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Analysis and Design of a Sales Application System for Micro-Scale Grocery Stalls

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ABSTRACT

Investments in information technology often require relatively large capital allocations, but a wise strategy can optimize the use of these funds, such as through developing desktop-based sales applications according to more specific needs and scope. The grocery stall 'CV Warung Berkah' will apply this strategy to manage inventory in sales transactions. The method in designing this sales system uses the waterfall method approach, while finding out the percentage of benefits of the system built with the investment costs incurred using the return-on-investment method approach. Based on the results of the analysis and discussion in the research conducted, the sales system application for micro-scale basic food stalls is feasible to be implemented or developed with an investment feasibility test value or what is usually called ROI of 62.0%. This application system, all sales transactions are recorded accurately as material for the shop owner's analysis in deciding to purchase and inventory goods.

1. Introduction

The tight economic competition is felt by all groups, both upper-middle scale entrepreneurs and lower-middle scale entrepreneurs. For entrepreneurs who have sufficient capital investment, investing in information system technology is a long-term strategy that can be taken to continue to exist in today's tight economic competition, for example by building a digitalized information system that integrates all economic chains. This is different from small-scale entrepreneurs where the capital system only relies on internal resources with a limited scope. Let's take one example, namely small-scale basic food stalls which are generally found in residential areas. For grocery stall owners, investing in digitalization technology is not easy because they must have quite a large amount of capital [1].

The object and location of this research is "CV Warung Berkah" which is located in a residential location of residents of Comrang village, Tobat village, Balaraja sub-district, Tangerang regency. This basic food stall is an example of a small-scale home business that provides various types of daily necessities with a limited amount of capital investment. At this location, there are 8 food stalls with a population of 155 families [2]. Business competition between several basic food stalls makes the owner of 'CV. Warung Berkah' must think about finding and implementing new strategies, innovating and being creative for the survival of its business. One example of a strategy that can be implemented is managing the inventory system so that stock overloads do not occur, filtering sales transactions so that you can know the types of goods that sell quickly, and improving service to buyers and so on. This strategy cannot be implemented if the sales system process still uses conventional methods, which means all processes are carried out with manual records [3].

To implement the strategy above, one approach is to utilize advances in information technology, including building a sales application system. Even though its implementation requires quite a large investment, it can be adjusted according to needs, for example designing a desktop-based cashier application at the 'Hikmah Jaya' grocery store using the waterfall method approach. The waterfall

method is an approach to software development, where the analysis stage involves identifying needs by considering the main functions required [4]. Generally, basic food stalls are small scale and those whose business locations are in the middle of residential areas only serve their target market in the surrounding area. With capital investment and a limited target market, the development of these businesses usually does not have significant business progress each year, this is one of the factors that causes many grocery stall businesses to go bankrupt amidst business competition. Therefore, to increase competitiveness, especially in small-scale basic food stalls, a good and effective business management system is needed [5].

Investment and application of technology in a field or business does not have to be carried out totally with quite large investment capital, small and medium businesses, for example, grocery stores, can take advantage of technological advances by designing a sales information system according to current needs while considering the life cycle of the system itself (System Development Net Life Cycle) for future sales system development [6]. Therefore, in this research, based on the research object chosen and the identification of the problem analysis that has been carried out, a sales system will be built as an alternative solution to problems, especially those related to inventory management, sales transactions so that it can provide maximum service to buyers. The method for designing the sales system uses a waterfall method approach to facilitate the development of information systems in a structured manner and according to needs [7]. With this method approach, each development stage, from requirements analysis to implementation and testing, will be carried out sequentially and thoroughly, allowing better monitoring of the progress and quality of the system being developed.

Meanwhile, at the design stage of the sales system application program obtained from the results of the needs analysis, the Delphi programming language will be used with the MySQL database system management. The feasibility study or return on investment method for the system being built will be described in return on investment (ROI). This is carried out to find out whether the sales system being built is feasible or not based on the presentation of the benefits generated with the costs incurred [8].

2. Methods

The type of survey in this research is a descriptive qualitative survey, namely a type of survey in research that describes an activity on the research object[9], while data collection and processing is obtained from the results of observations and interviews on research objects which are then developed from the results of data collection from literature studies related to the research theme. The system analysis stage is the stage of identifying problems, analyzing system requirements and analyzing user needs for the system that will be built in this research [10]. Next is the system design and implementation stage, at this stage the researcher designs the implementation environment using the SDLC (System Development Life Cycle) approach for sustainable system development using the Waterfall Method. After being designed and implemented, the researcher carried out a feasibility test. This was done to determine the percentage of benefits of the system built with the investment costs incurred. The researcher used the return-on-investment method approach [11].

The final stage of this research is the implementation and maintenance of the system, this stage is the final stage after the system has been successfully built and after testing the percentage of feasibility values. Meanwhile, the maintenance phase is an activity carried out periodically to ensure that the sales application system being built is running as it should [12]. Researchers monitor application systems that have been built and utilized by users or CV Warung Berkah owners, this aims to ensure that there are no bugs or errors in the application. The stages in this research can be seen in Figure 1 below.

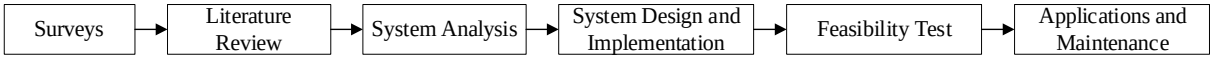

Figure 1. Research Method

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3. Results and Discussions

3.1. System Analysis

Analysis of the situation of the running system is considered very important because it can make things easier or provide an initial idea for designing the system to be developed [13]. Of the several basic food stalls in the research location, the majority of the sales transaction process still uses a manual system and it can be said that there is no specific system or recording of the sales process, whether from the process of recording or collecting data on goods, sales transactions or other reports. If this is allowed to continue gradually over a long period of time it will cause losses for the shop owner himself. Therefore, the owner of the basic food stall 'CV Warung Berkah', in this case the object of research, the researchers will create a sales application system that can carry out transaction processes automatically, making the transaction process easier and hopefully improving service for consumers. In designing the sales application system, the researcher used the waterfall method approach as can be seen in Figure 2.

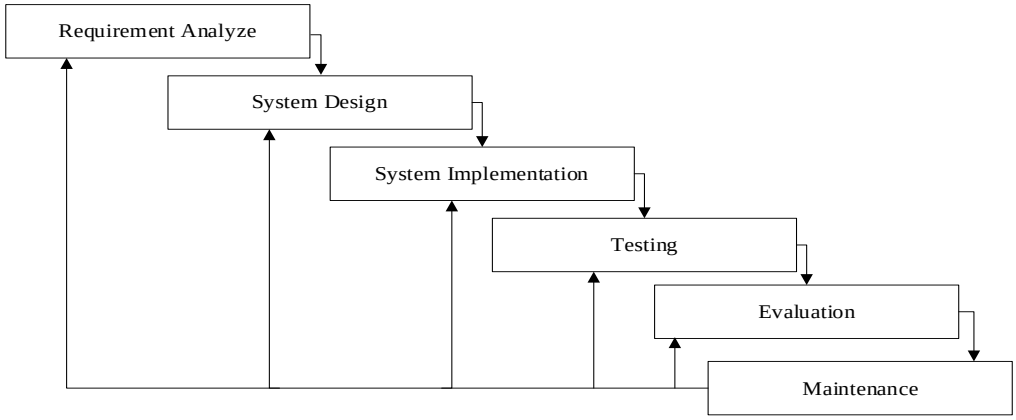

Figure 2. Waterfall Method

The grocery stall 'CV Warung Berkah' in carrying out its business processes has one worker or one shop assistant as a helper in serving sales transactions with a daily wage of IDR 80,000/day or an average of IDR 2,400,000/month with operational hours starting at 07.00 WIB until 22.00 WIB. There is no specific recording of sales transactions in carrying out the business process. The notes contained in a book are notes regarding receivables or cash bonds from buyers. Of course, this will cause difficulties in making decisions regarding inventory and subsequent purchases of goods as well as other processes.

To find out functional and non-functional requirements in building a sales system application, the researchers conducted direct interviews with CV Warung Berkah owners. This was done to meet the needs of the system that researchers will build. Researchers directly observe the problems that occur so they know the picture of the solution that will be provided. An overview of the identification of problems that occur in the research object can be seen in table 1 below.

Table 1. Identification of Problems

Problem Identification	Problems	Cause of the Problems	Solution
Inventory Management	Stock items are not updated	There is no recording of incoming goods data for purchases or records of goods sales	A system is designed that can provide menus or information regarding stock data and is integrated with the menu for purchasing and selling goods
Manual Data Management	Determining the selling price of goods is not the same between buyers and buyers.	Determining the selling price is based on the memory of the owner or serving officer.	In designing the application, a selling price field will be created or the selling price will be determined based on the cost price.

Problem Identification	Problems	Cause of the Problems	Solution
Manual Transaction Report	There are no reports on sales of goods so it is difficult to find out the profit from selling goods.	There are no written reports or data regarding profits from the sale of goods	A sales application system was designed that provides a report menu for each sales transaction, goods purchase transaction and accounts receivable records. The system is built by paying attention to user needs, so that information can be quickly accessed by users or owners to support decision-making.

3.2. System Planning

After knowing the problems and user needs of the research object, a sales system is proposed as an alternative problem solution that is tailored to the user's needs. There are several stages that researchers carry out in system design, including designing activity diagrams, use case diagrams and designing database models.

a. Activity Diagrams

The initial design for implementing the system that the researcher carried out was to create an activity diagram design, which is a visual image to describe the sequence of activities in the system to be built. Apart from that, the benefit of designing activity diagrams is that they can be used as information for sustainable system development as can be seen in Figure 3.

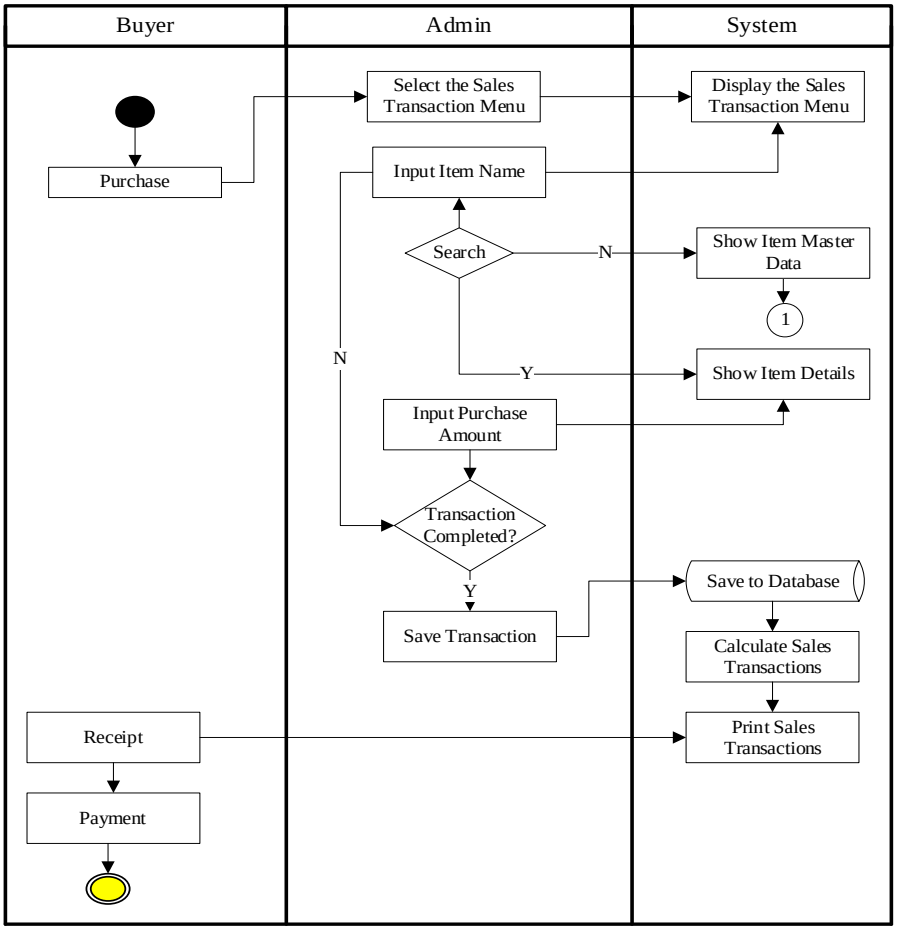

Figure 3. Activity Diagram

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b. Use Case Diagram

This diagram describes functional requirements that describe communication between users and the system[14]. This research is focused on designing a sales system application for a micro-scale basic food stall, which is a retail business that focuses on selling daily necessities for local people who have a significant role in the local economy. By increasing the efficiency of the sales system, it is hoped that it can have a direct positive impact on people's welfare, while also providing an example of the effective application of information technology on a smaller scale. In this design, there are two actors. The system can only be accessed by the admin actor or shop owner as the main actor, as seen in Figure 4.

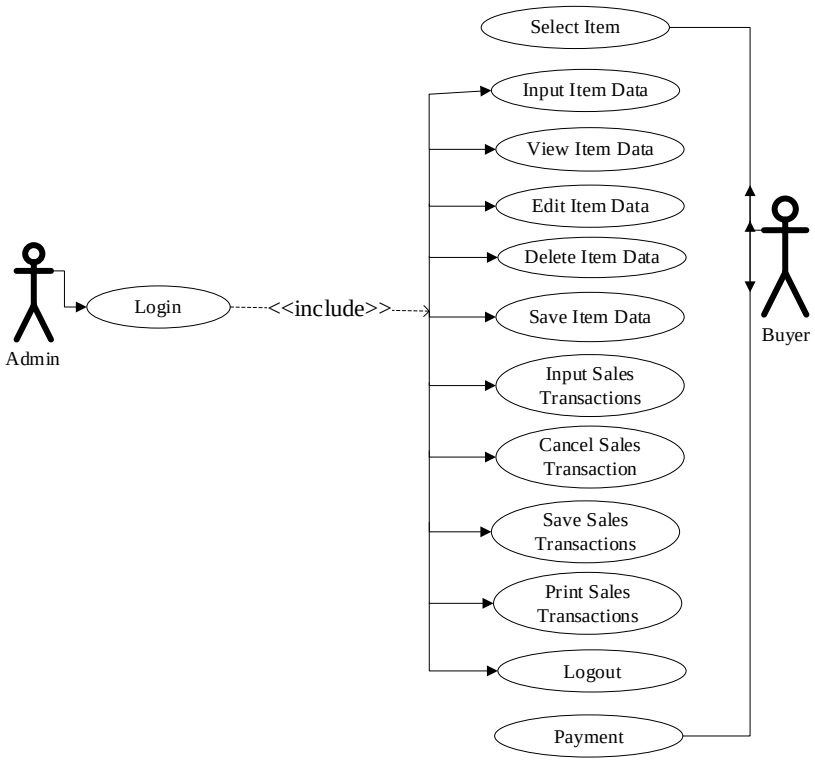

Figure 4. Use Case Diagram

c. Entity Relationship Diagram

The Entity Relationship Diagram (ER-Diagram) is a logical data model in describing the concept of database design, this data model shows the relationship between several entities in a system that will be designed [15]. The following is an overview of the ER-Diagram that will be built as shown in Figure 5.

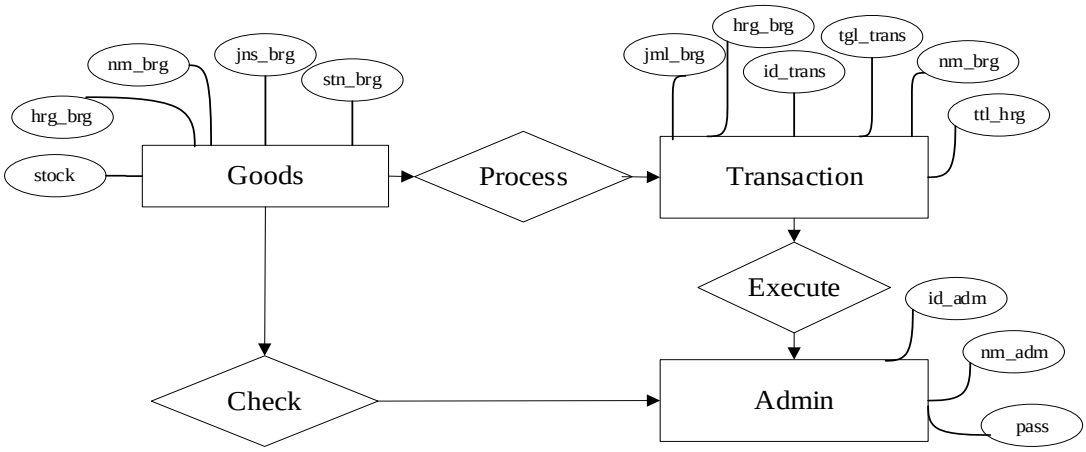

Figure 5. ER-Diagram

3.3. System Implementation

The next stage is to implement the system that has been designed into an application or software. The design of the micro-scale grocery stall sales system was implemented in the Delphi programming language with a database management system using MySQL. The following is the interface or user interface of the system that will be implemented [16].

Figure 6. Dashboard Menu

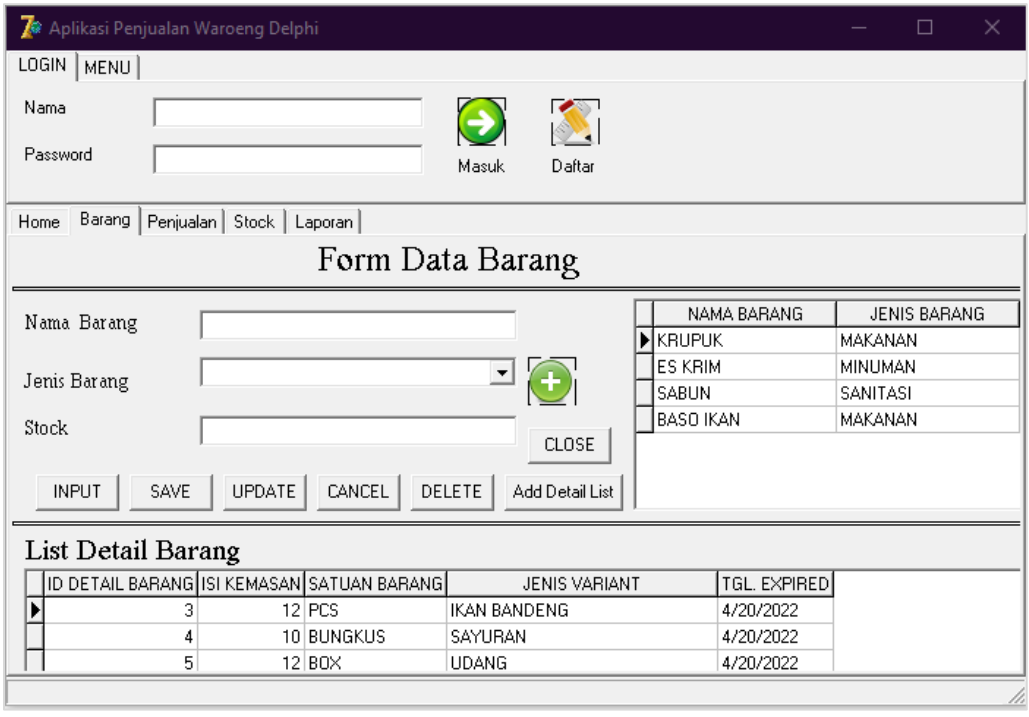

Figure 7. Inventory Item Menu

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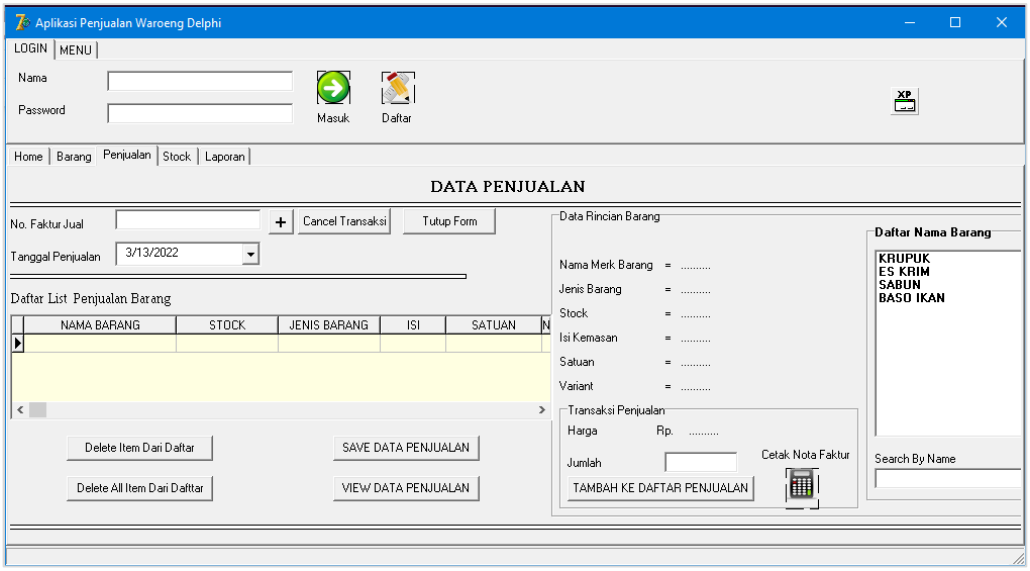

Figure 8. Transaction Menu

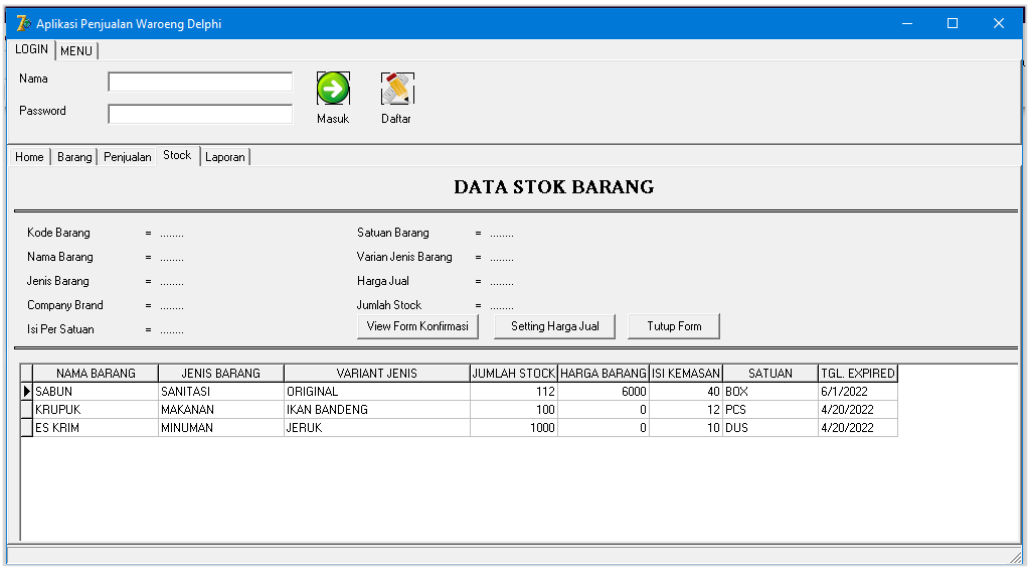

Figure 9. Inventory Menu

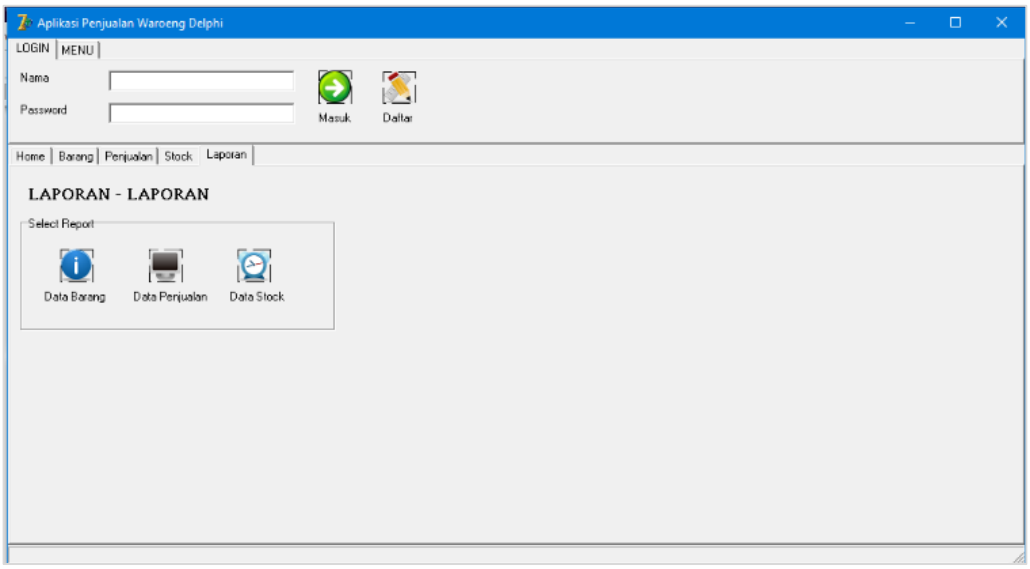

Figure 10. Report Menu

3.4. System Feasibility

The method used to test or measure feasibility is the Return on Investment (ROI) method, which is a method for measuring the efficiency or profitability of an investment. In this test, the total investment (Procurement) is estimated at IDR 5.000.000,- which is the investment cost for procuring or purchasing hardware, printer ink and receipt paper. Meanwhile, system maintenance costs and purchasing printer ink and stucco paper are carried out in the seventh month. Furthermore, the total benefits are IDR 2.100.000,- for tangible benefits and IDR 6.000.000,- for intangible benefits, respectively. The total benefits are profits from savings or increased sales for 6 months, which includes operational efficiency costs including overtime wages. and procurement of stationery, improving service or sales and efficiency of inventory costs (stock of goods that do not move). The percentage of benefits of developing a sales application system with the costs incurred (investment) is presented in Table 2 with the following formula:

$$ROI = \frac{Profit - Investment\ Costs}{Investment\ Costs} x\ 100\% \quad (1)$$

Table 2. Return on Investment

Resume	IDR
Total Benefit	8.100.000,-
Total Investment	5.000.000,-
Difference	3.100.000,-
$ROI = \frac{IDR\ 3.100.000}{IDR\ 5.000.000} x\ 100\% = 62.0\%$	

Based on the feasibility test above, the percentage rate of return on investment is 62.0%, it can be concluded that the implementation of the sales application system at the 'CV Warung Berkah' which has been designed is suitable for implementation.

4. Conclusion

Based on the research stages that have been carried out, starting from the design stage using the SDLC (System Development Life Cycle) approach, system development using the waterfall method approach to feasibility testing using the ROI (Return on Investment) method approach, then the sales system application for micro-scale food stalls in particular at the grocery stall “CV Warung Berkah' is feasible to be implemented and developed, it can be seen that the percentage of feasibility test results is 62.0%. The implementation of this application is expected to improve service to consumers through managing an organized inventory system and accurate recording of sales transactions, making it easier for shop owners to analyze decisions regarding purchasing and inventory of goods. The suggestion from this sales application system project is that although the above analysis is acceptable, in its implementation, the shop owner needs to pay attention to the capabilities of the resources they own or capital as material for long-term investment, considering that the source of capital only relies on internal resources with a limited scope.

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