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Point of Sales System Integrated with Warehouse for MSME using RCA Analysis

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***Abstract*— Point of sale is a sales-oriented activity as well as a system that helps the transaction process. Through point-of-sale system, data or information that is varied in large quantities can be processed quickly and precisely in one digital data center so that time savings can be made. For micro, small and medium enterprises (MSME) tend to find it hard in managing product returns. A lot of MSME has difficulty in obtaining product data return information so that it gets complaints from customers about missed return data. This point-of-sale system can help MSME activists in managing and managing product data return information. This research uses the method of Analisa Root Cause Analysis (RCA) as a tool in the analysis of problems and needs of the system. Application is developed by using CodeIgniter framework. The results of this information system provide convenience in managing sales transactions in order to produce accurate and accurate reports. This research is the first research that discusses the system point of sales for MSMEs with the additional process of product return transactions and integrates between the sales section in the store and the inventory section of the head office.**

Keyword:Root Cause Analysis, Point of Sale, Information Systems, Products)

I. INTRODUCTION

Information is important for the company, especially in the field of service in order to help customers [1]. The utilization of information technology in the business world is currently growing very rapidly. One example is the implementation of the Point Of Sale system [2]. Point of Sales (POS) is an information system that allows for transactions, which includes the use of cash registers [3]. Within the scope of POS, a cash register does not stand alone but is included in other supporting software [3]. The design of point of sales (POS) application system can provide better service to consumers, such as in calculating the price and the number of goods purchased can be faster and the quantity of goods is no longer dependent on manual recording [4]. Large and medium-sized companies engaged in trading will generally use the POS system in supporting their business activities [5]. With the Point of Sales application, we will get the benefit from the added value that can be managed on improving the quality of service [6]. A regular POS system is made not to be connected to other POS systems and can be designed to connect to other POS systems through the Internet or intranet [7]. POS was originally just a calculator-like machine equipped with a place to save money and can print transaction receipts. But nowadays it has developed into a complete tool with features such as loss/profit statements, stock of goods, sales per period, and others [8]. Generally, POS data will provide product information, sales volume, price, sales value, type of promotion involved during the sale of the product and also the duration of the promotion [9]. Product logging and manual transactions can be done, but this has many shortcomings [10]. The product is everything that the manufacturer can offer to be noticed, requested, purchased, used as a fulfillment of the needs or desires of the market concerned [11]. The product in question is all kinds of gadget accessories with various types that have certainly been used by the public in general.

The point of sales system is widely used by trading or retail business entities for small businesses such as MSMEs or large companies. MSMEs come from the abbreviation Micro Small and Medium Enterprises. In today's era of technological development, MSMEs should focus on customer service and satisfaction [12]. In article 1 Number 20 of 2008 defines MSMEs as (1) micro-enterprises are businesses in the economic sector owned by individuals by meeting the requirements and criteria of MSMEs stipulated in the Law. (2) Small business is a business in the economic sector that is established by itself either individually with a business entity where the small business is not part of the branch of a medium business or a large business either in terms of ownership, power, or part directly or indirectly as the criteria of small businesses regulated in the Law. (3) medium enterprises are businesses in the economic sector that are established by themselves both individuals and business entities where the medium enterprises are not part of the branch of small businesses or large businesses either in terms of ownership, power, or become part directly or indirectly as the criteria of medium enterprises regulated in the Law. The Investment Coordinating Board (ICB) recorded the submission of Business Identification Number (BIN) for micro-enterprises recorded 170,152 or equivalent to 86 percent from 197,322 BIN published through the system Online Single Submission (OSS) throughout September 2020. BKPM (Badan Koordinasi Penanaman Modal) Spokesperson Tina Talisa in a written statement in Jakarta, Tuesday (10/20/2020) said, At the beginning of the pandemic period, the number of micro-scale business BIN decreased for three consecutive months from 36,337 BIN in March 2020, to 28,435 BIN in April 2020 and touched the lowest number in May 2020 with only 15,845 BIN issued by BKPM. However, the micro sector has proven to be

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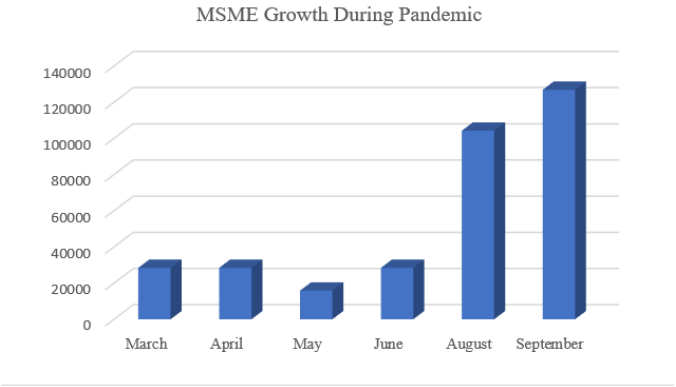
very resilient to pandemics. This is evidenced by the surge in micro sector BIN in June 2020 which reached 35,283 BIN, jumping 123 percent from the previous month. That number continues to increase every month until it reaches nearly 200 thousand BIN in September.



Source : Badan Koordinasi Penanaman Modal Years 2020

Figure 1. Graph of MSMEs BIN Improvement

For MSMEs who own stores or may start developing stores by forming branches, it creates high businesses that require control over their daily transactions. Each transaction involves various data on the organization, such as the amount of inventory, the amount of money coming in and out, the number of items to be made, and more [13]. When compared to the company's condition where every product data collection in the store and order products that run out in the store can be done quickly by referring to the company's database, thus making workers do the work effectively and efficiently [14]. This can also be applied to MSME business entities. Without product supplies, MSMEs cannot conduct sales activities [15]. The issue of information about product inventory is very important for the user of the information concerned to make a decision to know the availability of products that will be needed by the company [16]. One way to control product inventory is to determine the minimum stock of the product [17].

For MSMEs, it often has difficulties in managing product returns from store to company at the head office. This results in a high level of complaints from customers relating to product returns. This point of sales system can help MSME activists in managing and managing product return information. With these problems, the purpose of this research is to analyze and build an integrated point of sale system with warehouses for MSMEs using the RCA analysis method. So that this point of sales application has more value in terms of transactions and ease of report creation.

II. RESEARCH METHODS

A. System Analysis Method

The system analysis uses the Root Cause Analysis (RCA). Root Cause Analysis (RCA) is a process designed to investigate and classify the root causes of incidents related to incidents in the form of safety, health, environment, quality, reliability, and production impacts. In general, the term "incident" is used to identify incidents that produce or have the potential to produce as a result of consequences. In short, RCA is a tool designed to help writers not only identify but what can happen and how it happens and why it does. Understanding why an incident is likely to occur is key to formulating effective recommendations [18].

B. Type of Research

This research was conducted by taking the type of research from data sources, data analysis and expatriation in the reporting of research results. The method is based on research data source using field research method, by taking data from some MSMEs and medium retail companies. The analysis of the collected data is done using qualitative methods based on information directly from the users of this system. In reporting the research results use descriptive methods to clearly describe the information from the beginning of this system process to the problem-solving stage.

C. Data Collection Techniques

- Observation

This study conducted observations and observations directly how the company serves customers, the process of returning damaged products, the process of returning products to the cashier and the cashier gives to the store supervision to send to the operational manager to check

- Interviews

Interviewed 3 warehouse staffs, sales manager, human resources development staff, and 2 cashiers at two stores.

- Literature Studies

Documents obtained from this research are examples of sales report forms, return forms, and street letters made by the company for product delivery to stores, and return receipts.

D. Research Flow Diagram

The stages of the process that will be carried out in this research are described in the flow diagram in this image as follows:

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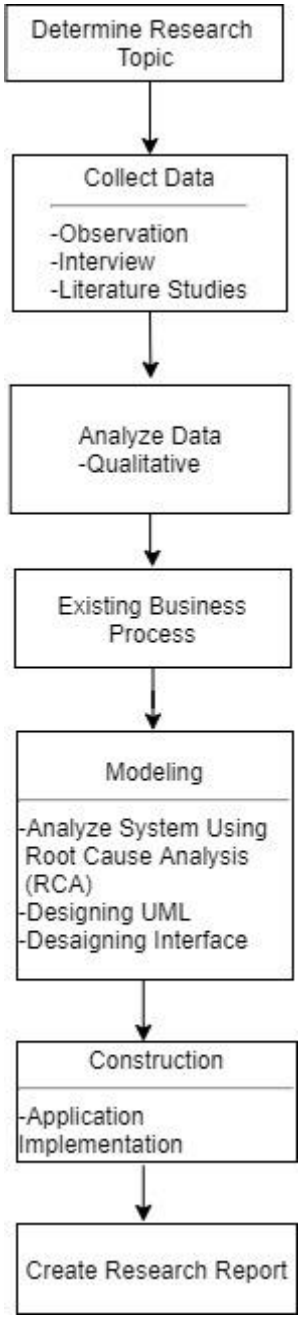

Figure 2. Research Flow Diagram

1. Determining Research Topics; Determine the topic of research based on the problem that has been formulated.
2. Data and Information Collection; Data collection and information needed by observation method, interview and literature study for existing data.
3. Data Analysis; In this study using data analysis with a qualitative method.
4. Existing Business Process; This analysis is to find out the business processes running on MSME.
5. Modeling
   - System method using RCA analysis method
   - Designing UML and Databases
   - User interface design
6. Application implementation and creation
7. Create research report

III. RESULT AND DISCUSSION

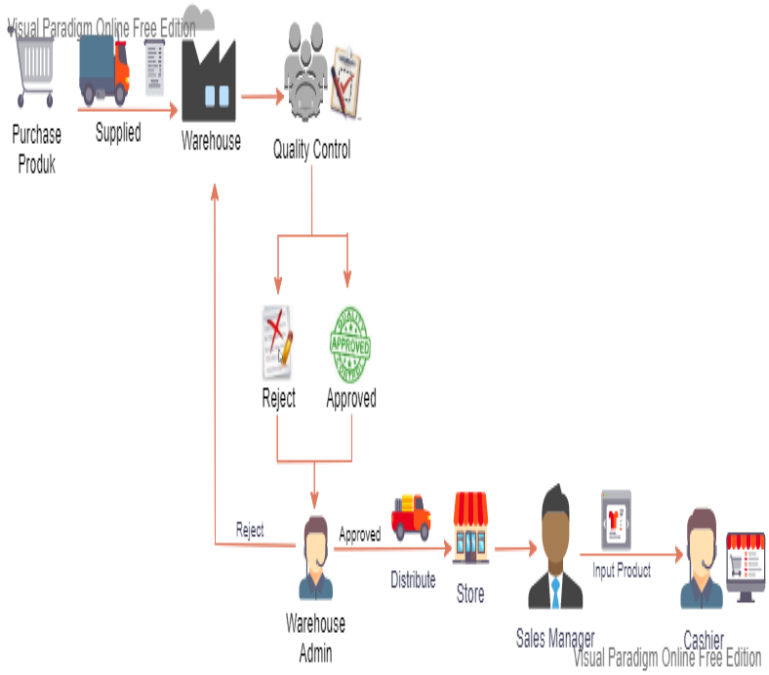

Figure 3. Business Processes Existing System

A. *Existing Business Process*

1. Details of business process stages run as follows:
2. Make a list of products needs of the store and submit it to the supplier
3. Supplier prepares products according to the product list
4. After that send the product to the warehouse
5. Warehouse accepts products and performs control quality to find out the product that fits the specifications and defective products.
6. After that warehouse admin get a list of products that pass the quality control and defective products
7. Products that pass QC will be sent to the store while the defective products will be returned to the supplier
8. Warehouse admin sends products as per store needs
9. Store admin gets product and inputs into POS app
10. After inputting the cashier can see the product along with stock
11. Customers come to the store and choose the product to be purchased
12. Customer delivers the product to the cashier
13. Cashier inputs transactions in POS application
14. Cashier validates the product to be purchased by the customer

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15. Cashier hands over the total price amount to the customer
16. Customer making payment
17. Cashier prints the results of the transaction and provides proof of transaction to the customer

B. Root Cause Analysis (RCA)

Based on the analysis of the current system process can be concluded that the system has no problems in operational management in MSMEs. But after analyzing the problems that arise by using Root Cause Analysis (RCA) there are some problems found in the field that can be solved by the application system.

Table 1. The Root Cause Analysis (RCA) Analysis Method

Cause	Result	Solution
MSMEs have difficulty in storing and recording product return data.	MSMEs often get complaints from customers because return products are often not recorded.	Creating a form for product returns and warehouse will get a list of product returns after filling out the form.
MSMEs have difficulty in the process of selling.	MSMEs have difficulty in the process of selling.	Creating reports in real-time in order to record sales reports and give decisions or actions on store conditions quickly.
Creating reports in real-time in order to record sales reports and give decisions or actions on store conditions quickly.	Creating reports in real-time in order to record sales reports and give decisions or actions on store conditions quickly.	Creating a product detail form so that MSMEs can monitor the brand of products sold.

C. Requierment System Analysis

From the reasons mentioned above, MSME have requirement system with flow from solution, process design, input design and output design that need in built a system:

Table 2. Requirements System Analysis

No	Solution	Process	Input Design	Output Design
1	Creating a form for product returns and warehouse will get a list of product returns after filling out the form.	Managing product returns.	Form return product.	Form return product.
2	Creating reports in real-time in order to record sales reports and quickly make decisions or actions on store conditions.	Creating a sales report.	Creating a sales report.	Sales report.
3	Creating a product detail form so that MSMEs can monitor the brand of products sold.	Managing product details data.	Product details data form	List of product details
4	Creating a minimal form of product inventory to prevent running out of products.	Monitoring the minimum product inventory data	Monitoring the minimum product inventory data	List of minimum product inventory data.

D. System Interface

Based on the results of the analysis of the problem that has been mapped and the solution. So, the system interface is carried out according to the analysis carried out using the UML approach as follows:

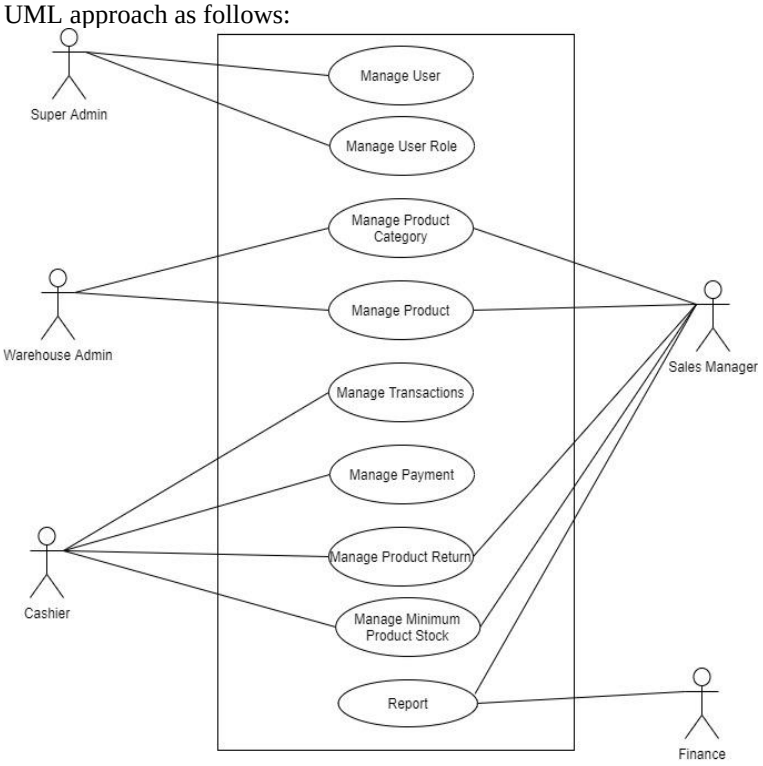

Figure 4. The Use Case Diagram System Point of Sales

This system process consists of 5 actors, namely super admin, warehouse, sales manager, cashier and finance each actor gets a limitation of access rights and the role of each user:

- Super admin is tasked to create user and user role management. If super admin wants to create a new user, super admin can go to the options page then select the sub-menu user, after that, super admin can press the add new user button then super admin fill in the add new user form after it is filled in select the Save User button if the system is successful will send a data message successfully saved. When the super admin edits the data in the user data edit form. If successful, the system will send a data message successfully changed. When the admin selects the delete form, the system will validate and if successful the system will send a notification the data is successfully deleted. Then sub-menu role user for super admin activities gives facility access rights to the user. Super admin manages user role that is adding, editing and deleting user role on the system. Super admin goes to options page then select sub-menu role user, then admin input user role in add role user form. If successful, the system will send a data message saved successfully. When the super admin edits the data in the user data edit form. If successful, the system will send a data message successfully changed. When the admin selects the delete form, the system will display a pop-up "Do you really want to delete this?" if you want to delete this?" if you want to

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delete click ok if not click cancel after that the system will display a notification.

- Warehouse admins manage product categories, and product data like; to add, change and delete fields. In managing product categories, the warehouse admin goes to the product page then clicks the category sub-menu to see the list of product categories. Then the user can add and edit product category data. When the data is successfully added or changed the system will send a notification that the data was successfully saved, updated or deleted. Warehouse admins manage product data that is adding, changing and deleting product data. The warehouse admin goes to the product page then click the product sub-menu to see the product list. Then the user can add, edit, delete product data. When the data is successfully added or changed the system will send a notification that the data was successfully saved, updated or deleted.

- Cashier manages transactions, product returns, minimum products and payments. The cashier manages the transaction by adding, changing and deleting the transaction data. Cashier enters the POS page then clicks the transaction sub-menu to make a transaction, then the system will display the transaction product and transaction price after that the cashier validates the product to the customer, and the customer makes a payment and the cashier prints the total transaction, the cashier can also change the transaction by way of the cashier click the button delete the product. In managing the return of the cashier's product can go to the POS page then click the Product Return sub-menu for product return transactions and cashier inputs product data to be returned after that click save and the system will display the successful return transaction notification. Then the cashier can add, edit, delete product return data by clicking the number button if you want to add and click the delete button if you want to delete the transaction, when the data is successfully added or changed the system will send a notification that the data is successfully saved, updated or deleted. To manage the minimum stock data the cashier goes to the product page then clicks the store's request sub-menu to see the list of minimum stock. Then the user can add, edit, delete the minimum stock data. When the data is successfully added or changed the system will send a notification that the data was successfully saved, updated or deleted. Managing payments after the cashier performs the cashier transaction can choose the option of payment via cash or debit by clicking the payment menu then select cash or debit then input the total bill then the system will display the successful payment.

- Sales Manager can access manage product categories and product data as well as sales reports, to validate product data sales manager can enter the store request menu after that sales manager can validate the product shipments from the warehouse if it is the same sales manager can update the product so that the product stock increases by clicking on the action then select product update, sales report can be accessed with the report menu then select sales report and sales manager input the date period that you want to see the sales report and then the system will display the sales list, and click download to download the sales report after which the system will display file storage validation, click yes to download.

- Finance can access the report menu in the menu there are sales reports and product return reports, to see and download the sales report finance can choose the report menu after that click the sales report submenu, the system will display a list of sales reports. If finance wants to download sales reports finance can input the report period and click search after that the system will display the report according to the input period after that click the print report system will display validation related to where to save the file click save to download the report and the system will display a pop-up report successfully downloaded.

E. Class Diagram

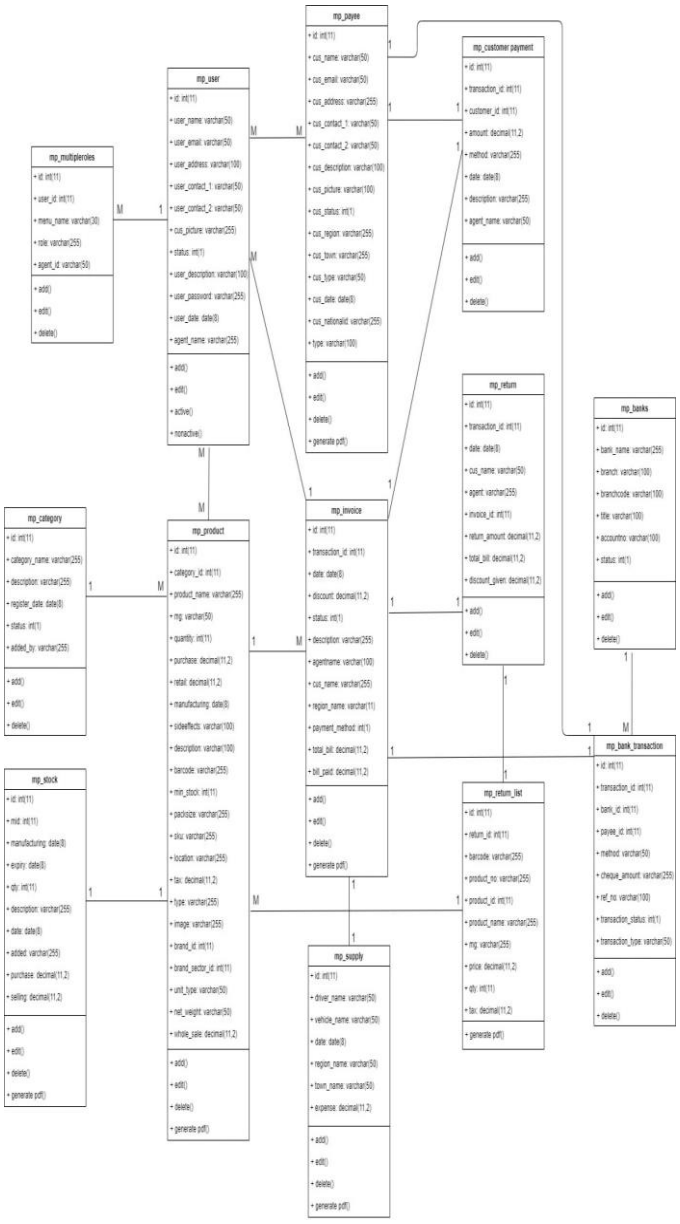

Figure 5. The Class Diagram

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Here's a class diagram of this point sale system. Class diagrams describe the structure and description of classes, packages, objects and relationships with each other such as containment, inheritance, associations, and others. The diagram class serves to explain the type of the system object and its relation to other objects. This diagram class describes the tables used in the creation of its program application. Each table consists of attributes of which the primary or foreign key has been determined. In the diagram class above the mp_invoice be the core class in this system.

- Class mp_user connected with class mp_multipleroles with one to many which means mp user class can be accessed more than one class mp_multipleroles otherwise class mp_multipleroles can only choose one class mp_user.
- Class mp_category connected to class mp_product with one to many which means one class mp_category can be accessed more than one class mp_product otherwise class mp_product can only be accessed by one class mp_category.
- Class mp_product connected with class mp_invoice with one to many which means class mp_product can be owned more than one class mp_invoice otherwise class mp_invoice can only be owned by one class mp_product.
- Class mp_stock connected with class mp_product with one to one which means class mp_stock can only be owned by one class mp_product otherwise class mp_product can only be owned by one class mp_stock.
- Class mp_payee connected with class mp_user with many to many which means class mp_payee can be owned more than one class mp_user otherwise class mp_user can be owned more than one class mp_payee.
- Class mp_supply connected with class mp_invoice with one to one which means class mp_supply can only be owned by one class mp_invoice otherwise class mp_invoice can only be owned by one class mp_supply.
- Class mp_ invoices are associated with class mp_return with one to one meaning class mp_invoice can only be owned by one class mp_return otherwise class mp_return can only be owned by one class mp_invoice.
- Class mp_return connected with class mp_invoice with one to one which means class mp_return can only be owned by one class mp_invoice otherwise class mp_invoice can only be owned by one class mp_return.
- Class mp_return connected with class mp_return_list with one to one which means class mp_return can only be owned by one class mp_return_list otherwise class mp_return_list can only be owned by one class mp_return.
- Class mp_customer_payment connected with class mp_invoice with one to one meaning class mp_customer_payment can only be owned by one class mp_invoice otherwise class mp_invoice can only be owned by one class mp_ customer_payment.
- Class mp_banks connected with class mp_bank_transaction with one to many which means one class mp_banks can be accessed more than one mp_bank_transaction otherwise class mp_ bank_transaction can only be accessed by one class mp_banks.
- Class mp_bank_transaction connected with class mp_invoice with one to one meaning class mp_bank_transaction can only be owned by one class mp_invoice otherwise class mp_ invoice can only be owned by one class mp_bank_transaction.

F. *User Interface*

A. Management User Interface

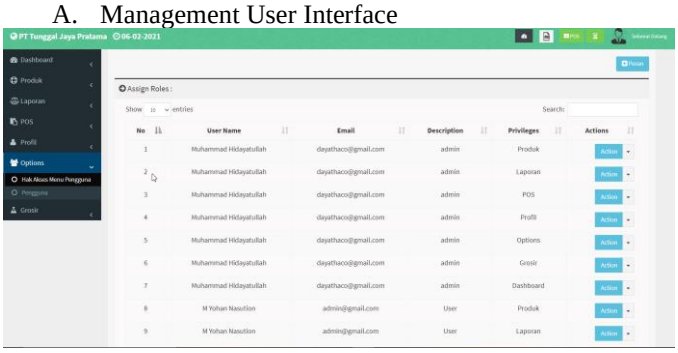

Figure 6. Process Management User

User management can be accessed by the super admin. Super admin can manage the user is add, edit and delete the user on the system. Super admin enters the User Options Management menu then selects the user sub-management user, after that click the add new user button then super admin fill in the add new user form after the form is filled in select the save User button if the system is successful will send a data message successfully saved. If the super admin wants to edit the data of the super admin user can click the action button then select edit the system will display the user edit form, if successful the system will send a message data successfully changed. If the super admin wants to delete, the super admin user can select the action then select delete, after that the system will display a pop up "Do you really want to delete this?" if you want to delete this?" if you want to delete click ok if not click cancel after that the system will display a notification.

B. Product Interface

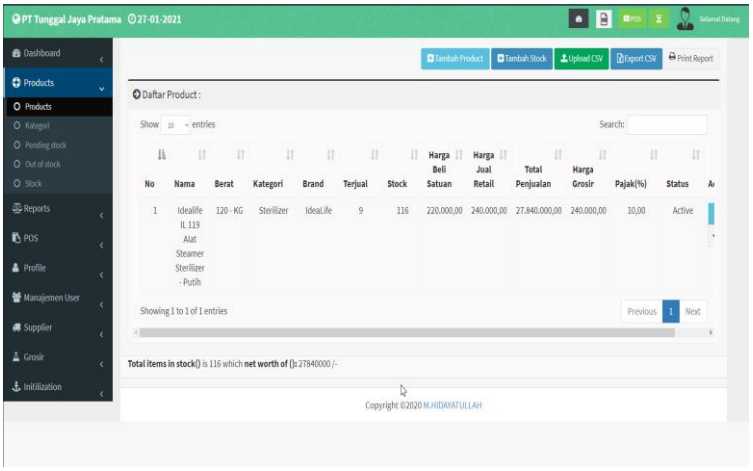

Figure 7. Transaction Product Interface

The product menu can be accessed by the warehouse admin. Warehouse admins can manage product data is. add, change and delete product data. Warehouse admin go to the product page then click the product sub-menu list and the application will display the product list, then the warehouse admin clicks the add product button to add the product and the system will display the product add form, the warehouse admin click add

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stock to add product stock and the system will display the product add form and click save if it has filled in the form after that the system displays a notification successfully saving the data, if you want to edit the product data of the warehouse admin can click the action then select edit the system will display the product edit form, the warehouse admin can also delete the product by clicking the action then select delete after that the application will display a confirmation pop up to delete the product.

C. Transaction Interface

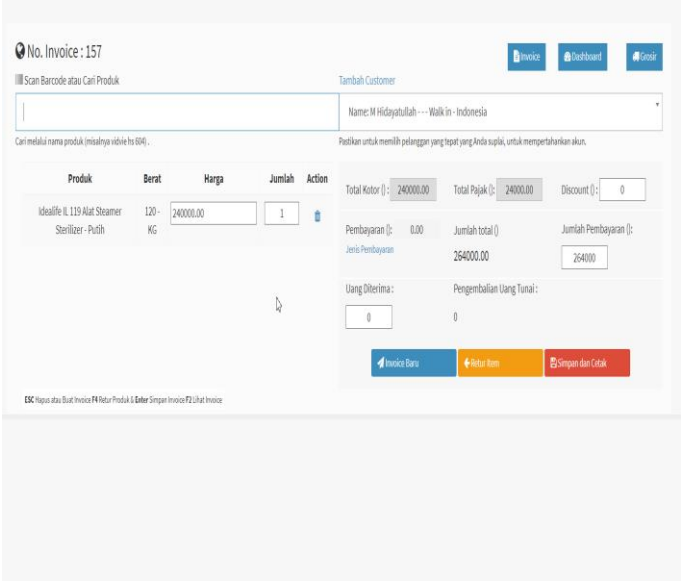

Figure 8. Sales Transactions Interface

Transactions can be accessed by the cashier. The cashier manages the transaction by adding, changing and deleting the transaction data. Cashier enters the POS page menu then click the transaction sub-menu to make a transaction, then the system will display the transaction and the cashier can input the product along with the number of products to be purchased by the customer then the system will display the price amount, after that the cashier validates the product to the customer, and the customer makes a payment and the cashier prints the total transaction, the cashier can also change the transaction by clicking the cashier button remove the product to remove the product or click the number button to reduce or increase the number of products. The system will send a notification that the data has been saved successfully

D. Product Return Interface

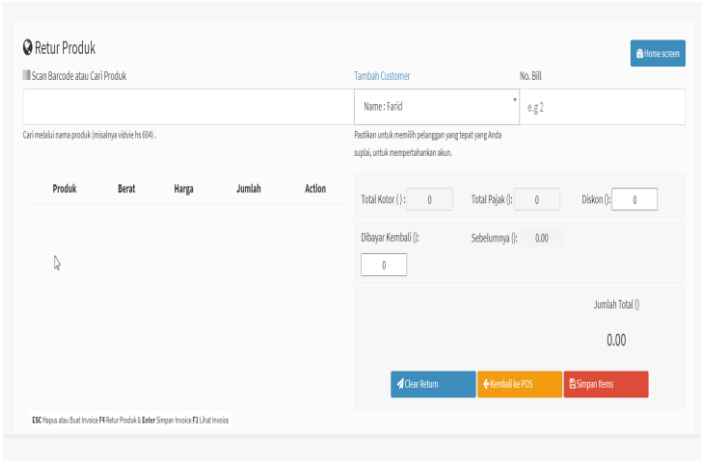

Figure 9. Product Return Interface

The product return menu is accessed by the Cashier. Cashier manages transactions that are adding, changing and deleting product return data. The Cashier go to POS page then click product return sub-menu for product return transaction and cashier input product data to be returned after that click save and the system will display successful return transaction notification. Then the cashier can add, edit, delete product return data by clicking the number button if you want to add and click the delete button if you want to delete the transaction, when the data is successfully added or changed the system will send a notification that the data is successfully saved, updated or deleted.

E. Report Interface Design

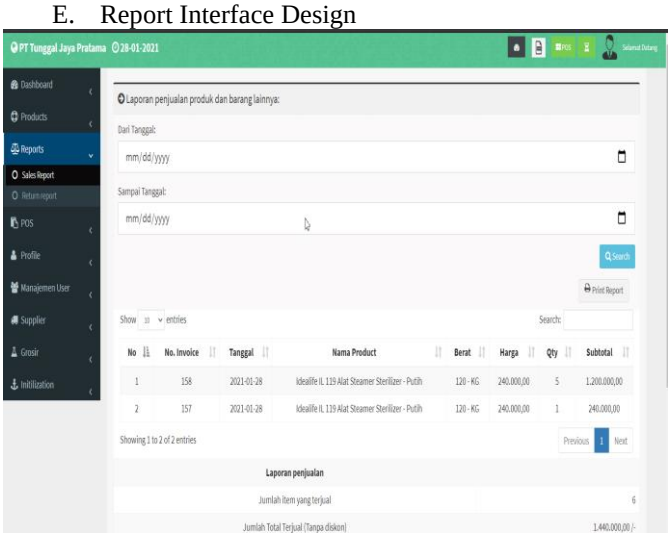

Figure 10. Report Interface page

The report menu is accessed by Finance. Finance can view and download sales reports. If you want to see the sales report finance can choose the report menu after that click the sub menu sales report, the system will display a list of sales reports, if finance wants to download sales report finance can input the reporting period and click search after that the system will display the report according to the period inputted after that click the print report system will display validation related to where save file click save to download the report and the system will display the report pop up.

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IV. CONCLUSION

The conclusions of this research based on the constraints experienced by MSMEs and resolved in the development of this system are as follows:

- This system provides product return recording facilities from customers who are integrated with the warehouse section of the head office so that the product return process from customers can be directly done. This is to minimize the complaint from the saddle and increase customer satisfaction to MSME business entities.
- This system makes the process of listing sales in detail and all data enters the database so that the data is not lost. This system is also assisted by the process of calculating sales so that the resulting sales data becomes accurate and can help MSME owners in monitoring the progress of their business.
- The development of this system is to add a product detail process that will help MSME managerial in monitoring products. This will help the presentation of what product information is in the sale.
- This system also added the facility of the process of determining the minimum inventory of products in the store, to assist in the addition of products from the head office. This can improve the effectiveness of product distribution from head office to store.

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