



E-Commerce Website Design With A Content Based Filtering Product Recommendation System At The Aqua Factory In Ruteng City

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Abstract

This study focuses on the design and development of an e-commerce website for the AQUA Factory in Ruteng City by implementing a Content-Based Filtering recommendation system. The system is designed to help customers find products that better match their preferences and needs from a large number of available options. Content-Based Filtering was chosen because it can provide personalized recommendations based on product attributes viewed or selected by users without requiring interaction data from other users. Compared to Collaborative Filtering and Hybrid Filtering, this method is considered more efficient in the early stages of system development. The implementation of this recommendation system is expected to improve user experience, increase ordering efficiency, and support the product distribution process in the AQUA Factory in Ruteng City.

Keywords: *E-commerce, Content-Based Filtering, Recommendation System, AQUA Factory, Product Recommendation, User Experience, Ordering Efficiency, Product Distribution.*

1. Introduction

The rapid development of information technology has transformed many industrial sectors, including sales and distribution processes. E-commerce enables online transactions to be conducted more efficiently, securely, and systematically while improving operational performance and customer service quality [1].

At the AQUA Factory in Ruteng City, product ordering is still handled conventionally through phone calls, text messages, and manual recording, causing delays, data input errors, and difficulties in managing transaction records and customer order histories [2].

Customers often face difficulties in selecting products that suit their needs because AQUA products are available in various packaging sizes and types. Without a recommendation system, customers must choose products manually, which is less efficient and less personalized [3].

To address these issues, this study proposes an e-commerce website integrated with a Content-Based Filtering recommendation system that provides personalized recommendations based on product attributes and user interaction history [4].

The implementation of this system is expected to simplify the management of product, stock, and order data in a centralized manner. In addition, organized sales data can support business evaluation and decision-making processes while improving operational efficiency, service quality, and the competitiveness of the AQUA Factory in the digital era.

2. Methodology

This research uses the Waterfall method as the system development approach for designing and developing an e-commerce website with a Content-Based Filtering recommendation system at the AQUA Factory in Ruteng City. The research process consists of several stages, including requirements analysis, system design, system development, system testing, and implementation and maintenance. Data collection was conducted through observation, interviews, documentation studies, and product attribute analysis to understand the existing business processes and customer needs. The system was developed to provide online product ordering services and personalized product recommendations based on product attributes and user interaction history. In the recommendation process, product data undergoes preprocessing techniques such as case folding, tokenizing, stopword removal, stemming, TF-IDF weighting, and cosine similarity calculation to generate relevant product recommendations.

3. Result and Discussion

3.1. Analysis system

System analysis in this study was conducted to identify the problems and requirements in the product sales process at the AQUA Factory in Ruteng City. Based on observations, interviews, and documentation studies, the product ordering process is still carried out manually, resulting in delays in recording, data input errors, and difficulties in managing stock and customer transaction history. In addition, customers often experience difficulties in selecting products that match their needs due to the wide variety of AQUA products available. To address these problems, an e-commerce website integrated with a Content-Based Filtering product recommendation system was designed. The system aims to simplify the online ordering process, help customers obtain relevant product recommendations based on product attributes and user interaction history, and improve the efficiency of product and order data management. In the recommendation process, the system applies data preprocessing techniques such as case folding, tokenizing, stop word removal, stemming, TF-IDF weighting, and cosine similarity calculations to determine the level of similarity between products and generate more personalized recommendations according to user needs.

3.2. Design

3.2.1. Use case diagram

The use case diagram of the AQUA Factory Ruteng City e-commerce system illustrates the interaction between users and the system being developed. In this system, there are two main actors: the admin and the customer. The admin is responsible for managing product data, stock, customer orders, and sales reports to ensure that operational processes run properly. Meanwhile, customers can register, log in, browse product catalogs, place orders, complete checkout and payment processes, and receive product recommendations based on their interaction history and previously viewed products. The use case diagram is designed to clarify the main functions of the system and the relationship between users and the e-commerce website so that the AQUA sales business process can run more effectively, systematically, and efficiently.

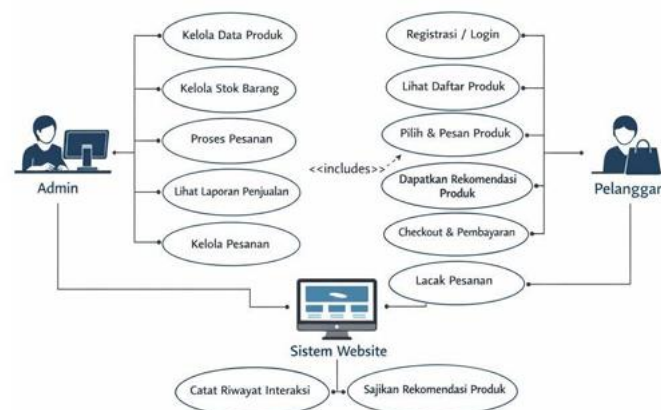


Fig. 1 : Use Case Diagram of E-Commerce System with Product Recommendations at AQUA Factory in Ruteng City

3.3. System Implementations

The system implementation in this study was carried out by developing a web-based e-commerce website for the AQUA Factory in Ruteng City using PHP and MySQL, while applying the Content-Based Filtering method to provide product recommendations to customers. The system consists of admin and user pages, where the admin can manage products and orders, while users can browse products, complete checkout, and receive product recommendations that match their needs.

1. Admin Dashboard

This figure shows the admin dashboard page used to monitor the overall system condition, such as total orders, revenue, product stock, and recent activities on the AQUA e-commerce website.

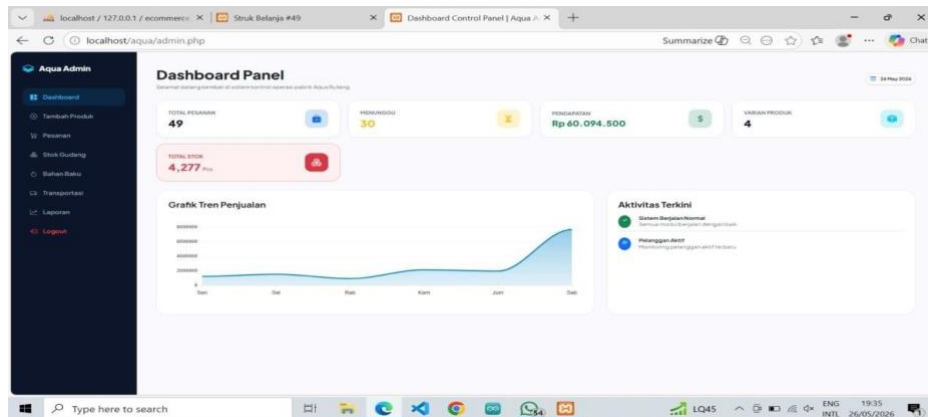


Fig. 2 : Admin Dashboard View

2. Add Product

This figure shows the add product form page used by the admin to input new product data, including product name, price, photo, and product description into the system.

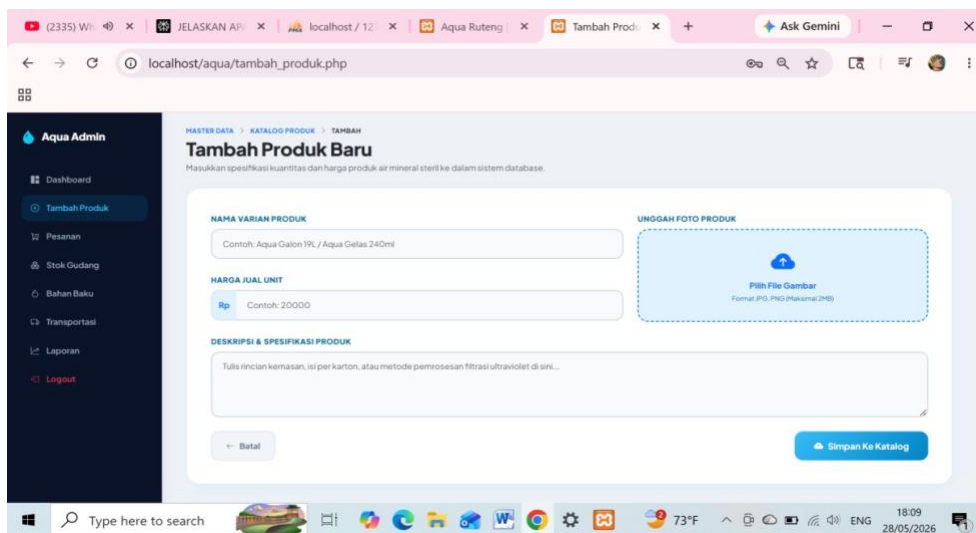


Fig. 3 : Add Product View

3. Customer Orders

This figure displays the order management page used by the admin to view, check, and manage customer order statuses on the website.

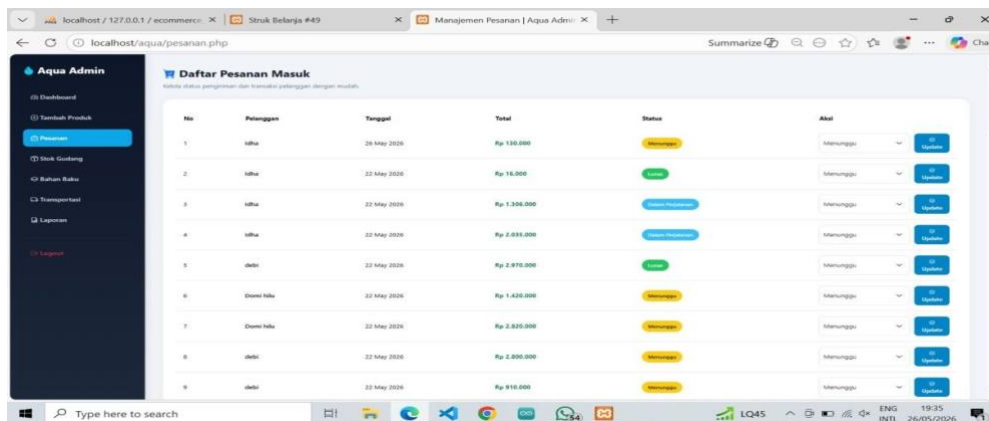


Fig. 4 : Customer Orders View

4. Warehouse Product Stock

This figure shows the stock management page used by the admin to monitor the quantity of products available in the warehouse.

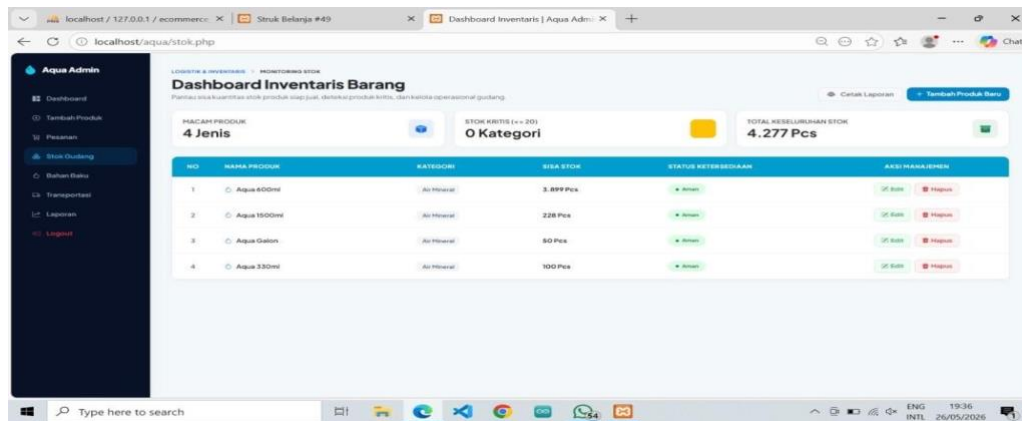


Fig. 5 : Warehouse Product Stock View

5. Product/Raw Material Data

This figure displays the product or raw material data page used to manage product stock data, including adding, editing, and deleting data.

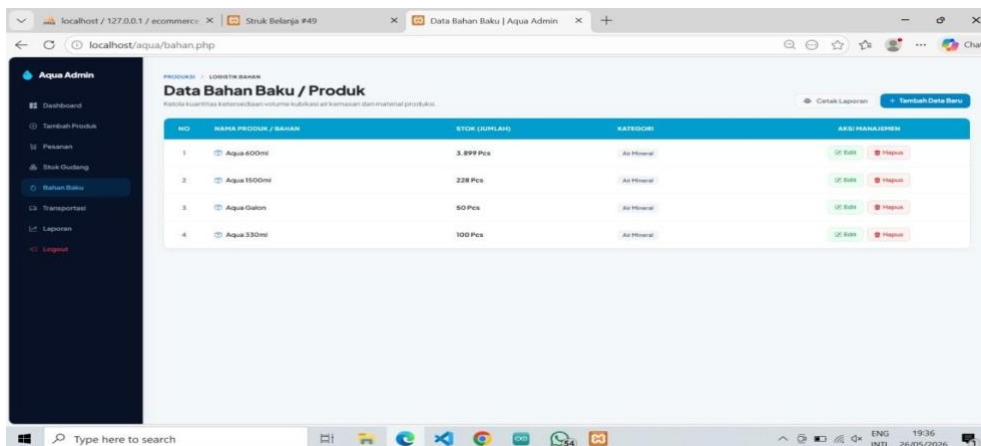


Fig. 6 : Product/Raw Material Data View

6. Transportation Cost

This figure shows the transportation cost calculator feature used to calculate estimated shipping costs based on travel distance.

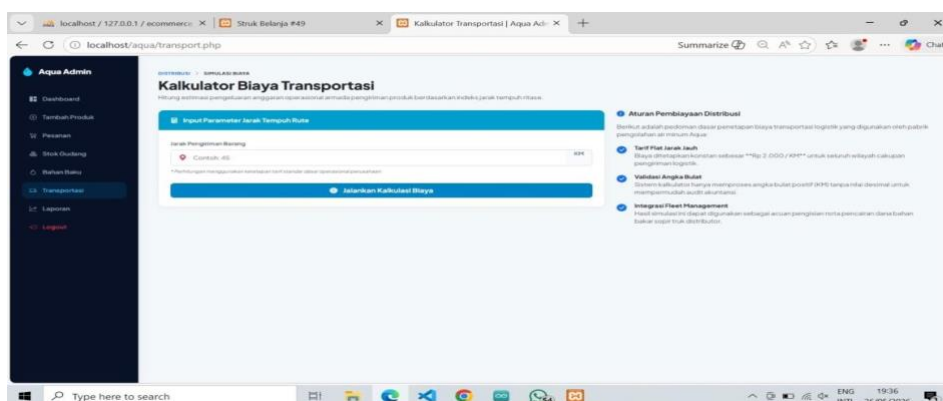


Fig. 7 : Transportation Cost View

7. Sales Report

This figure displays the sales report page used by the admin to monitor and recap sales transaction data based on a specific period.

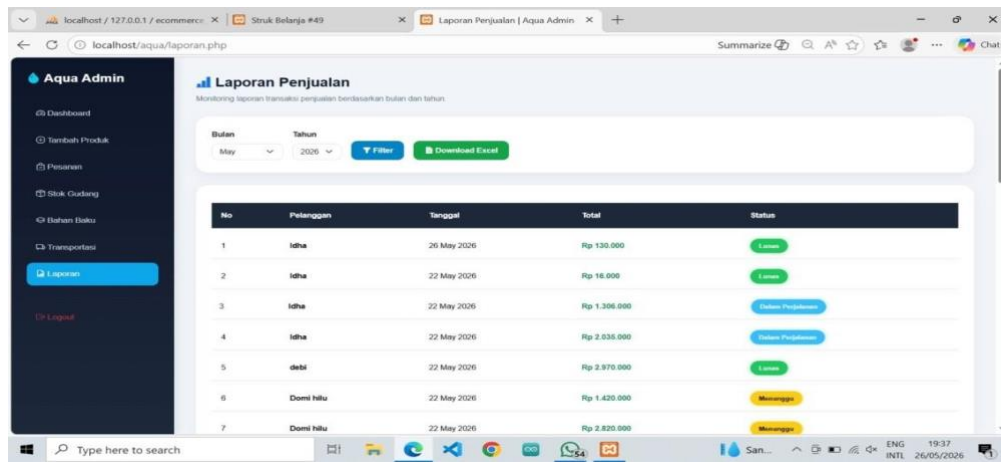


Fig. 8 : Sales Report View

8. Customer Dashboard

This figure shows the main page of the e-commerce website used by customers to browse product catalogs, make purchases, and obtain AQUA product information.

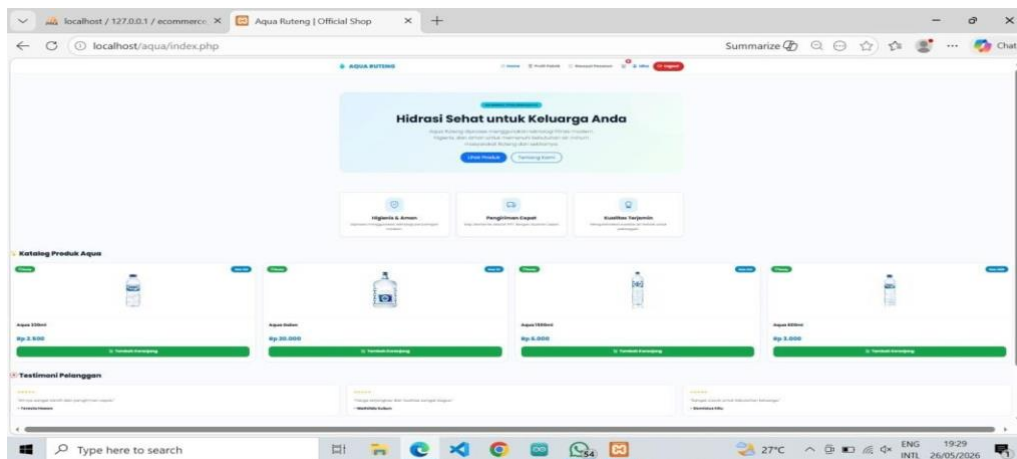


Fig. 9 : Customer Dashboard

9. Factory Profile

This figure displays the factory profile page containing information about the company, vision and mission, and the production quality of AQUA Ruteng.

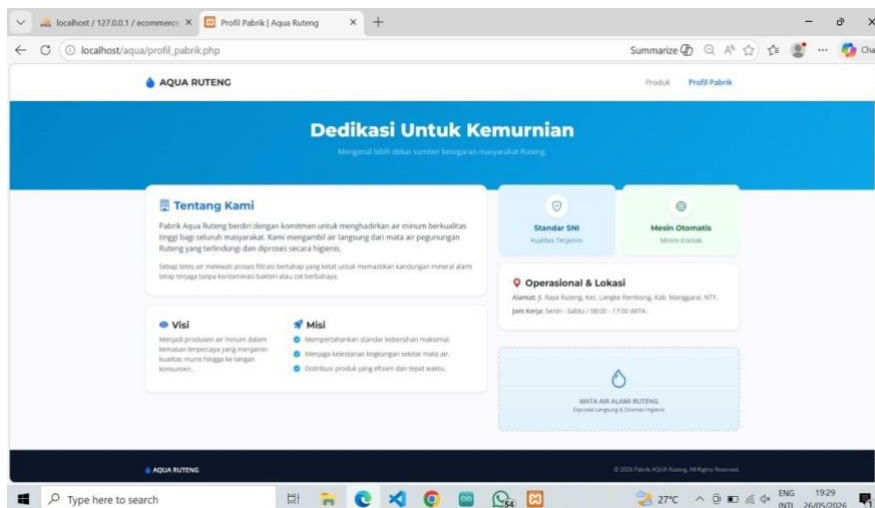


Fig. 10 : Factory Profile View

10. Product Checkout

This figure shows the checkout page used by customers to review products in the shopping cart before proceeding with payment.

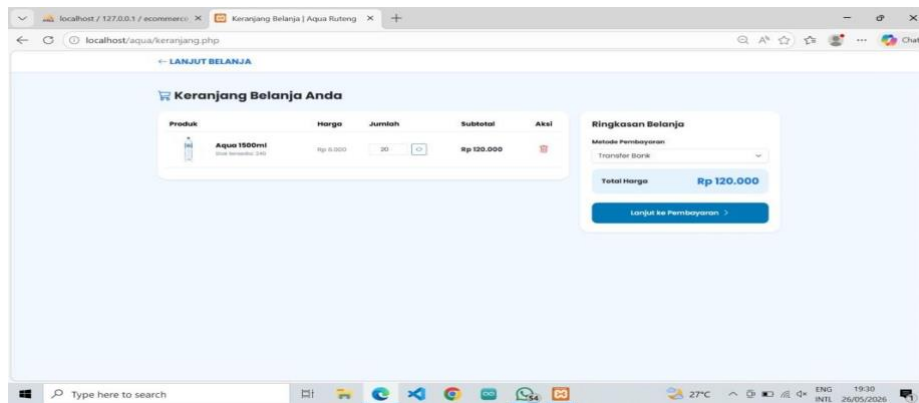


Fig. 11: Product Checkout View

11. Customer Address Input

This figure displays the customer shipping address input page used to determine the delivery destination and calculate shipping costs.

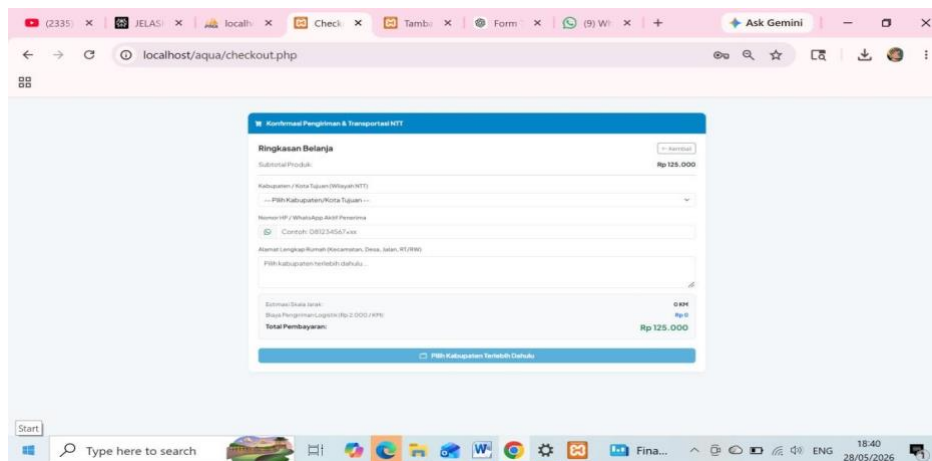


Fig. 12: Customer Address Input View

12. Order History

This figure shows the customer order history page containing transaction lists, order statuses, and details of previous purchases.

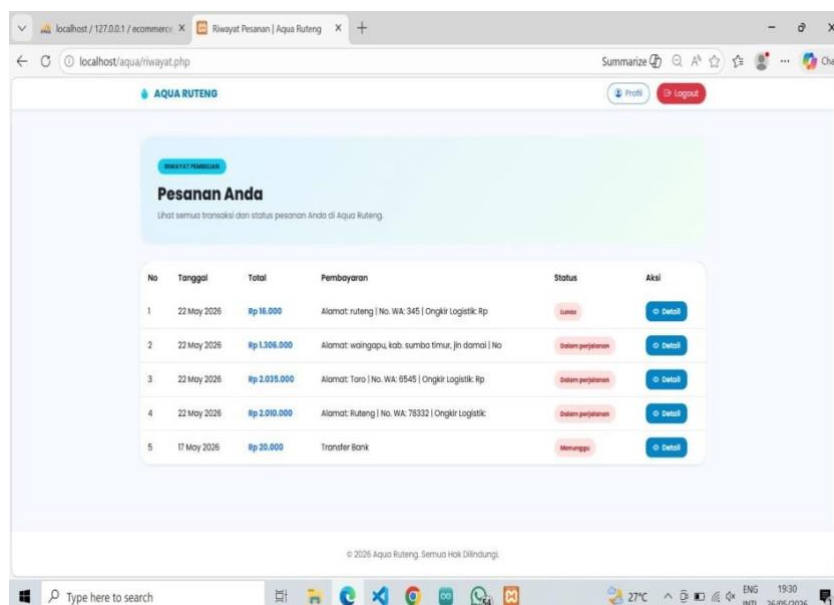


Fig. 13: Order History View

13. Payment Receipt

This figure displays the payment receipt used as proof of transaction after customers successfully place product orders.

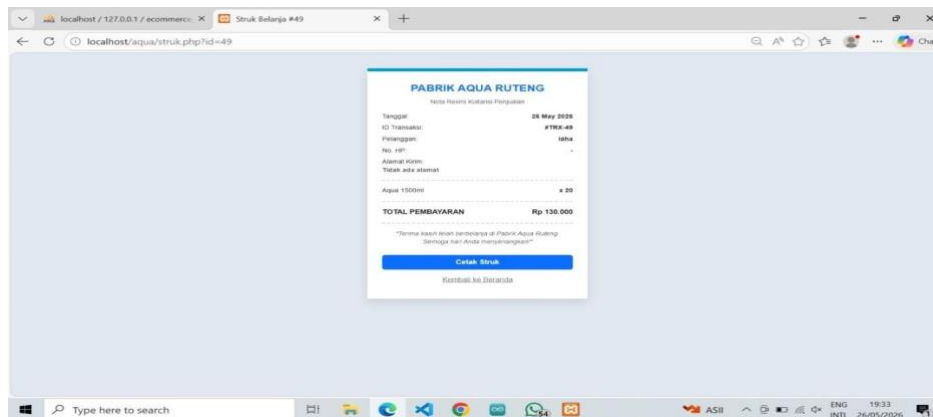


Fig. 14: Payment Receipt View

4. Conclusion

Based on the results of the research, it can be concluded that the e-commerce website for the AQUA Factory in Ruteng City was successfully developed by implementing the Content-Based Filtering method to provide relevant product recommendations to customers. The system is able to help customers order products online more easily, quickly, and efficiently, while also assisting the admin in managing product data, stock, and sales transactions. In addition, the testing results show that all system features function properly and are able to improve service quality and user experience in using the AQUA e-commerce website.

Acknowledgement

I would like to thank my parents for their unwavering support. I would also like to thank Mr. Petrus Katemba and Mrs. Dewi Anggraini, my supervisors, for guiding me through this research.

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