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FROZEN FOOD SALES SYSTEM AT DAKON STORE USING FRAMEWORK FOR THE APPLICATION SYSTEM THINKING METHOD

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Abstrak

Teknologi informasi dan komunikasi yang semakin maju telah memicu berbagai pengaruh, termasuk kebutuhan akan internet yang signifikan. Perkembangan teknologi ini membawa disrupsi pada sektor bisnis, khususnya perdagangan yang dituntut beralih dari toko konvensional ke toko online untuk mempercepat dan meningkatkan penjualan melalui e-commerce yang memperluas pangsa pasar tanpa batas. Toko Dakon frozen food, berdiri sejak tahun 2018 menghadapi masalah penjualan konvensional yang memaksa pembeli datang ke toko, serta pendataan stok dan penjualan manual yang memakan waktu. Untuk mengatasi masalah ini, penulis mengusulkan pengembangan sistem informasi berbasis website menggunakan metode FAST (Framework for the Application of System Thinking) yang memudahkan perancangan sistem, analisis kebutuhan, dan pembangunan sistem yang tepat. Implementasi sistem ini diharapkan dapat memperluas jangkauan pembeli, meningkatkan penjualan dan tata kelola yang lebih baik. Dengan metode FAST berbagai tantangan operasional dapat diatasi dengan lebih efektif. Pembayaran yang menjadi lebih efisien melalui otomatisasi proses penjualan, meskipun masih diperlukan peningkatan pada tampilan website untuk menyempurnakan pengalaman pengguna.

Kata Kunci: *Teknologi, E-commerce, FAST, Efisiensi*

Abstract

Increasingly advanced information and communication technology has triggered various influences, including a significant need for the Internet. This technological development disrupts the business sector, especially trade, which requires a shift from conventional stores to online stores to accelerate and increase sales through e-commerce, which expands market share without limits. The Dakon frozen food shop, established in 2018, needs help with conventional sales, which force buyers to come to the shop, as well as time-consuming manual stock and sales data collection. To overcome this problem, the author proposes developing a website-based information system using the FAST (Framework for the Application of System Thinking) method, making it easier to design systems, analyze needs, and build appropriate systems. Implementing this system is expected to expand the reach of buyers, increase sales, and improve governance. With the FAST method, various operational challenges can be overcome more effectively. Payments have become more efficient through automation of the sales process, although improvements to the website's appearance are still needed to improve the user experience.

Keywords: *Technology, E-commerce, FAST, Efficiency*

1. PRELIMINARY

Information and communication technology is currently increasingly advanced and developing, triggering various influences on its users. The Internet is a form of technological development that has become necessary for some groups [1]. In January 2024, there will be around 185 million individual internet users in Indonesia, equivalent to 66.5% of the total national population of 278.7 million (DATABOKS, 2024). This development brought disruption to the business sector. The business sector,

especially trade, must switch its business model from conventional to online shops [2]. To speed up and increase sales, by looking at the rapid development of information technology, you can take advantage of online services in the form of e-commerce [3]. E-commerce is an online trading technology that expands market share, bringing together customers without borders, anywhere, anytime, without barriers of place and time [3].

Dakon Frozen Food Shop is a conventional shop that sells frozen food. Established in 2018 until now, it sells a variety of frozen foods. The problem is that sales are still carried out conventionally, meaning buyers have to go to the shop. Apart from that, collecting data on stock quantities and sales data is still done manually using paper, so it takes a lot of time to search for the data. Then, making sales reports still uses recording in the ledger.

Several previous studies regarding sales information systems [4] discussed the Design of a web-based frozen food marketing information system using the waterfall method against the background of sales problems that were still manual and a marketing process that still used the word-of-mouth method. This research has helped provide a solution by producing a new & attractive marketing website design expected to help store performance. However, this research still needs to be improved. It is hoped that future research can further optimize web applications and suggest conducting a market survey to determine the necessary features.

Further previous research [5] concerns the implementation of a *Content Management System (CMS)* to increase sales of the Abie frozen food shop. I was discussing the problems that occur, namely wanting maximum profits but needing more marketing and sales that are still conventional by visiting the shop directly. This research provides a solution, namely an e-commerce website that can provide more detailed information and carry out more online sales *waterfall* promotions. This website was developed using a *CMS* and supporting plugins, one example of which is *Search Engine Optimization (SEO).* It uses the *Business Model Canvas (BMC)* method to analyze business and apply activity diagrams, use cases, class diagrams, and sequence diagrams to Design effective e-commerce systems. However, this research has the drawback of not developing e-commerce websites to support online sales.

Further, previous research [6] discusses designing a frozen food sales website based on the CodeIgniter framework, which aims to make it easier for business admins and consumers during the COVID-19 pandemic. The results of this research are a website using the development method. The waterfall method is a software approach that has a clear flow so that errors can be minimized if mistakes occur. This website design was also built using the CodeIgniter framework for the application workflow and bootstraps to handle the website appearance. According to test results, this website functions well and is easy to use. However, this research still needs to improve, which lies in the application features. Application features will likely be developed to increase convenience and consumer satisfaction, such as adding payment methods at other banks or using merchants such as OVO, DANA, and others).

Previous research further [7] revealed that the Toko Mentari Store is a store that sells frozen food, snacks, and desserts, with a vision to develop and expand the business by opening new branches in various regions. However, the current sales information system faces various obstacles, such as manual data management, which takes a long time, and messy recording of invoices for incoming and outgoing goods, often causing files to be lost or misplaced. To overcome this problem, a web-based *Point of Sales (POS)* system was designed. This system was built with the *PHP* programming language *MySQL* database. The research results show that implementing *POS* at the Mentari Store can help store performance, facilitate owner control, minimize fraud, and make sales data more organized. However, this research still needs to improve, which lies in the application features. To improve website development, it is hoped that we will add features that do not exist in the current system, such as a buyer's page and automatic payments using e-wallet (OVO, gopay, qris, and others).

Further, previous research [8]discussed the development of a stock management information system in frozen food stores that faced various obstacles in inventory. These obstacles include manual data management, which causes goods to go out and inventory stock needs to be recorded correctly, and expired goods, which are not recorded, making it possible for them to be sold to consumers. To overcome this problem, a web-based inventory information system was designed using the *PHP* programming language with the Codeigniter framework and a *MySQL* database using the *System Development Cycle (SDLC) waterfall* model method, which consists of planning, analysis, design, implementation, Testing, and maintenance stages. This research shows that the implemented web-based

system makes it easy to monitor stock in real-time, provides notification features, and successfully integrates data from various store branches.

Previous research has provided a diverse understanding of frozen food e-commerce website development, but several aspects must be implemented thoroughly. This research will complete the needs of each existing journal case.

Based on existing problems, it is necessary to develop a website-based information system using a high-level programming language to expand the reach of buyers, increase sales, and compete nationally, which is expected to grow and develop the business and improve good governance. For this reason, the author will establish a sales information system using the *FAST (Framework for the Application of System Thinking)* method. This method has several advantages, including (a) system design and business process flows can be tested more easily because there are system models in it, (b) detailed requirements can be analyzed as a whole, and (c) systems can be built more precisely and better. Clear because specifications or details can be modeled [9].

2. RESEARCH METHODS

In building and designing website-based information system applications at the Dakon Store using the *FAST (Framework for the Application of System Thinking)* system development model. There are 8 (eight) development stages in the *FAST* [10]. Method These phases are as follows:

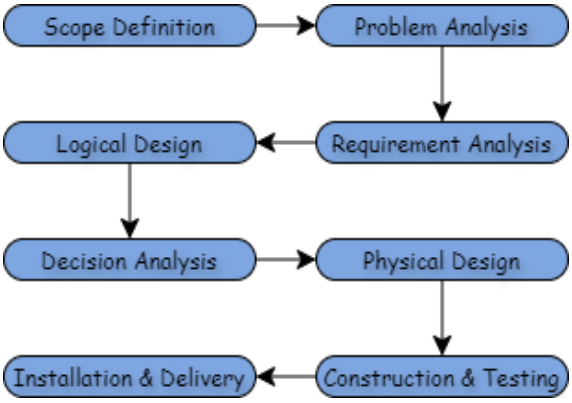

Figure 1. FAST method

Figure 1 explains the stages used in this research using the *FAST* Model. System development using the *FAST* method is carried out sequentially to produce an in-depth understanding of the problems with the running system and the proposed system design [11]. The following will explain the phases of the *FAST* method.

a. Scope Definition, namely, the scope of the research, is determined so there is no widening problem when carrying out the analysis.
b. Problem Analysis, namely this stage, analyzes the problems of the previous/current system using Cause and Effect Analysis tools.
c. Requirements Analysis, prioritizing existing business needs, including identifying the data, processes, and interfaces users want.
d. Logical Design is the stage of transforming business requirements to describe data structures, business processes, data flows, and user interfaces. The depiction can use flowcharts and DFD symbols.
e. Decision Analysis is the stage for considering several software and hardware options to implement the system.
f. Physical Design is the stage of transforming business needs into a physical design, which will be used as a reference in creating the system to be developed.
g. Construction & Testing is the stage for constructing the database, application program, and interface for testing the system.
h. Installation & Delivery, namely the stage of operating a new system and providing training to users [9].

3. RESULT AND DISCUSSION

3.1 System Development Results

The stages of analysis and Design of a frozen food sales information system using the *FAST* method are as follows:

a. Scope Definition

The scope of the problem discussed in this research is an information system using the *FAST* method to manage the Dakon Frozen Food Shop, a conventional shop that sells frozen food. Established in 2018, this shop offers a variety of frozen foods. The problem is that sales are still carried out conventionally, requiring buyers to come directly to the shop. Apart from that, collecting data on stock quantities and sales data is still done manually using paper, which takes a lot of time and is prone to errors. Sales reports are also still made by recording them in the ledger. The system that will be built aims to make it easier for customers to make purchases and also make it easier to process sales and stock data at the Dakon frozen food shop. This system is designed for three users: Admin, shop owner, and customer. Admins are limited to system changes and access rights. Meanwhile, shop owners must be more expensive in managing customer data, categories, products, transactions, and reports. And limited customers only purchase frozen food products.

b. Problem analysis

Problem analysis uses Cause and Effect analysis to help understand the conditions that occur in a system. An outcome is a sign of a different, underlying problem. Therefore, cause-and-effect analysis aims to understand the issues that arise so that later solutions can be obtained to overcome these problems [9].

Table 1. Cause and Effect Analysis

No	Problem	Reason	Solution
1.	Getting sales data information takes a long time	Manual sales systems slow down getting information	The new system must provide a menu of order information, payment confirmation, and Delivery
2.	Searching for data takes a long time	Data searches still use books	The new system must provide good search features
3.	Information on goods, prices, and stock is often not updated	The system still runs manually using books	The new system must be able to update information on goods, prices, and stock.
4.	The time required for the transaction process is long	The manual system from the beginning of the purchasing process to the end is done by writing	The new system must be faster and more efficient because of the processes carried out by the system
5.	Report generation takes a long time.	Bookkeeping in the old system is still written	The new system must be able to provide the reports that
6.	Service to customers becomes disrupted and takes a long time	Limitations in service	The new system must be able to speed up service by displaying shop contact info and providing a chat feature.

c. Requirement Analysis

The following needs analysis aims to identify functional requirements for developing the Dakon frozen food store information system.

1. Analysis of user needs
   There are three users, namely Admin, shop
2. System requirements analysis
   1) Dashboard menu, profile, help menu
   2) Registration and login form for all users
   3) Admin can set the classification roles of all users
   4) Admin can manage all users
   5) Product, category, customer, order, transaction management forms

6) Shopping basket form for customers
7) Customer account status management form
8) The form displays and searches transaction history
9) Icons for favorite products
10) Form for writing product reviews
11) Notifications for every activity carried out

3. Data requirements analysis
   1) Admin Data
   2) Customer Data
   3) Category Data
   4) Product Data
   5) Order Data
   6) Report Data
4. Analysis of system security requirements
   1) Use MD5 encryption for the login password so that it is not known by people who do not have access rights [12]
   2) Some interfaces can only be accessed by specific users
   3) Use a captcha during registration to avoid bots when filling out the form

d. Logical Design

1. System Flowchart

The system flowchart shows the workflow in the system as a whole. The flowchart for the frozen food sales system developed is as follows:

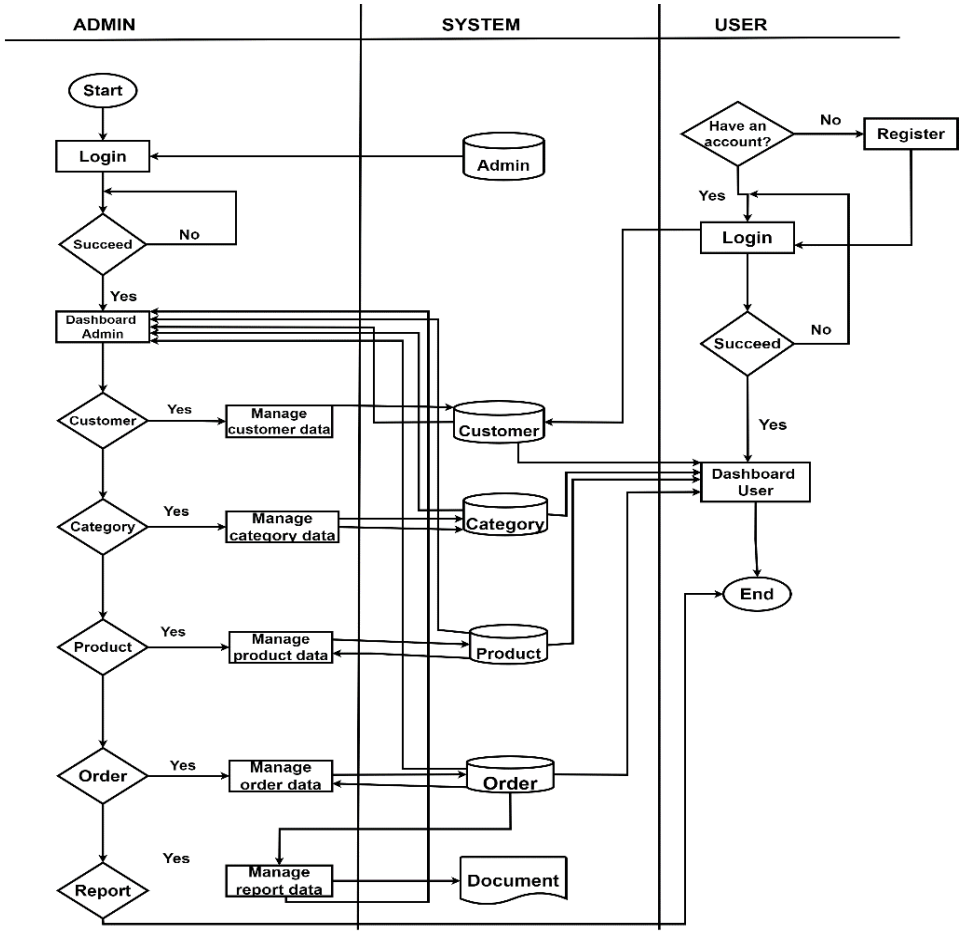

Figure 2. Flowchart System

2. DFD (Data Flow Diagram)

DFD is a graphical representation of data flow through an information system. Data flow diagrams are used by systems analysts to design information processing systems and to model entire organizations. The following is the DFD (Data Flow Diagram) design for the Dakon Store [13]

1) Context Diagram

The context diagram on the website system has three entities involved: Administrator, Owner/Shop Owner, and User/Customer. The administrator is tasked with managing the website system; the shop owner is tasked with managing shop management such as products, orders, reports, and others. Meanwhile, users/customers can place orders and receive information about the Dakon Frozen Food Shop. Know the data that flows in and out of the frozen food sales website. Below are images of 3 context diagrams.

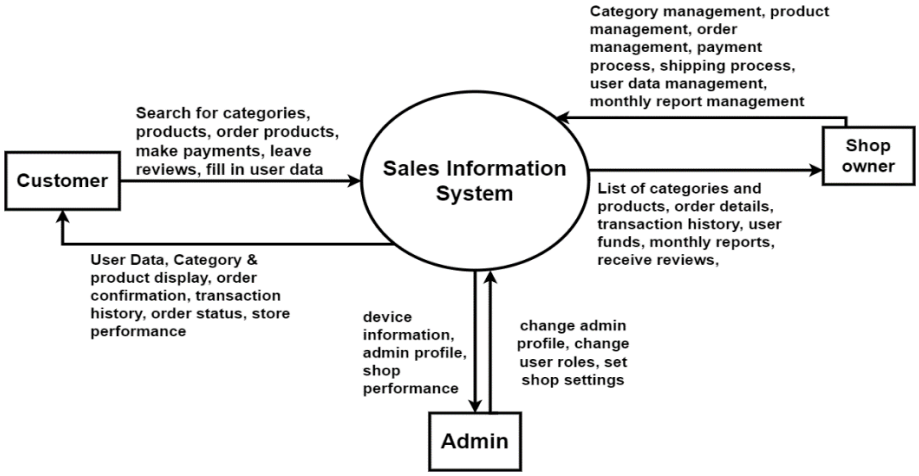

Figure 3. Context Diagram

2) DFD Level 1

Level 1 describes the flow and interaction of data in the system in detail. Admins can log in and manage user data, while customers can interact with the system by making purchases. The system manages data categories used to classify product data, where product data and consumer orders are also managed. Apart from that, the system can generate reports based on stored data. This level 1 DFD shows the data flow and relationships between various entities. Below is a picture of 4 DFD level 1.

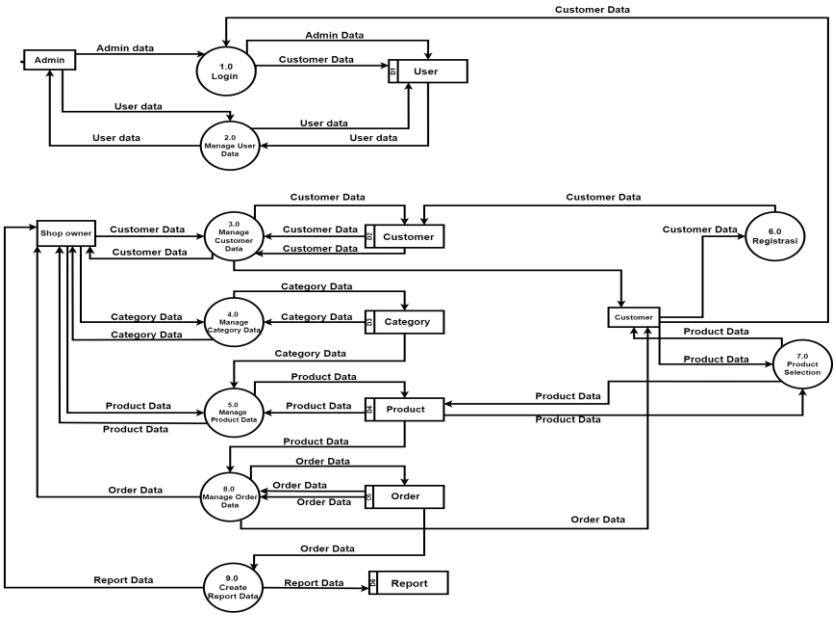

Figure 4. DFD Level 1

e. Decision Analysis

Decision analysis determines the software and hardware that will be used to implement this new system, namely:

1. Hardware requirements are one laptop unit, an internet connection
2. Software requirements:
    1) Operating System: Windows 11 Pro-64 bit
    2) Database: MySQL
    3) Web Browser: Microsoft Edge, Google Chrome
    4) Web Editor: Sublime Text
    5) Framework: CodeIgniter 3
    6) Bootstrap : 3
    7) Payment Gateway: Midtrans

f. Physical Design

Physical Design is a process of implementing the results of logical Design into physical Design with the help of software. This physical Design is built in two parts: the back end and the front end.

1. Login Page

This page is a login interface for the Admin, owner, or consumer. New consumers must register, one of which is to determine their username & password by clicking register. Meanwhile, consumers who already have a username & password can immediately click enter.

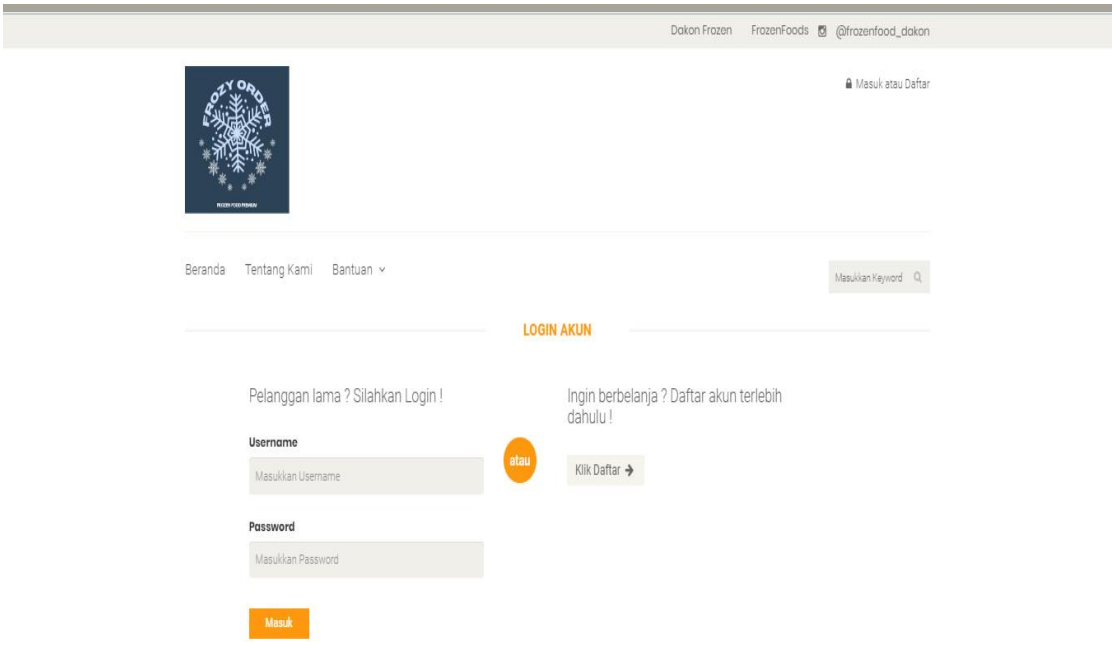

Figure 5. Login Page

2. Account Register Page

This page shows a form for filling in personal data for new consumers. One is filling in the username & password data, which is used to enter the website. This account registration form includes using a captcha to avoid bots when filling out the form.

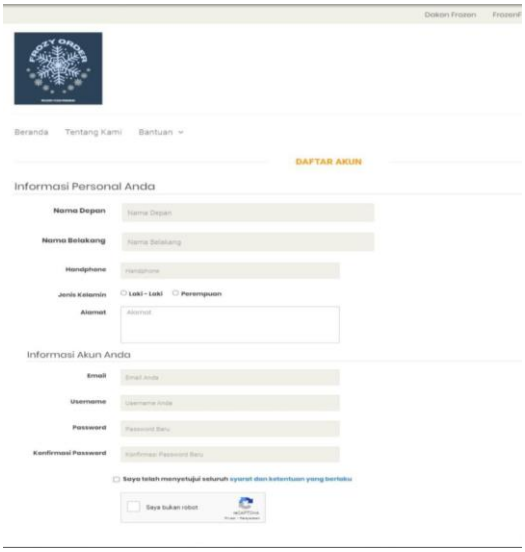

Figure 6. Registration Page

3. Customer Homepage

This page is the second page after logging in. This page displays price discounts, various categories, and products. There is also a cart page, transaction history, and notification page for consumers.

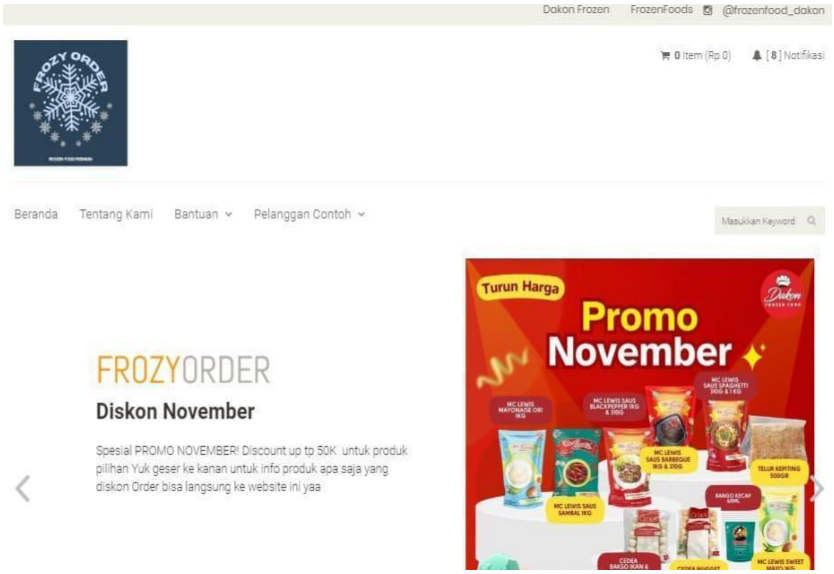

Figure 7. Home Page

4. Product Details Page

This page displays the detail page for each product. Contains product images and complete product descriptions. Customers can also input the products they want to buy on this page and then add them to the basket feature. There is also a favorite icon for the products you like. On the page at the bottom, there are other product features that provide references to customers for different types of products.

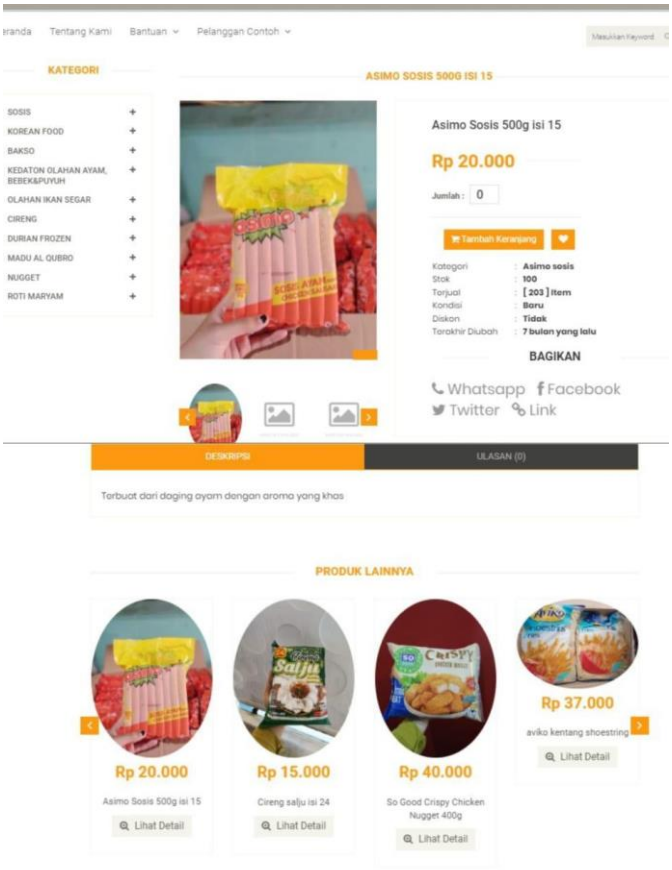

Figure 8. Product Details Page

5. Product CRUD Admin Page

This page displays the product name, status, price, condition, stock, and action. This action is to carry out product management. Owners can add, edit, delete, and view detailed descriptions of the product data. A search feature is also provided to search for product data that appears to be in the last letter of the alphabet.

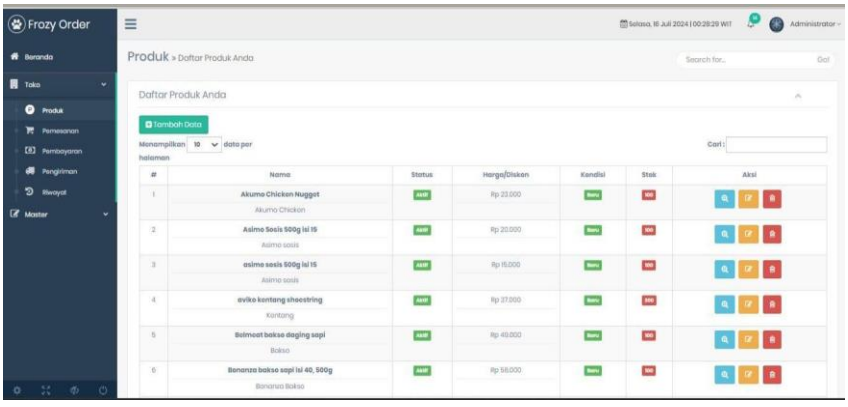

Figure 9. Product CRUD Page

6. Customer List Page

This page displays the customer's name, gender, level (standard/premium), status (active/inactive), username, and action. This action is to carry out customer list management. Owners can edit or view detailed descriptions of customer data.

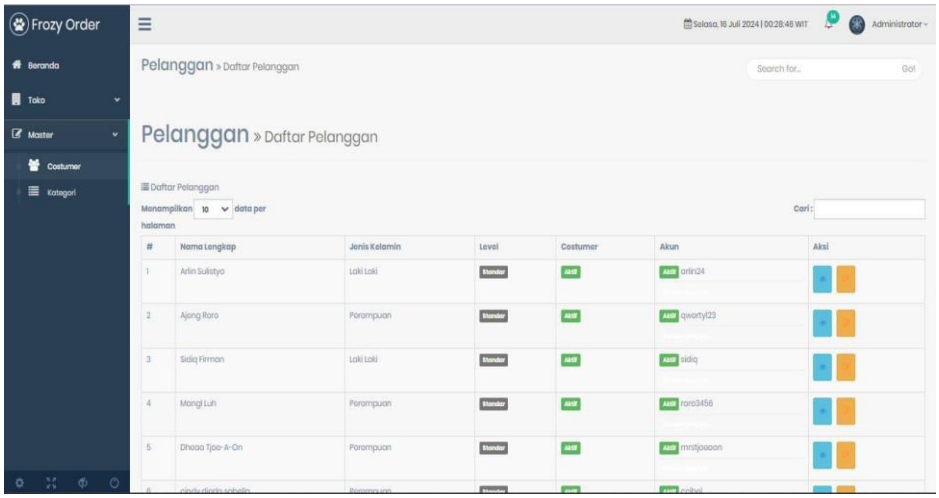

Figure 10. Customer list page

7. Order Page

This page is a display of the customer order page. Contains information on the selected product, including product, price, discount, item, and total quantity. It also contains customer information: name, contact, and complete address. On this page, customers can choose their preferred shipping method. You can pick it up or use a courier with additional estimated costs. The payment method will appear when the owner has sent the shipping costs.

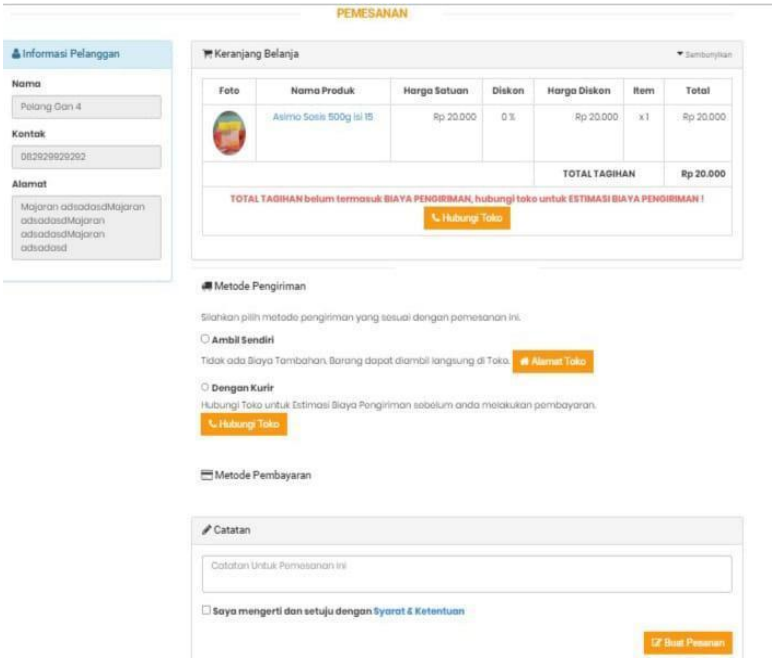

Figure 11. Order Page

8. Payment Page

This page is a payment method page. Customers can choose the type of payment they want. Various kinds of banks exist, such as *QRIS, DANA, OVO, and LINKAJA.*

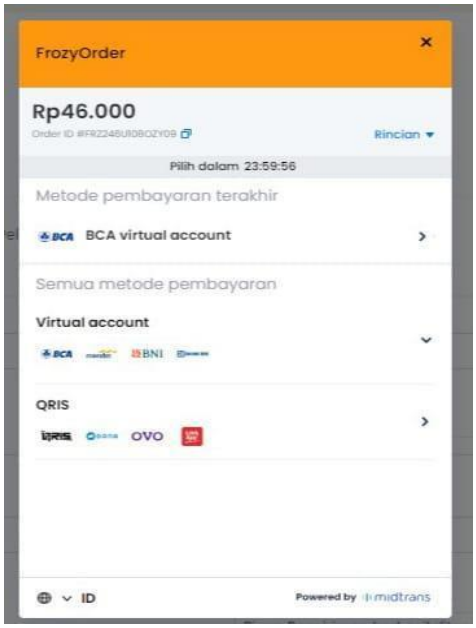

Figure 12. Payment Methods page

g. Construction & Testing

At this testing stage, Testing is carried out using *black box* testing to determine the functional suitability of the system to run properly. By carrying out *black box* testing, it is hoped that the system can function well and meet user needs through the design made at the analysis and design stage [14]. The following are the results:

Table 2. *Black box* testing results [15]

No	Tested Features	Testing Scenarios	Expected Results	Test Result
1.	Login	Users log in using the registered username and password	The login process is booming, and the user can switch to the home page	Valid
2.	Registration	The password entered is not the same as the password confirmation	Get warning notifications	Valid
3.	Add, View, Edit, Delete Products	Add, view, edit, and delete are actions in a product management system	Having action options to add data, edit data, view details, and delete data will make it easier for owners to control product management	Valid
4.	Categories and Products	Selecting one product type will switch to another variant page for that product.	Switch pages to other product variants	Valid

h. Installation & Delivery

At the installation and delivery stage, install the website at the Dakon frozen food shop. This section also displays a comparison table of the old system with the new system.

Table 3. Comparison of the Old System and the New System

No	Old system (manual)	New system (computerized)
1.	Product purchases still come directly to the shop	It can be done via the website
2.	Order recording is done manually using a book	Orders are automatically saved on the website
3.	Data storage is written and stored on book media	Computer-based storage using a website database
4.	Payment method that only uses cash and 1 type of bank only	Payments can be made via e-money using various methods provided, such as QRIS, OVO, multiple types of banks
5.	It takes quite a long time when officers want to recapitulate category, product, or report data.	The time required to record data is faster.

3.2 Discussion

The development of a website-based information system uses the FAST (Framework for the Application of System Thinking) method. The FAST method was chosen because it can facilitate system design, needs analysis, and the development of the right system. By using the FAST (Framework for the Application of System Thinking) method in designing a frozen food sales website that has been created at the Dakon Store, it is expected to expand the reach of buyers, increase sales, and improve better governance. The features integrated into this system include login, register, home, product, consumer, ordering and transaction. The login feature ensures that only registered users can access the system. The registration feature provides additional security, namely the use of captcha to avoid bots in filling out forms. This home feature contains various menus in this website system. This product feature displays various types of frozen food products offered along with a complete description of the product and also a product rating that is useful for providing recommendations for superior products. On the other hand, the store can carry out product CRUD activities. In the consumer feature, there is an action to activate an account or not, where an active account can access the website. While the ordering & transaction feature makes it easy for consumers to order products online along with easy payment via e-money.

4. CONCLUSION

The conclusion of the design and implementation of the frozen food sales system using the FAST (Framework for the Application of System Thinking) method shows that this method simplifies the process of designing an effective and efficient system. This system was developed to overcome several major problems such as difficulty in controlling stock levels, errors in recording sales data, the length of time to search for data, and the purchasing process which is still carried out conventionally. The new system is designed to improve the operational efficiency of Dakon Shop by enabling more effective management of inventory, orders, and payments. Automation of the sales process also helps reduce the need for time-consuming and error-prone manual tasks. For further development, it is recommended that research be more focused on improving the appearance and content aspects of the existing website. Although this website already has a good foundation, improvements to more relevant and interesting content and design elements such as a more intuitive layout, harmonious colors, and additional graphics and supporting multimedia can significantly improve the user experience. This will make the website display more optimal and meet user needs better.

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