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Application of The Waterfall Method to the Website-Based JM Leather & Shoes Point of Sales Information System

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ABSTRACT

Trading business is a type of business that has the basic concept of buying supplies of goods and reselling them with the aim of making a profit. In the current era, people continue to flock to set up a place of business, this is due to changes in market conditions as well as increasingly sophisticated economy and technology. JM Leather & Shoes continues to supervise and record the processing of goods data, supplier data, expenditure data, sales transactions, purchase transactions, and the preparation of reports which are always evaluated every month by superiors. During this time, both cashiers and administration record in the ledger. This of course causes various problems. Where the process of making reports takes a relatively long time, because the administration must first adjust the real stock at the place of business with the stock in the records until finally the difference between the two is found. One effort that can be made is to create an application that can help facilitate business process activities and minimize the occurrence of errors that could have a negative impact on the company's future. With this system, the data processing process from searching, adding, changing, to creating reports as evaluation material becomes easier and faster. The risk of data loss or damage can also be reduced to a minimum because it has been stored in the database, making it more effective and efficient. Future researchers are expected to add features for forecasting the items that are most and least desired by customers.

Keywords: Information System; Point of Sales; Website

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1. INTRODUCTION

Business trade is something type business Which own draft base buy supply goods supply And sell it return with the aim of seeking profit.[1] Supported by technological developments that have developed, information system technology is a tool used to display information so that it has useful value for its users. Apart from that, the aim of the information system is to provide information services to make activities easier to carry out. [2] Apart from this, processing information to support company operations will of course help in the company's activities [3]. One of the other benefits of current internet adoption is the ability to switch from traditional paper-based information management to computerized system. [4]

JM Leather & Shoes is a trading business operates in the *fashion sector* located on Jl. Werkudara No 11 LegianKaja, Badung, Bali. J.M Leather & Shoes sell products withbasic leather materials ranging from sandals, shoes, wallets, bags, to jackets Skin. For the product manufacturing process, JM Leather & Shoes works the

same as *professional* tailors who are experienced inthe field. In his age Which Still spelled out young, that is not enough from OneFor years, JM Leather & Shoes has been able to compete with trading businesseskind. This can be seen from sales which continue to increase, with turnover reach range three tens until four tens million inone month.

J.M Leather & Shoes Keep going do supervision and recording to processing data goods, data *suppliers,* dataexpenditure, sales transactions, purchase transactions, to manufacture reports that are always evaluated every month by superiors. During this time, both cashiers and administration carry out internal recordsbook big. Matter This naturally give rise to various problem. Where the process of creating reports takes time which takes a relatively long time, because the administration must adjust firstbetween the real stock at the place of business and the stock on record until finally the difference between the two was found. Administration too needs adapt data expenditure, with transaction sale, purchases, to inventory of goods that will later be used in preparation reports, start from report sale, report purchase, report supply goods, report *stock hospitalization* untilreport profit make a loss. From facet recording transaction, good transaction salenor transaction purchase, Of course Also need Lots Of time, because apart from recording manually, the cashier and administration also need to calculate the total price one by one using a calculator, as well make note sale Which Also in a way manually. This will be resulting in quite long queues when there are many *customers* Which do purchase in time Which simultaneously. From facet security, the paper recording system is still less secure, because it is not exists right access so that every person Can do change to the data Which There is. [5]

Currently JM Leather & Shoes needs an information system *Point of Sales* which will later be able to directly view, search, adding or changing data on incoming and outgoing goods, and can create reports automatically regarding transactions that occur,start from report sale, report purchase, report supplygoods, *stock taking reports* , profit and loss reports, and sales graphs every day [6]. The *Point of Sales* Information System was created using a website because it can be accessed with any media, whether laptop, cellphone or computer [7]. Made expected can help recording, search and making report data more fast, and The risk of data loss or damage can also be reduced minimum Possible Because has stored to in databases.[8] Company confidentiality can also be more awake because only can opened after *user* do *login* on system.[9] The method used is the Waterfall Method because it has been proven to be effective, where the work process is carried out sequentially at each stage from top to bottom.

Based on description in on, problem Which appear from backgroundbehind in on is How “Designing And Build a Information Systems *Points of Sales* at JM Leather & Shoes based *Website* ”.

2. RESEARCH METHODS

This research uses a software development methodology, which has been proven to be effective, namely the waterfall method. This waterfall method is carried out sequentially at each stage from top to bottom. In this research, the waterfall method is used because it allows for departmentalization and control, so that it can minimize errors that will occur at JM Lather & Shoes [10]. In the website development process using the Ralavel programming language and the management system uses the MySQL database. Ralavel is used because it speeds up application development, makes it easier to develop resources with the best platform to get safer applications using security principles[11]. This decision is based on considerations of reliability, speed, and good support for application development. This waterfall method starts from the planning, analysis, design process stages, and up to the implementation stage in the Purpose of Sales system at JM Leather & Shoes based on the website.[12]

2.1 Literature Review

Literature study is a series of activities related to methods of collecting library data, reading and taking notes and managing research materials [11]. With this activity, researchers gain theoretical and practical aspects, and broad insight for writers that can be used as research material.[13]

2.2 Waterfall Method

According to, in the development stage of an application or system, the waterfall method is the method most widely used for the development stage.[10] This Waterfall method is one of the earliest parts of the SDLC used for software development.[14] This waterfall model is also known as the traditional model or classic model. The waterfall model is often also called the linear sequential model or classic cycle of life.[15] This waterfall model provides a sequential software life flow approach starting from analysis, design, coding, testing and support stages. The research method applied in this research is the development of the waterfall method. The waterfall method is a systematic and sequential information system development model. The stages in this waterfall method are the first: Requirements analysis and definition. System services, constraints and objectives are determined by the results of consultations with users which are then defined in detail and function as system specifications. The second is System and software design. The system design stage allocates system requirements for both hardware and software by forming the overall system architecture. Software design involves identifying and describing the software's basic system abstractions and their relationships. The third is implementation and unit testing. At this stage, the software design is realized as a series of programs or

program units. Testing involves verifying that each unit meets its specifications. Fourth, integration and system testing. Individual program units or programs are combined and tested as a complete system to ensure whether they comply with software requirements or not. After testing, the last step is that the software can be sent to the customer. Operation and maintenance. Usually (although not always), this stage is the longest stage. The system is installed and used in real life [16].

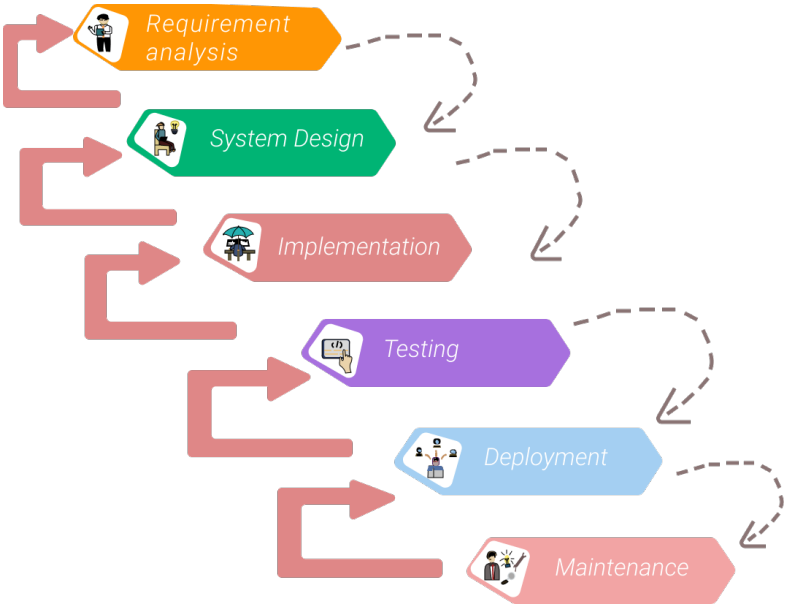

Figure 1. Waterfall Method

2.3 Data collection

In study This use several methods as toolor means of collecting data. Data collection is divided into primary data and secondary data.[17] Primary Data is data obtained directly from source concerned. [18] There are 2 types of this method that is the first method Interviews namely researchers dig information with speak directly with source person. Consult with party Which concerned For get data Which needed researcher in designing and building systems [13]. The second method Observation, Observation done in a way direct with do observationat JM Leather & Shoes. Observations were made by following ongoing business processes, starting from the retrieval process goods from *suppliers*, buying and selling transaction processes, to manufacturing report. Next, the second data is secondary data. Secondary data collection methods are divided in two that is the first method documentation Which done on study This is by collecting some product sales data such as sales recaps daily. The second is Method Literature, where the data taken from journal and books Which can support study. As for book or journal which is used in this research is a book that discusses systems, information, *point of sales*, sale, *inventory*, *UML*, *Databases*,*Website,* and theories Which other.

2.4 Data analysis

At the data analysis stage, the data obtained at JM Leather & Shoes is then analyzed to become information so that the results can be understood to solve problems related to research at JM Leather & Shoes.

3. RESULTS AND DISCUSSION

JM Leather & Shoes is a company operating in the *fashion sector* such as selling bags, shoes and sandals which has great potential for growth. This company is strategically located on Jl. Werkudara no 11 Legian Kaja, Badung, Bali. J.M Leather & Shoes sell products with database and work the same as *professional* tailors who are experienced inthe field.

3.1 Continuous System Analysis

Analysis Which done in study This based on information from the owner regarding the system flow which is running well sale nor purchase on J.M Leather & Shoes. Before building a *Point of Sales information system*, first explained explanation regarding the flow happen sale and purchase. Dobson

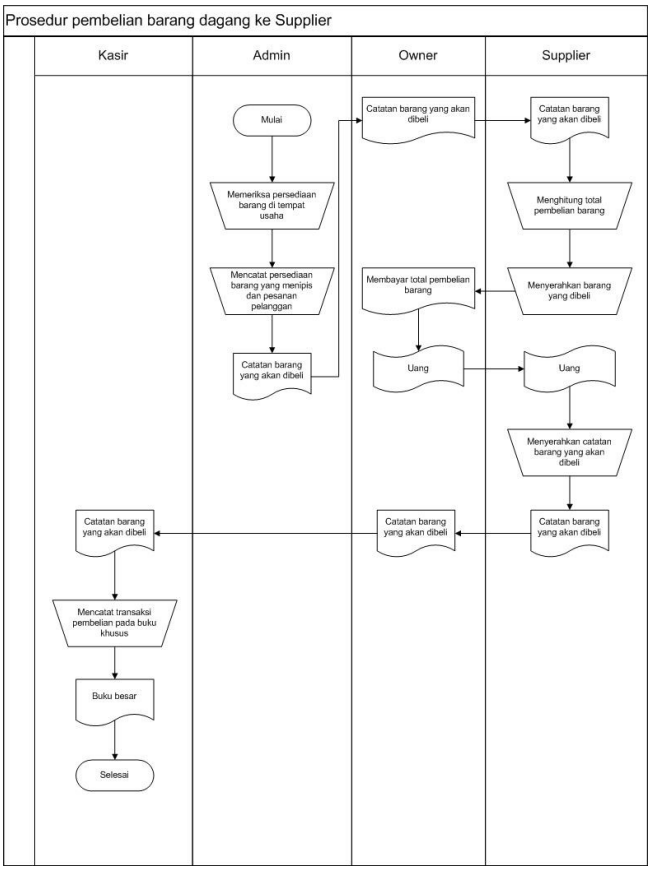

Figure 2. Document Flow Diagram of Merchandise Purchase Procedures

On Genre document procedure purchasegoods trade moment this goes, following is the procedure:

1) Started from part admin Which do inspection toinventory trade on J.M Leather & Shoes
2) After do inspection, admin do record to supply goods Which start thinning the supplies.
3) Furthermore, notes the submitted to owner.
4) *Owner* does book to *suppliers* in accordance notes goodsWhich will be purchased from admin.
5) *The supplier* calculates the total purchase of goods and how much is requiredpaid.
6) *Suppliers* deliver goods Which purchased to *owner.*
7) *Owner* does payment.
8) *Suppliers* accept payment and then returnnotes item purchased to *the owner.*
9) *Owner* delivers notes purchase to admin.
10) Admin do record purchase goods trade in bookbig.
11) Process complete.

From problem Which There is based on results analysis system Which currently walk, so submitted a system design WhichLater it can help minimize and overcome problems existing with a description in each *system flow diagram* as follows.

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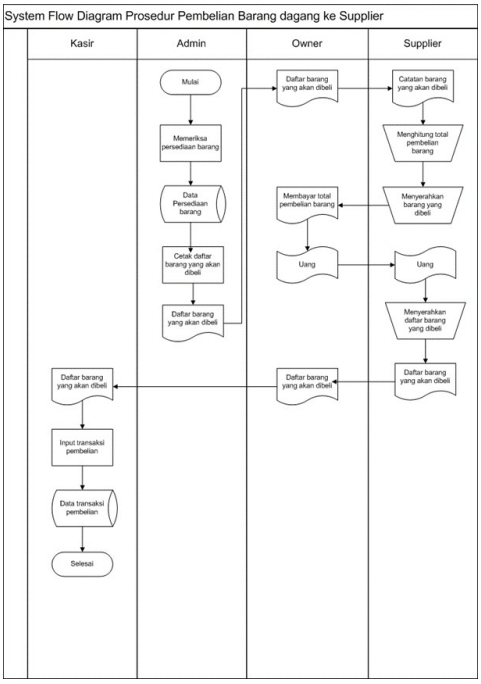

Figure 3. System Flow Diagram Procedure for Purchasing Goods from Suppliers

explains the document flow of purchasing procedures goods to *suppliers* Which submitted, below is the procedure:

1) First, admins inspect supply goods with use system Which There is, where data the has storedin the *databases* inventory.
2) System will display data Which start thinning inventory, so the admin just needs to print a list of items Which must purchase.
3) Next, the admin submits *a printout* of the list of required items purchased to *the owner,* and *the owner* handed over the list to *suppliers.*
4) Step next No There is difference with process Which moment Thiswalk, start from calculation total Which must paid, Payment, to returning *the printout of* the list of items received buy.
5) admin do input data transaction purchase Which Then data the stored to in *databases* transaction purchase.
6) Process finished.

3.2 Problem Analysis

There are several problems or weaknesses with JM Leather &Shoes, so that methods have been analyzed to identify problems that is with Method PIECES namely Analysis Performance Based on the analysis that has been carried out in the process making report sale, purchase and supply goods Still It takes a relatively long time [19] because it is still in use the system is not yet computerized, so performance is not yet possible done with maximum. The second is Analysis Information , Weaknesses information Which There is in J.M Leather & Shoes that is Data recording of incoming and outgoing goods is still being carried out using sheets of paper (ledgers), while production There's not just one thing found in JM Leather & Shoes, so allows errors to occur when recording data and influential to in accuracy report Which produced And information that delivered less appropriate. And the third is Control Analysis yet exists security access on J.M Leather & Shoes isproblem with this analysis. This is because of data still can changed by various parties so it is not possible to know which one data Which original. In system Which will designed, there is right access so that not just any person Can use it. The fourth is Analysis Efficiency, At JM Leather & Shoes there are still weaknesses in terms efficiency happen waste on need for processingrecording data goods enter and go out Which is data formaking reports, the place to store data is inadequate so the workflow at JM Leather & Shoes cannot be said yetefficient. The fifth is Analysis Service, Service Still Not yet maximum because system Which usedon J.M Leather & Shoes still own Lots Of lack, so that recording Not yet accurate and results Which desired need long time.

3.3 Analysis Need Functional

Functional requirements are functional requirements which are all processes carried out by the system and indicate the facilities needed in the system [20]. Function from system *information Points of Sales*

Which will madethat is The system that will be designed is expected to be able to domanagement data including Users can enter data Which required in accordancewith production which found in JM Leather & Shoes, User can displays data Which has in insert toin system, User can add, change, disable Andsearch for data so that data in accordance. As well as the system This expected capable produce information Which required by J.M Leather & Shoes, among them the system can display and print reports from the datahas been managed, the system can display and print sales reports, Purchase Report, Inventory Report, Stock Report hospitalization, Report Profit Make a loss, And Chart sale daily.

3.4 Analysis Need Non-Functional

Functional Requirements are requirements that describe how the system will work in the future. [21] In analyzing non-functional requirements, there are several things Which required for support system information *Points of Sales*, the following include devices soft supporter system that is OS Windows, MySql, Xampp, Sublime Text, Laravel, PHP, HTML, And Bootstrapping. For Devices hard supporter system Which needed with specifications Which adequate (LCD, keyboards, hard disk, memory, printers, processor, Scan barcode)

3.5 Use Case Diagrams

Use Cases is a modeling for the behavior of the software application that will be created which contains description function from A system from user perspective[22], Use cases work in a way describe typical interaction between the user of a system and the systemyourself through a story How A system used. Following This is Use Cases Diagram for System Point Of Sales Information

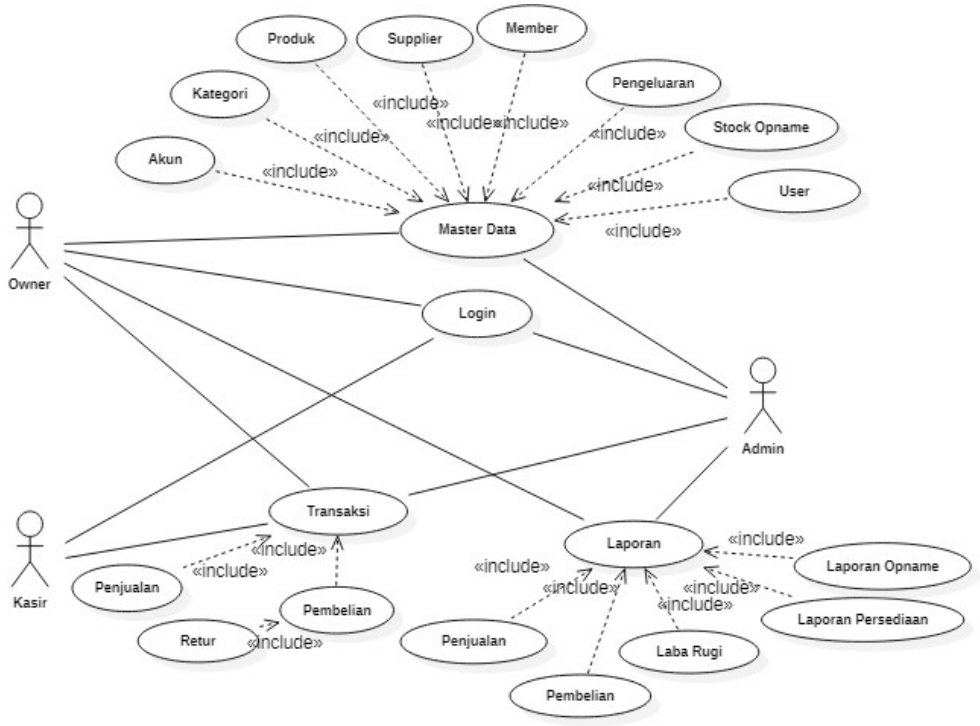

Figure 4. Use Case Diagram

Narrative use case is a function to explain in more detail the elements in the Use Case Diagram[23]

Table 1. Description of Use Case Diagram Main Menu

Narrative Use Cases Points of Sales	
Objective	- For Enter into the application and managing master data, transactions, and report. - If actor login as owner, thenactor can do all transaction, report and processingdata contained in the Point of application Sales. - If actor login as admin, thenactor can do processing data in the master data menu, menu transaction purchase, And report. - If the actor logs in as a cashier, then actor can do processing transaction sale.

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Description	System these enabling actors for manage data on point of application sales start from plus, edit, until making report.

Scenario Main

Actor	*Owner*, Admin, And Cashier
Condition Beginning	Actor open application *point of sales*
Action Actor	**Reaction System**
1. Actor (Admin, *Owner*) Select the Menu button Masters data	The system will display submenu masters data between other, Account,Category, Product, Users, Members, Suppliers, Expenditure, And Stock Hospitalization.
2. Actor choose knob Menu Transaction	The system will displays submenu purchase transactions contained therein there is return purchase And print note (Admin, Owner), Transaction Sale Which inside it there is choose print note (Cashier, Owner)
3.Actor (Admin, Owner) selecting the Menu button Report	The system will displays submenu Report, among them report sale, report purchase, report supply goods, report stock hospitalization, profit report make a loss.
Condition End	If the command is appropriate, then the system willdisplays as desiredby Actor. And actor can do processing data in accordance with right access each.

3.6 Class Diagram

A class diagram is a type of diagram in UML that is used to display the classes and packages that exist in a system that will later be used. [24] Class diagrams describe the attributes, operations and constraints that occur in the system Class diagrams are not only used for visualizing, describe, and document various system aspects, but also to build *executable* code from application device soft. Following This is *Class diagram* on application *Points of Sales* can see on picture.[25]

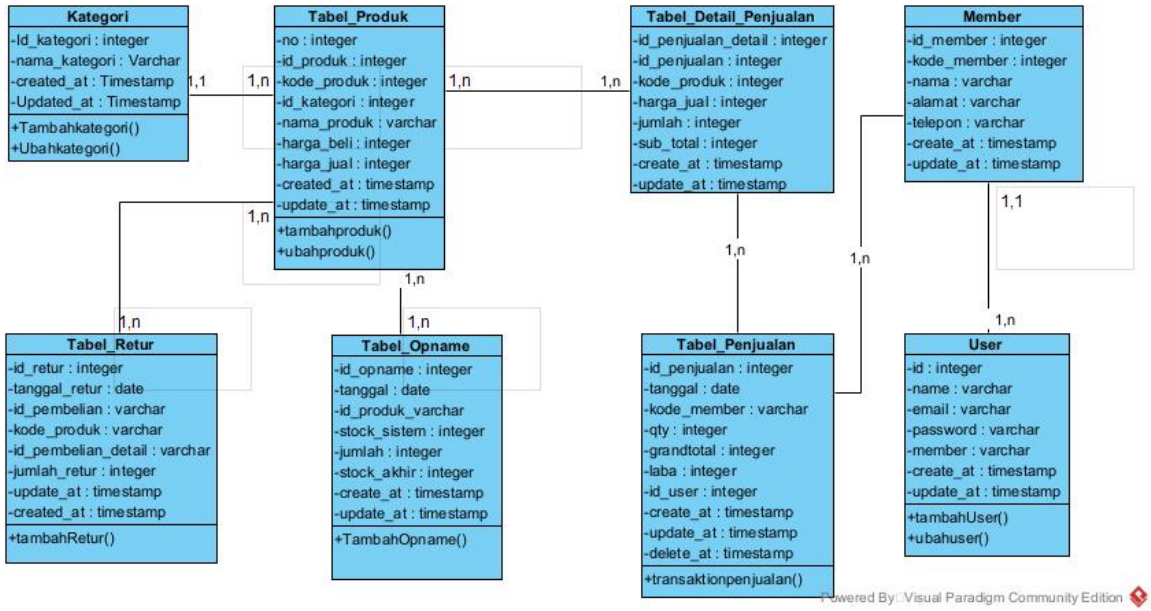

Figure 5. Class Diagram

3.7 System Analysis and Implementation

The login page is the first page that appears when the system is opened. On this page the user must enter their email and password. After the email and password are filled in, use the Sign In button to enter the system. The login display can be seen in Figure 6

Figure 6. Login Page

The following is the login display as admin, on this page there are several menus contained in it such as the Master data menu which consists of account, category, product, supplier, member, expenditure, stock taking and user data. Next is the transaction menu which includes a purchase transaction menu. Finally, there is a report menu, starting from sales reports, purchases, inventory, stock taking, to profit and loss reports can be seen in Figure 7.

Figure 7. *Main Admin Page*

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The following is a display of the main page of the product data menu. In this menu there is a list of products and there are also several menus such as adding data, changing data, and searching for product data. The main display of the product data menu can be seen in Figure 8.

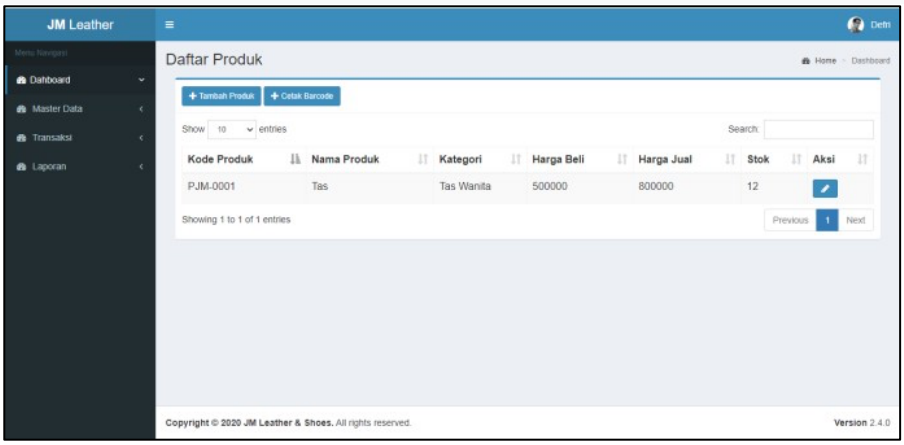

Figure 8. Main Product Page

The following is the main display of the supplier data menu. In this menu there is a list of suppliers and there are also several menus such as adding data, changing data, and searching for supplier data. The main display of the supplier data menu can be seen in Figure 9

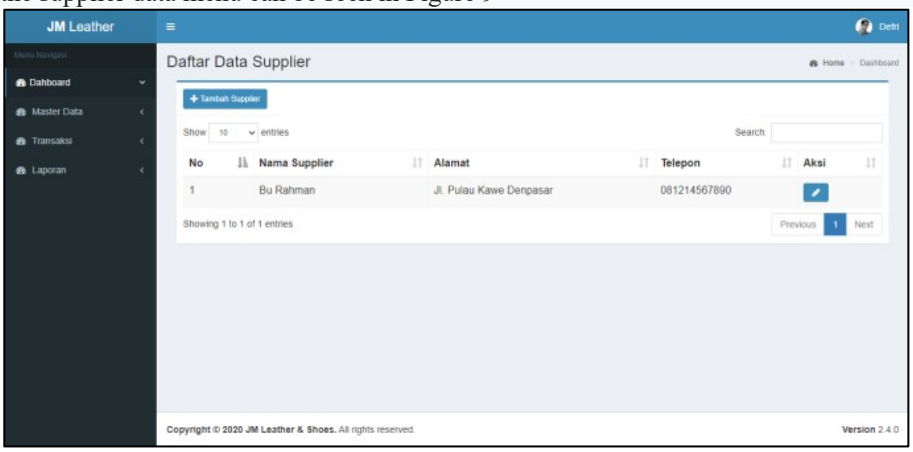

Figure 9. Supplier Main Page

The following is the main display of the stock taking menu which is used to manage original stock data with system stock. On this page there is a button to add stock taking data. The stock taking page display can be seen in Figure 10 below.

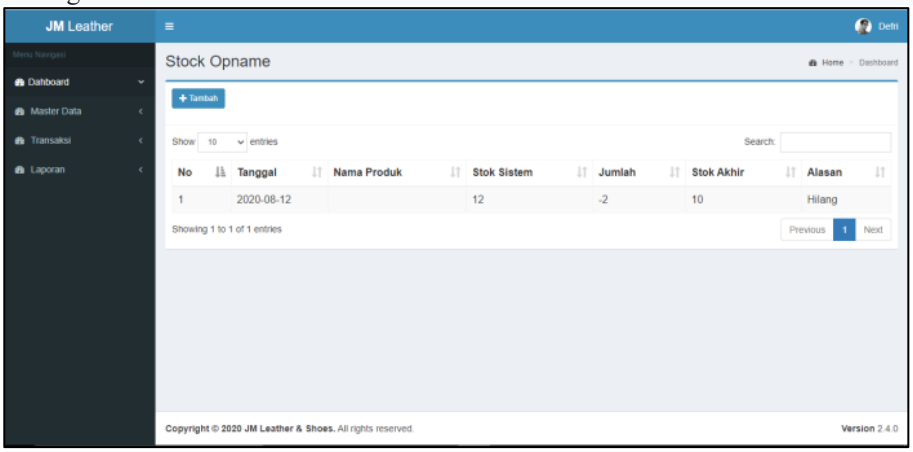

Figure 10. Main page of Stock of Name

The following is a display of sales data resulting from sales transactions that have occurred. There is a new Transaction button to add transaction data. The sales data page display can be seen in Figure 11 below.

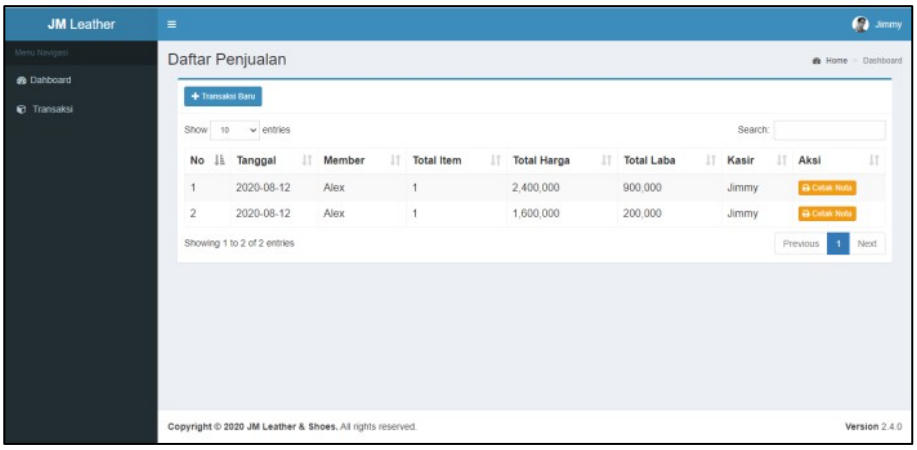

Figure 11. Main Sales Data Page

The following is a display of the sales transaction page that can be seen when the user presses the new transaction button on the sales data. The sales transaction page display can be seen in Figure 12 below.

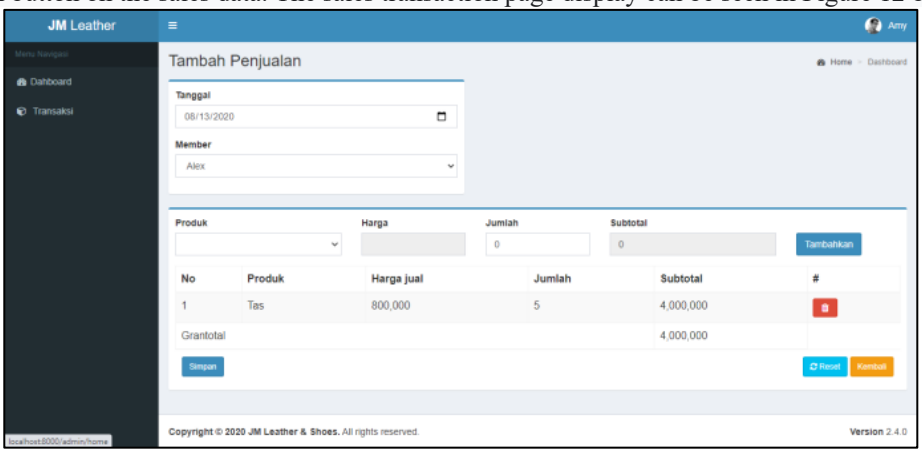

Figure 12. Main Sales Transaction Page

The following is a display of purchase data resulting from purchase transactions that have occurred. There is a new transaction button to add transaction data, and a return button to return purchased goods to the supplier if the goods are inappropriate or damaged. The purchase data page display can be seen in Figure 13 below.

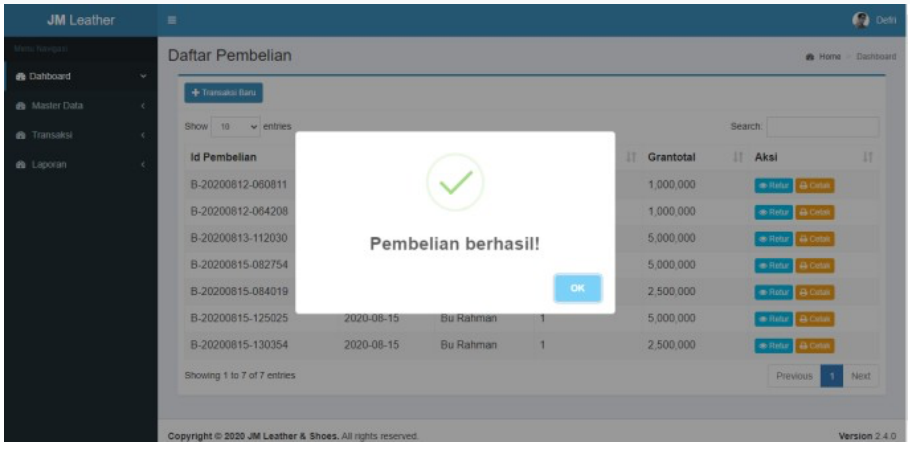

Figure 13. Main Page of Successful Purchase Transaction

The following is a sales report display that can be set according to the selected date. There is a print button to print the report results. The sales report page display can be seen in Figure 14 below.

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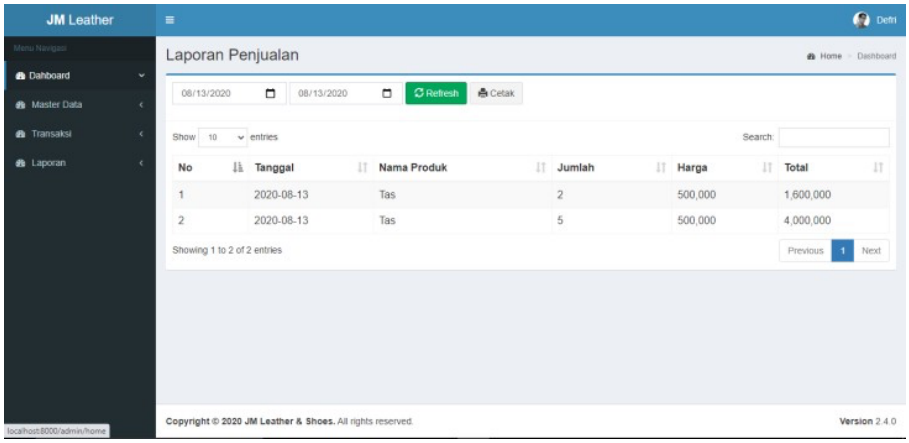

Figure 14. Sales Data Report

4. CONCLUSION

Based on the results of the discussions that have been carried out, it can be concluded that the Point of Sales Information System using the waterfall method has been successfully built and designed to process data which includes searching, adding, changing, and creating reports. With this system, it can help companies in that company operational activities are no longer carried out manually, so that they are more effective and efficient and can minimize recording errors. Future researchers are expected to add features to predict which items are most and least sought after by customers.

REFERENCES

[1] Sumantri, *Pengantar Agronomi*. Jakarta: PT. Gramedia, 2013.
[2] R. dkk Sutjiadi, "Perancangan Sistem Informasi Manajemen Tugas Akhir Pada Institut Informatika Indonesia Menggunakan Metode Incremental," *TELSINAS*, vol. 2, p. 153, 2022.
[3] R. dkk Januardi, "Persepsi Pengguna Dalam Mengukur Kinerja Operasi Konstuksi Berbasis Sampling Menggunakan Analytical Hierarchy Process," *TELSINAS*, vol. 2, p. 113, 2023.
[4] A. A. dkk. Kurniawan, "Analysis and Design of PT KDA Langling Cooperative System Through Web-based Savings and Loan Transformation Technology," *TIERS Inf. Technol. J.*, vol. 4, no. 2, pp. 104–114, 2023.
[5] I. B. dkk Udayana, "The Influence Of Hedonic Shopping Value, Web Informativness, Web Entertainment On e-Loyalty With E-Satisfication as A Mediation on Tokopedia," *Int. J. Econ. Bus. Account. Res.*, vol. 5, no. 3, 2021.
[6] R. M. Tandirerung, Y. T., Widyanto, E. A., & Rahmah, "Pengaruh kinerja lingkungan dan kinerja keuangan terhadap corporate social responsibility pada perusahaan manufaktur di BEI," *J. Eksis*, vol. 15, no. 1, pp. 68–81, 2019.
[7] dan V. P. Supono, *Pemrograman Web dengan menggunakan PHP dan Framework Penyala Kode*. Jakarta: CV. Budi Utama, 2016.
[8] R. J. Keith, "The Marketing Revolution," *J. Mark.*, vol. 3, no. 24, pp. 35-38., 2022.
[9] Y. dkk Damini, "Evaluation of Geverment in Information System Security to Minimize Information Technology Risk," *INTENSIF*, vol. 8 No 1, 2024.
[10] A. W. Aceng, "Analisis Metode Waterfall Untuk Pengembangan Sistem Informasi," *J. Ilmu-Ilmu Inform. Dan Manaj. STMIK*, pp. 1–5.
[11] Binus University, "Kelebihan Menggunakan Laravel," 2024. [Online]. Available: https://socs.binus.ac.id/2018/12/13/kelebihan-menggunakan-laravel-web-development/.
[12] R. S. Pressman, *No Title.* .
[13] Saryono, *Metode Penelitian Kualitatif*. Bandung: PT. Alfabeta, 2010.
[14] S. Hidayati, NUr, "Application of Waterfall Model in Development of Work Training Acceptance System," *INSENTIF*, vol. 4, 2021.
[15] dkk Arwaz, Aini Arifta, "Pengujian Black Box Pada Aplikasi Sistem Seleksi Pemenang Tender Menggunakan Teknik Equivalence Partitions," *J. Teknol. Sist. Inf. Dan Apl.*, vol. 2, no. 2, 2019.
[16] I. Sommerville, *Software Engineering (Rekayasa Perangkat Lunak)*. Jakarta: Erlangga., 2011.
[17] Fi. dkk Redjeki, "Impelemntation of Appropriate Marketing and Sales Strategies in Improving Company Performance and Profit," *Int. J. Sci. Socienty*, vol. 3, no. 2, 2021.
[18] Sugiyono, *Metode Penelitian Kualitatif, Kualitatig, dan R&D*. Bandung: Alfabeta, 2010.
[19] Wukil Ragil, *Pedoman Sosialisasi Prosedur Operasi*. Jakarta: Mitra Wacana Media., 2010.

[20] Universitas Digital Indonesia, “Kebutuhan Fungsional,” 2009.
[21] R. M. Dennis, A., Wixom, B. H., & Roth, *System Analysis And Design*. USA: Wiley, 2014.
[22] Lisnawanty, “Perancangan Sistem Informasi Kearsipan Surat Masuk dan Surat Keluar Berbasis Multiuser. Program Studi Komputerisasi Akuntansi, AMIK BSI Pontianak,” *J. KHATULISTIWA Inform.*, vol. 2, no. 2, 2014.
[23] J. L. Bentley, Lonnie D dan Whitten, *Systems Analysis and Design for the Global. Enterprise*. New York: McGrawHill, 2007.
[24] Munawar, *Analisis Perancangan Sistem Berorientasi Objek dengan UML (Unified Modeling Language)*. Bandung: Informatika Bandung, 2018.
[25] D. Hasbid, Riswan, “Penerapan Waterfall Model pada Perancangan Sistem layanan dan Informasi dengan Pendekatan OOAD MEnggunakan UML,” *J. IRObot (INternational Res. Big-Data anad Comput. Technol.*, vol. 5, 2021.

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