# Design of Web-Based Motor Vehicle Spare Parts Sales Application Using the Rapid Application Development (RAD) Method

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**Abstract.** The development of technology, especially in the industrial era 4.0 and the era of technological disruption accompanied by the increasing literacy of society in technology, has influenced the operations of a business company, especially in their marketing methods as the front line of a business process. Company X in Surabaya, which is engaged in the sale of motor vehicle spare parts, is one of the companies that is aware that the market continues to grow and they must follow these changes by designing a sales website to increase their revenue. This sales website was developed using the rapid application development (RAD) method because this method is suitable for developing software on a small to medium scale and has advantages in terms of efficiency of work time. The results obtained from the design of this sales information system software are a system that can help company X in managing spare part sales as a whole with features that include product catalogs, product transactions, multiple payments, shipping calculations, return menus, customer satisfaction ratings and sales reports per time period.

**Keywords:** Website; Rapid Applicaton Development; Marketing; Information System.

## 1. Introduction

The impact of technological advances is marked by the era of technological disruption as an implication of the industrial revolution 4.0 era. Technological disruption can be interpreted as a fundamental change due to the development of digital technology that has begun to replace and change the role and work of humans. Including in the field of marketing, the development of technology marked by technological disruption has forced business organizations to change and develop their marketing channels to reach a wider market share [1]. Technology can help a company change its business processes by enabling the automation of traditionally manual tasks like data entry, inventory management, and customer care. This reduces human error and increases labor productivity.

In the field of marketing, the role of technology due to the massive online transactions utilizing digitalization which is marked by changes such as the growth of a cashless society, business start-ups, and online transactions, as well as the transformation of physical stores into e-commerce. In the past, buying and selling transactions could only be done by making direct offers and had to come to the store. However, with the current concept of E-Commerce, this paradigm has changed, using the internet a

business organization can offer and market its products online to buyers without having to meet face to face and not be limited by space and time.

New business models like e-commerce, digital platforms, and the sharing economy have also emerged because of technological advancements, giving businesses the ability to reach a larger market and provide customers with additional value. Using cloud computing and digital collaboration apps, technology speeds up communication between departments and locations, improving workplace flexibility and efficiency [2]. However, technology also spurs innovation in product development by digitizing testing and research, which makes businesses more responsive to shifts in the market.

The opportunities and potential for success of online marketing activities by utilizing websites are also driven by changes in the social status of Indonesian society where currently most of the Indonesian society is increasingly technologically literate from year to year. This is indicated based on data from the Indonesian Digital Society Index (IMDI) which is an index measuring the level of competence and skills of Indonesian society in using digital technology in everyday life which has increased. Based on the IMDI Index, it is known that in 2024, the IMDI index of Indonesian society will reach 43.34 or increase by 0.16 compared to 2023, this value is taken based on a survey conducted in all provinces and districts/cities in Indonesia[3]. Of course, based on the data, it also has an impact on the value of e-commerce transactions in Indonesia. In the publication of the Indonesian Data and Information System Center through a report from the Indonesian Ministry of Trade in 2024, it was stated that in the period 2020 to 2024, the number of e-commerce users in Indonesia continued to increase, and is predicted to continue to increase until 2029[4].

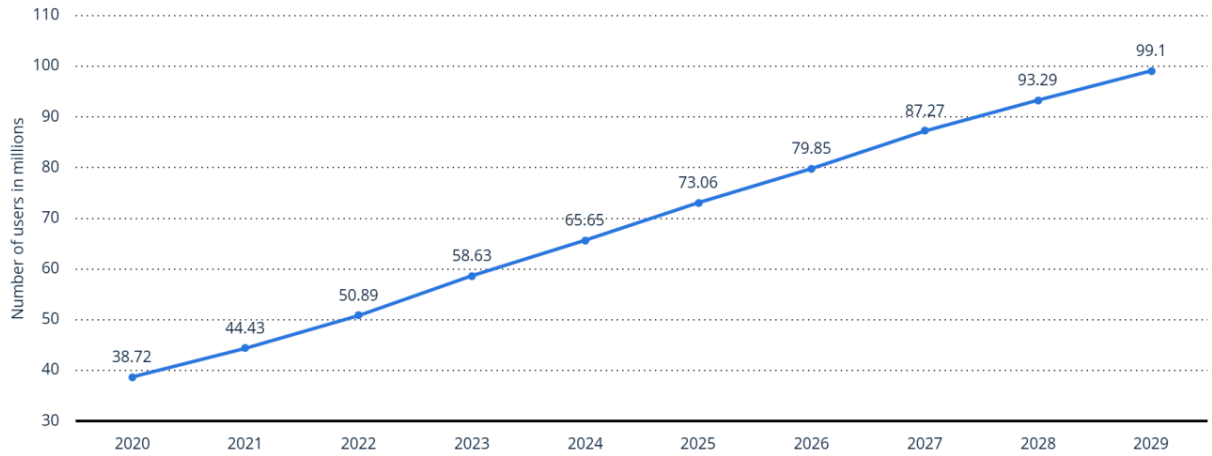


**Figure 1.** Number of Indonesian E-Commerce Users 2020-2029

Based on the background above, this study takes the object of company X located in the Kedungdoro area of Surabaya. Company X is a shop and distributor engaged in the distribution or selling of motor vehicle spare parts, industrial machinery, and heavy equipment. Based on the results of discussions with the company owner, it is known that the company needs an E-commerce system that can facilitate them in carrying out the buying and selling transaction process to customers without having to come directly to the shop. The objectives to be achieved are to increase the effectiveness and efficiency of the company's performance, increase market share and provide convenience for the company and customers in buying and selling motor vehicle spare parts transactions.

## 2. Literature Review

### *2.1. Previous Research*

In the study using references from previous studies to find comparisons and studies, as well as to enrich the theory of the research to be conducted. The studies used are as follows:

**Table 1.** Previous Research

| | Research Theme | Research Methodology | Result |
|---|---|---|---|
| 1. | Design Of Motorcycle Spare Parts Sales Information System And Web-Based Customer Complaint Features At Pt. Fuboru Indonesia [5] | Waterfall method. | Web-based application to handle marketing processes in the sales and purchase process of motorcycle spare parts includes features such as stock transfer, price discount features on each selected product, customer complaint management for post-purchase products to product return procedures. |
| 2. | Motorcycle Spare Parts Sales Website Design at D'LIGHTS Batang Tarang Workshop[6] | Rapid Application Development (RAD) | The result of this research is a design for a website for selling motorcycle spare parts at the D'Lights Batang Tarang workshop. |
| 3. | Web-Based Motorcycle Spare Part Sales and Service System at Alvin Berkah Jaya Palembang Workshop[7] | Prototype Model | A web-based application that has the main feature of serving the motorcycle sales and service system and changing the transaction process to be digital-based. |

The research gap in this study is known that most of the research found on Google Scholar in the period 2020 to 2025, the majority of the use of the RAD method in designing spare part sales information systems is only limited to discussing the development and implementation of web-based information system applications or desktop applications, but not many have discussed how the RAD method is able to handle business needs in the motor vehicle spare part sales sector which often change, for example, there are promos, seasonal stock, seasonal marketing and accommodate the system's ability to adapt to business changes. Even the use of the Midtrans payment gateway as a payment method model is still minimal.

### *2.2. Digital Marketing*

The term digital business has many instruments, one of which is digital marketing, or sometimes it can also be called E-Marketing. The marketing process by utilizing digital technology has advantages which are considered very effective and cost efficient. This is because of the help of the internet which allows a fast transaction process and is not limited by space and time[8].

Digital marketing activities are steps in creating a buyer experience through interactions between sellers and buyers, thus forming customer value through their digital shopping experience. Marketing by utilizing technology is also an effort that can be applied by organizations or business companies to their consumers with the aim of changing their shopping behavior to be digital-based, through several steps such as implementing interactive direct shopping, providing one-stop shopping services through e-commerce platforms, complete product information through shopping catalogs, providing promos and discounts on certain products that aim to increase customer satisfaction[9]. The indicators of digital marketing itself refer to Philip Kottler's marketing mix which consists of 7 things, namely:

1. Product: are the products and services offered by an organization, which generally include features, product reliability, quality and benefits, brand image, equity value, product design, color and so on.
2. Price: is the nominal amount of currency that must be paid by customers to obtain the marketed products and services.

3. Place: is a marketing place, in the context of digital marketing the marketing place in question can be a distribution channel such as a website, mobile application or other form of platform where the products and services are marketed.
4. Promotion: refers to activities carried out by companies to communicate the advantages of the products and services they have with the aim of persuading customers to be interested in making a purchase.
5. People: is an element related to the size and quality factors of human resources in an organization. Organizations that have quality human resources have advantages in terms of performance and productivity.
6. Process: interpreted as factors related to the methods, flows, procedures and policies related to the implementation of activities carried out by business actors in providing services to consumers.
7. Physical Evidence: is a factor or element related to image, appearance or supporting evidence that can be shown by companies or business actors related to the products and services they market. The better the company can show physical evidence that is their advantage, the more it can provide the perception that there is a guarantee of quality and good benefits from the products and services.

### *2.3. Information System*

Technology and information systems are developing at a quick pace, making them a competitive advantage that a business must possess to win. If the use of technology and information systems can enhance employee performance, it can be deemed successful. By utilizing technology and information systems, businesses must prepare their human resources (HRs). It is impossible to separate the role of IT, which can bring innovation to every development, from the ease of numerous commercial processes[10]. Information systems have several components which are also known as building blocks, namely (1) input block, (2) model block, (3) output block, (4) technology block, (5) database block, and (6) control block[11].

These days, applying and implementing information technologies requires a significant financial investment from any firm. However, inadequate IS implementation and selection may make it more difficult to accomplish corporate objectives. Decision-making may be impacted by IS's inability to gather, store, and transmit critical information for business organizations. This can result in fewer options for decisions and incorrect actions that cost the company money and drive away clients[12].

### *2.4. Marketing Information System*

Marketing information system is part of a business information system that includes a collection of procedures that implement, record, calculate, create documents and sales information for management purposes and other interested parties, starting from receiving sales orders to recording the emergence of invoices or accounts receivable. Components in a marketing information system generally consist of several things such as[13]:

a. Recording sales transactions
b. Calculation of quantities and prices
c. Creating and printing sales notes
d. Creating sales reports.

Forming customer experience is the goal of a marketing information system, this can happen to be several main things such as: (1) the role of the application holistically so that it has an impact on the digital transformation of customers so that it has a positive impact on customer experience, (2) how customer behavior and trends over time, and (3) Factors that shape customer tendencies towards digital offerings. Customer experience can be related to digital factors as shown in the following image[14].

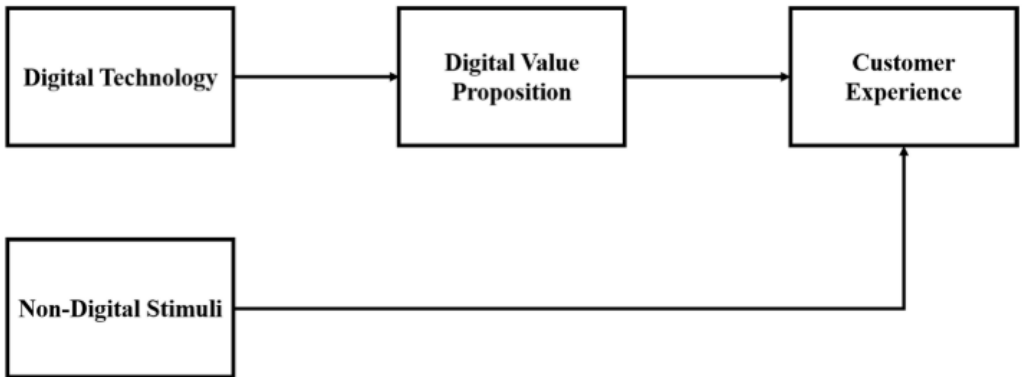


**Figure 2.** The Relationship between Digital Technology and Customer Experience.

This is also reinforced by research from Ningrum et al. in 2023[15] which stated that the determining factors for the success of implementing a digital transformation model through a marketing information system for customers include three things, namely customer experience, good operational processes, and the creation of new business models.

## 3. Methodology

### *3.1. Rapid Application Development*

The development of sales information systems at company X uses the Rapid Application Development (RAD) method. The RAD method allows system development to be faster and developers or developers meet directly with stakeholders so they can discuss directly if the design or features are still not in accordance with stakeholder desires. In addition, the database design, features, and interfaces can be used by subsequent developers to improve or add features that do not yet exist[16]. The stages in implementing the RAD method are:

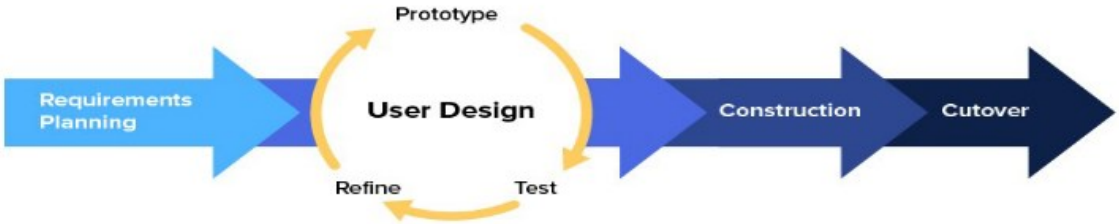


**Figure 3.** Stages of Implementing the RAD Method

The design phase of the sales information system application at company X is in accordance with the RAD stages as shown in Figure 3 above, as follows:

a. Requirements Planning: At this stage, the research team conducted an analysis to identify user needs and requirements needed for system development by discussing with the company owner. The results of this initial needs stage are the functional needs of the system and the access rights of each entity in this application. The distribution of application user access rights can be seen in the following table:

**Table 2.** User Access Rights Table for Company X's Sparepart Sales Information System Application

| User | Feature | Access Rights |
|---|---|---|
| Administrator | • Master: Goods, Warehouse, Supplier, Warehouse Goods | • Item List (Create, Read, Update, Delete)<br>• Warehouse List (Create, Read, Update, Delete) |

| User | Feature | Access Rights |
|---|---|---|
| | • Report: Sales User Configuration | • Warehouse Item List (Create, Read, Update, Delete)<br>• Report Transaction (Generate and Print)<br>• User Configuration (Update) |
| Sales Person | • Product Management: Product price, product specification, product details<br>• Shopping Cart: Item, Item Quantity.<br>• Sales: Item, Item Price, Item Quantity, Item Name, Customer Name | • Search (Create, Read, Update, Delete)<br>• Sales of Goods (Create, Read, Update, Delete) |
| Customer | • Make a purchase transaction<br>• View the product catalog<br>• Profile Management<br>• Creating product reviews<br>• View transaction history | • Consumer Profile (Create, Read, Update)<br>• Transaction (Create, Read, Update, Delete)<br>• Report transaction (Generate and print)<br>• Self-Configuration (Create and Update)<br>• Review (Create) |
| Company Owner | • View transaction reports<br>• Product Management | • Report Transaction (View)<br>• Sales of Goods (Create, Read, Update, Delete) |

The access rights table is used to control and restrict the rights or authority of each type of user in utilizing a system or application, according to the findings of the preliminary needs analysis of users and features to be worked on. This is crucial for software development, particularly for preserving workflow clarity, efficiency, and security.

a. User Design: At this stage, researchers build software prototypes based on the initial needs that have been identified by designing a prototype of the interface, collecting feedback from users and, if necessary, developing and improving the prototype that has received input from users. An example of prototyping development carried out at this stage is as shown in the following image:

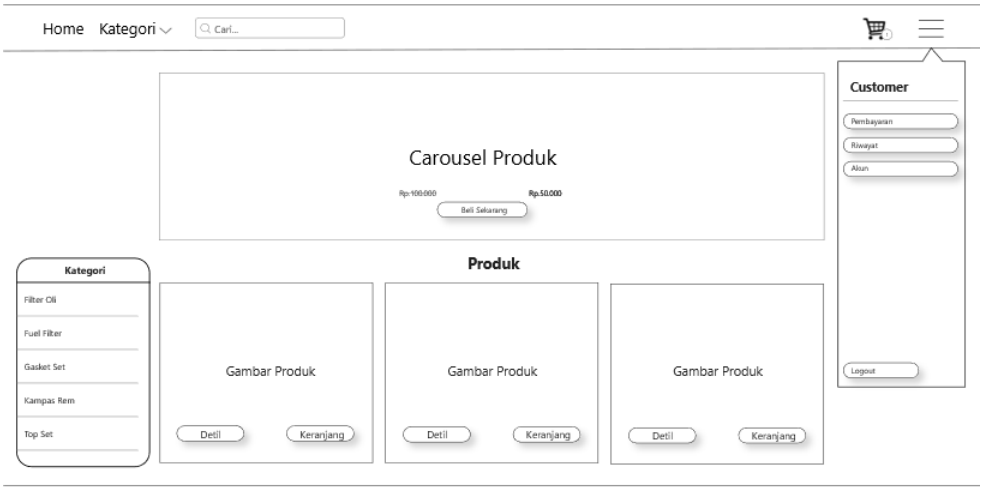


**Figure 4.** Product Page Prototype Design

b. Construction: is a stage where the application development team converts the approved design into a system form continuously while receiving feedback from users. The feedback received from users aims to improve the weaknesses of the system being developed. This process can be repeated continuously to meet user needs and expectations.

c. Cutover: Ensure that all system features, functions, and interfaces are complete and meet user needs, and conduct user trials. At this stage, one of the steps taken is to provide quick training to end users so that they are ready to use the system and also to ensure that the system is ready to be used by end users.

*3.2. Architectural Design*

Architectural Design aims to explain the relationship between the system and the user along with an overview of how the system will work. Architectural design can also be the system structure of a program or computer system consisting of software components, the externally visible characteristics of these components, and the relationships between these components.

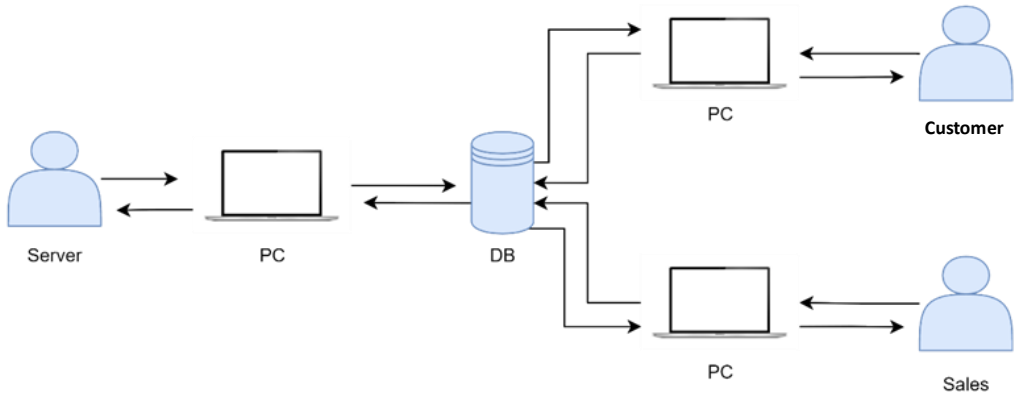


**Figure 5.** Architectural Design

In the architectural design as in Figure 5 provides an overview of the relationship between the system and the user and the relationship between the system and the database. The use of a database in creating a system is fundamental. The database management system (DBMS) that will be used in creating a web-based marketing information system at company X will use SQL Server.

## 4. Results and Discussion

*4.1. Use Case Diagram*

Use case diagram is a modeling to provide an overview of the behavior of the information system to be created, use case diagrams are used to find out what functions are in the system and who has the right to use these functions. In designing this spare part marketing information system, the design of the use case diagram is as shown in the following image:

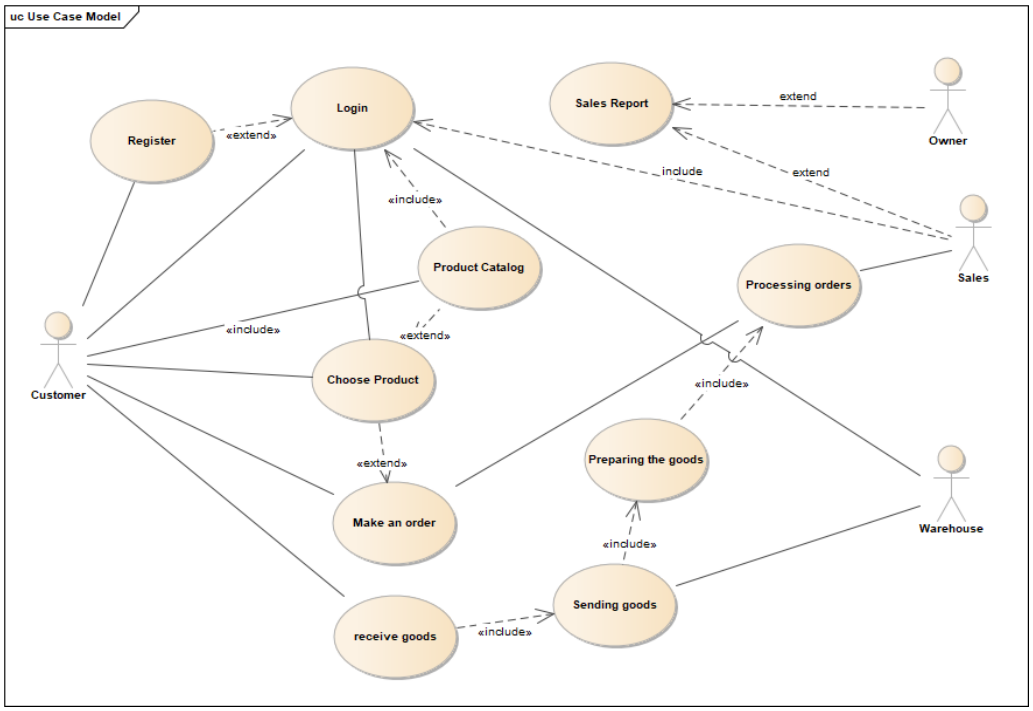


**Figure 6.** Use case Diagram

The explanation in the use case diagram above provides an illustration that the system initiation begins with the customer role who logs in then views the catalog and orders goods that are processed by the sales department. After the sales receive and process the order, the order will then be received by the warehouse department which will start checking the availability of goods that match customer demand. The goods that have been prepared will then be sent to the customer and the company can see the transaction details that will be recorded in the sales report.

### *4.2. Activity Diagram*

An activity diagram is a diagram that provides a model and description of the flow of procedures and processes that occur sequentially in an information system. In designing this marketing information system application, the activity diagram design that explains the sales process flow is as follows:

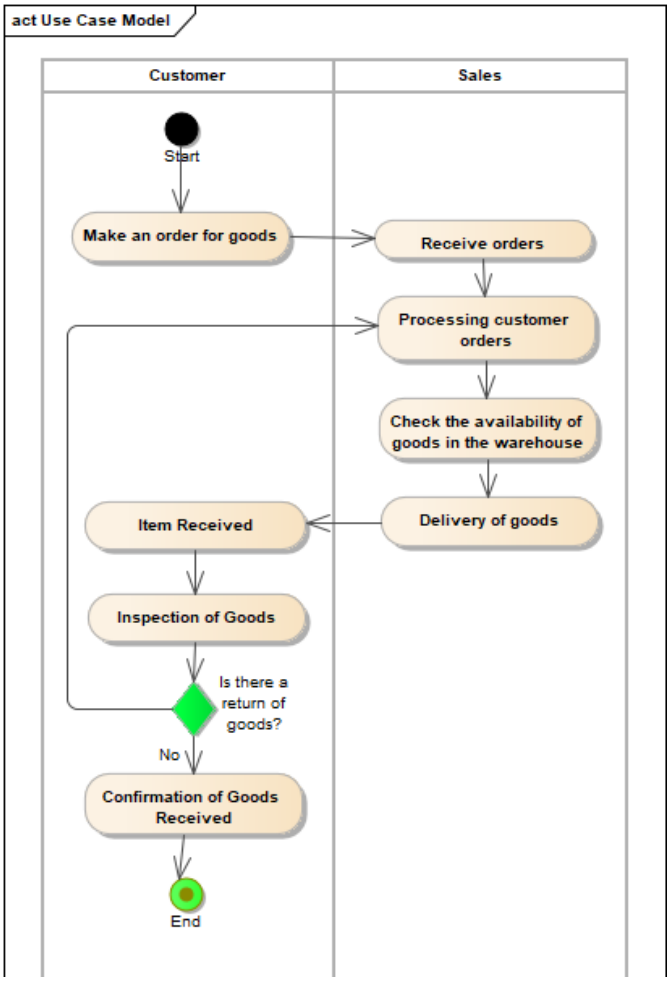


**Figure 7.** Activity Diagram

The explanation from Figure 7 above is that when a customer orders the desired product, the order will be processed by the sales team and the goods will be checked in the warehouse and then the goods will be sent. After the goods are sent, the customer can check the goods received whether they are in accordance or not, if they are not in accordance, the customer can make a return process. If the goods received are in accordance, the customer can confirm that the goods have been received and stated in accordance with the order.

### *4.3. User Interface*

In the following interface design, the display is developed according to the prototyping that has been designed and discussed with the user. At this stage, it is also part of the construction stage in the RAD phase. Some of the interface displays of the spare part sales application at company X are as follows:

#### *4.3.1. Login Page*

The login page is the initial page before accessing the marketing information system website. On this page, users are required to fill in their username and password. If the user does not have an account, the user can first register their account.

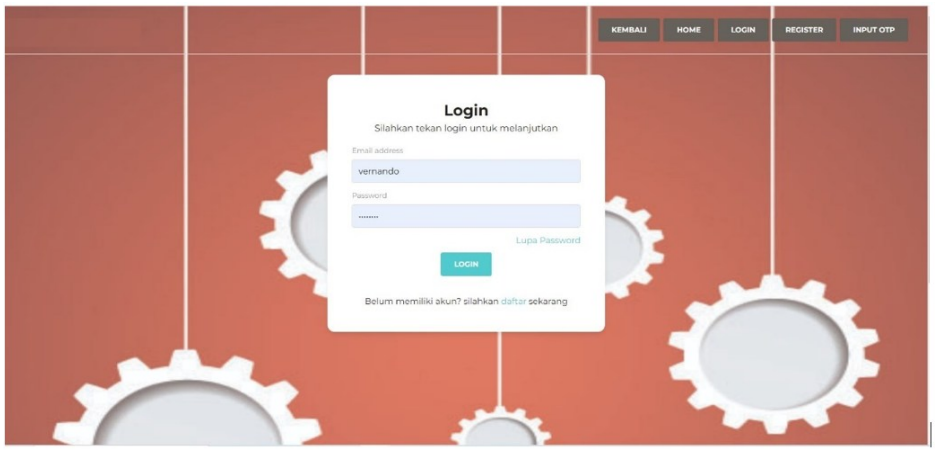


**Figure 8.** Login Page

The features owned by this application, especially when registering an account (Register menu), in addition to inputting basic identity, users are also required to register an active email because in this application verification is done by sending an OTP code via email.

*4.3.2. Product Category Page*

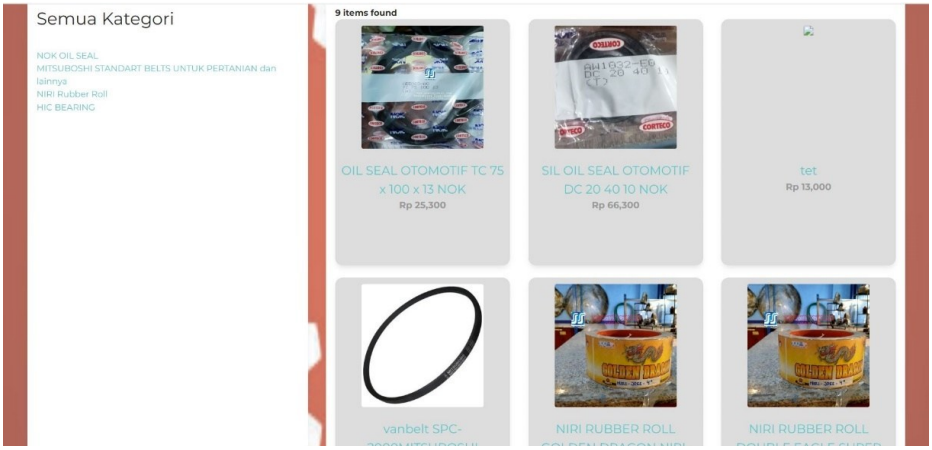


**Figure 10.** Product Category Page

The product category page is a page that displays the categories and products marketed by company X. On this page, users can select or search for the products they want, and users can also see all the items in that category.This menu design is consistent with research from Yunita, et al. [17] which highlights the value of an information system that allows customers to search for product details by category, increasing customer productivity and happiness.

*4.3.3. Shopping Cart Page*

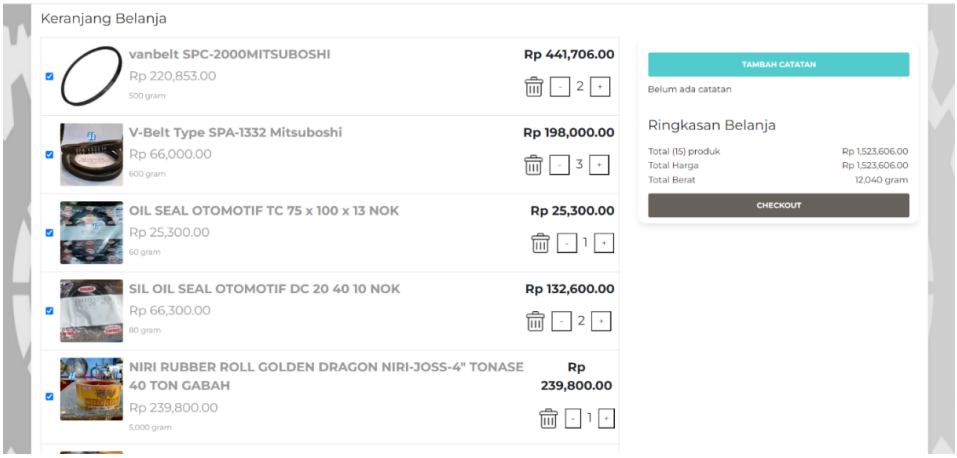


**Figure 11.** Shopping Cart Page

Figure 10 above is a display of the shopping cart page. The function of the shopping cart itself has various functions such as being a virtual container for storing purchased products, a place to check goods before making payments, speeding up the shopping process, and being used to manage product details and orders.

*4.3.4. Shopping Summary Page*

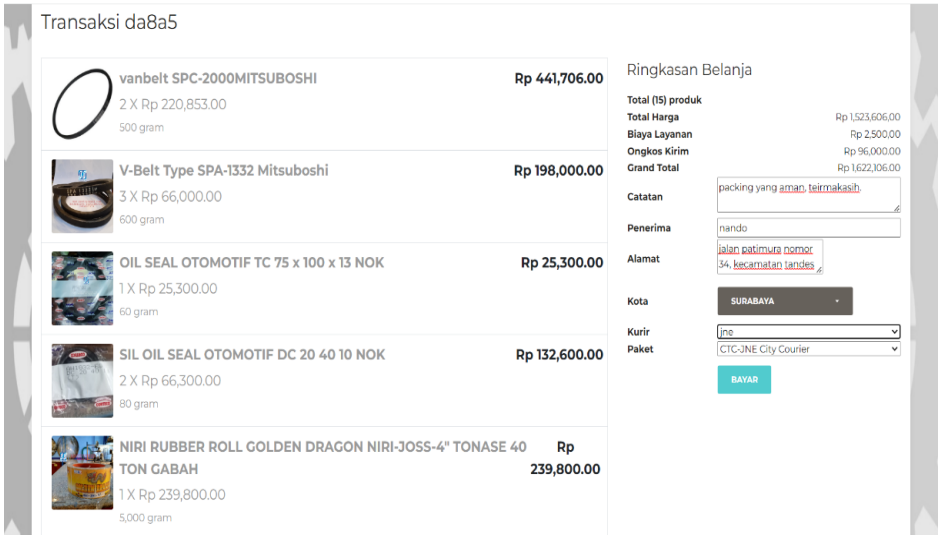


**Figure 12.** Shopping Summary Page

The page above is a page that functions to display a shopping summary. On this page, customers can re-check the summary of items that have been checked out, on this page customers have the option to provide notes such as Recipient Name, Address, City, choice of courier and Courier Package, before continuing to the payment page.

*4.3.5. Payment Page*

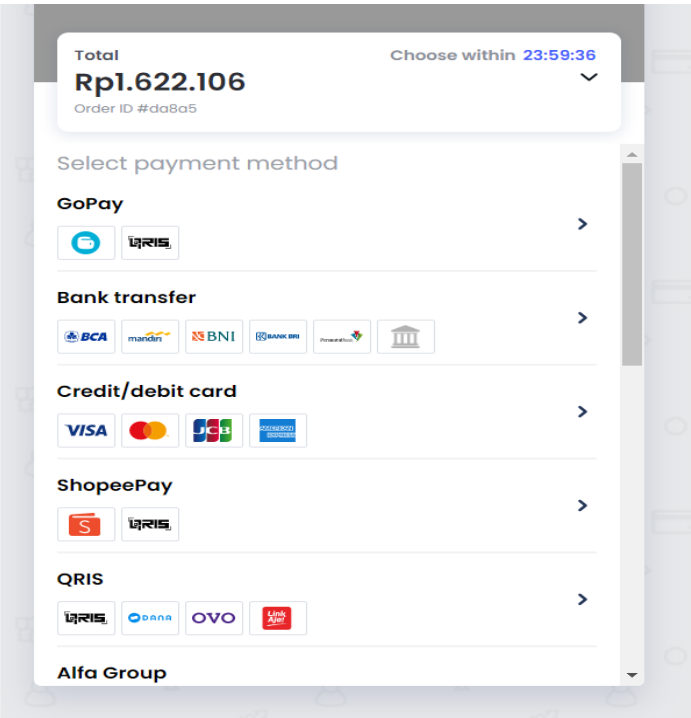


**Figure 13.** Payment Page

The page in figure 13 is a page that has a function as a Pay page. On this page, customers can choose the payment method to be used. In this spare part marketing information system, the payment menu uses the API from the midtrans payment gateway. In addition to supporting the buying and selling process and providing security for order payments, Midtrans is a payment system that is utilized between buyers and sellers during transactions. In order to meet the demands of online payment transactions utilizing credit cards, debit cards, and cash withdrawals and transfers, Midtrans has integrated e-commerce features [18].

*4.3.6. Product Return Page*

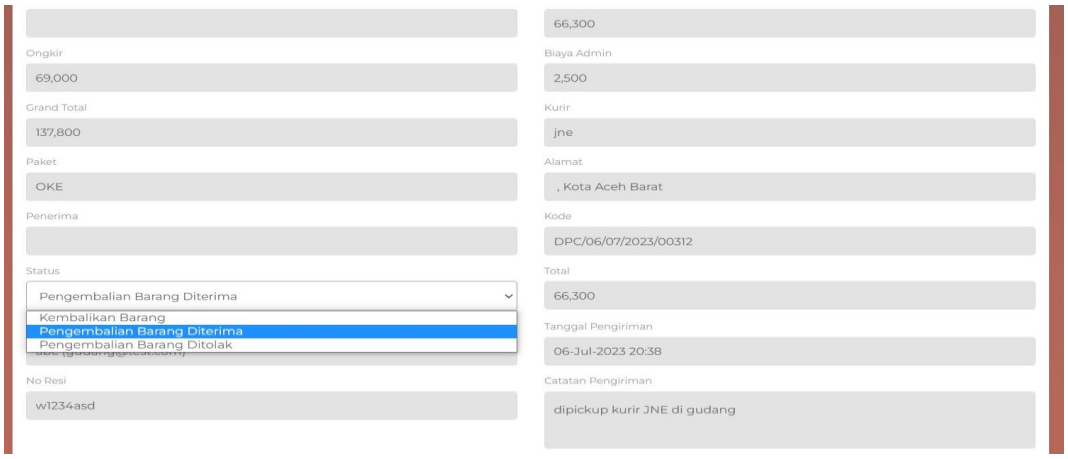


**Figure 13.** Product Return Page

The return page is a page that functions to process the return of goods that have been purchased to the seller or online store for various reasons such as defects or damage. On this return page, customers are

asked to attach photos and reasons for choosing to return the goods, which will be an assessment for the store to ensure that the product needs to be returned or not. The need for a product return system stems from the fact that it helps owners find out why products are returned, makes tracking easier, and enhances customer service by informing suppliers to replace them with new products[19].

*4.3.7. Sales Report Archive Page*


**Figure 14.** Sales Report Archive Page

The report archive page above is a page that can be used by the admin or company owner to see the details of the spare part sales transactions that have been made. On this page, the desired transaction report can be sorted based on the period of the start date and end date of the transaction to be viewed.

## 5. Conclusion

Based on the results of the web-based application design to handle the spare parts sales transaction process, several conclusions were drawn, including:

- This website aids businesses in growing their customer base by allowing customers to more easily obtain information from the online product catalog without physically visiting the business.
- The advantages obtained from the development of this application when compared to the previous conventional model, the existing sales information system is able to smooth and simplify the spare parts sales transaction process.
- Online sales sites (e-commerce) can help and facilitate companies in running transaction processes that have so far been conventional to become digital-based and help improve sales transaction processes and the grouping of products based on categories has proven effective in supporting the ease of searching for spare parts and in creating more structured sales reports.

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