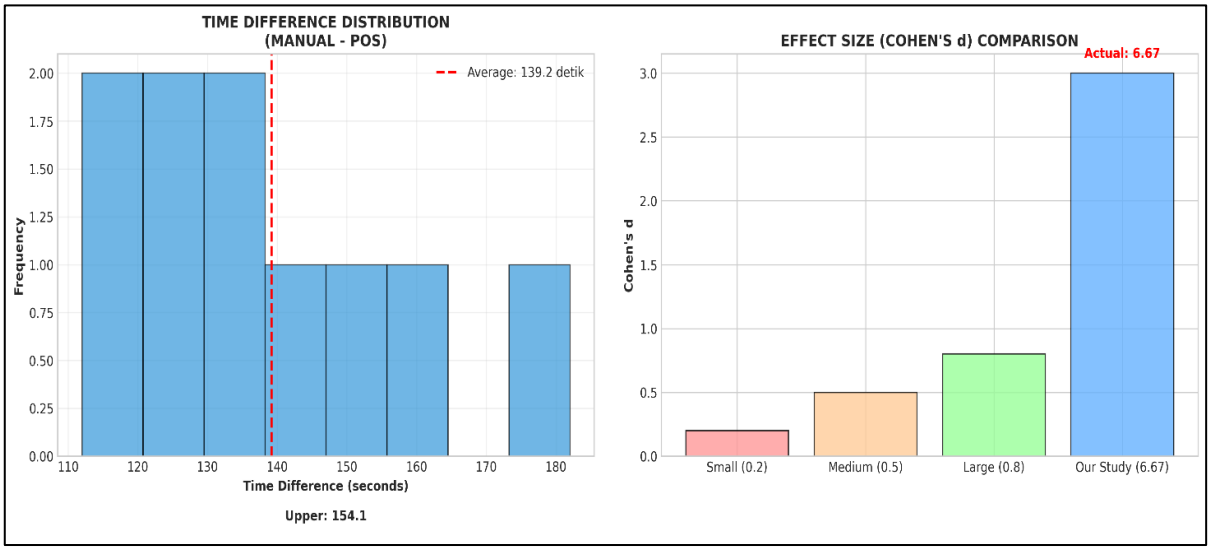


Figure 12. Distribution of Time Differences and Effect Size (Cohen's)

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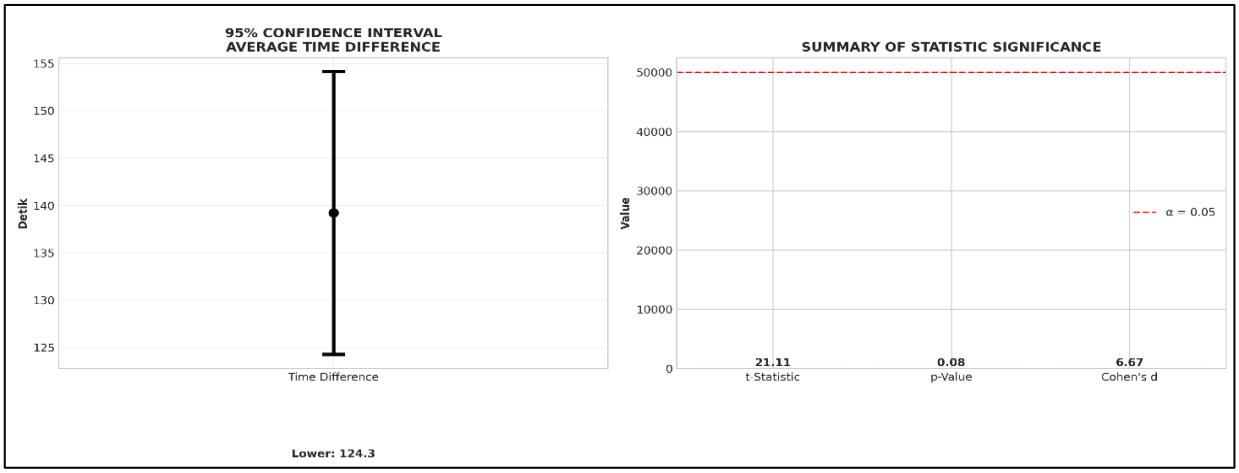


Figure 13. 95% Confidence Interval for the Mean Time Difference

Based on the paired t-test statistical analysis, it can be concluded that:

1. Statistically, there is a very significant difference between manual transaction times and POS system transaction times ($\rho < 0.001$).
2. In practical terms, the average time reduction of 139.2 seconds (from 183 seconds to 43.8 seconds) indicates a significant increase in efficiency.
3. The effect size (Cohen's d = 6.67) indicates that the implementation of the POS system has a very large and meaningful practical impact.
4. Confidence: the 95% confidence interval [124.28, 154.12] provides high confidence that the observed time reduction was not caused by chance or sampling error.

From the tests that have been carried out, the POS system has been proven statistically and practically to be able to significantly improve transaction time efficiency and can be implemented well at CV Kharisma Lestari.

DISCUSSION

The implementation of the POS system at CV Kharisma Lestari has demonstrated remarkable improvements in operational efficiency and user experience. The 76.1% reduction in transaction time (from 183.0 to 43.8 seconds) represents a transformative change that aligns with digital transformation trends in small retail businesses. This improvement can be attributed to the elimination of manual processes and the automation of key operational tasks through systematic digitalization. The exceptional System Usability Scale (SUS) score of 85.83 places the system in the "excellent" category (Najaf et al., 2024). This high usability score directly correlates with the iterative prototyping approach, which allowed for continuous user feedback and interface refinement throughout the development process.

The paired t-test results = 21.11, $\rho < 0.001$) provide strong statistical evidence for the system's effectiveness. The Cohen's d value of 6.67 indicates an effect size that is not only statistically significant but also practically substantial. This magnitude of improvement transcends mere statistical significance and represents a paradigm shift in how small retailers can leverage technology for operational excellence. The 95% confidence interval [124.28, 154.12] for time reduction provides robust evidence that the observed improvements are consistent and reliable. This narrow interval, combined with the large effect size, suggests that the POS system delivers predictable and substantial benefits across varying transaction scenarios.

The success of this implementation underscores the effectiveness of the prototyping methodology in developing information systems for small businesses. The iterative nature of prototyping allowed for : early error detection, enhanced user adoption, cost-effective development, technology acceptance, human-computer interaction principles, process optimization analysis. This research makes significant contributions to both theory and practice in small business digital transformation. The implementation of a prototyping-developed POS system at CV Kharisma Lestari has demonstrated that:

1. Substantial efficiency gains (76.1% time reduction) are achievable through well-designed digital systems in small retail contexts.
2. Exceptional usability (SUS 85.83) can be achieved through iterative, user-centered development approaches.
3. The prototyping methodology provides an effective framework for developing customized solutions that address the specific needs and constraints of small businesses.
4. Statistical rigor combined with practical relevance provides a compelling case for digital transformation in the small retail sector.

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The findings challenge the notion that advanced digital systems are exclusively for large enterprises and provide a replicable model for small businesses seeking to leverage technology for competitive advantage. The success of this implementation suggests that with appropriate methodology and user involvement, small retailers can achieve digital transformation outcomes that rival those of larger organizations.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the prototyping method was successfully applied to develop a POS Information System that meets the specific needs of CV Kharisma Lestari. The resulting POS system has been proven to improve operational efficiency, data accuracy, and support managerial decision-making. Based on the instruments and analysis above, it can be concluded that: (1) there was a reduction in transaction time from 3 minutes to 0.9 minutes. (2) A 70% increase in efficiency was quantitatively proven. (3) The greatest improvement occurred in the calculation and stock update stages. The level of user acceptance (usability) of the system was very high, indicating that the system was easy to learn and use.

Recommendations for further research are : developing the system by adding simple e-commerce features for online and offline sales integration, implementing more in-depth data analytics, such as product demand forecasting., applying the prototyping method to other types of SMEs for comparative studies.

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