JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

Analysis and Design of Sales Website on Twins Petsop Using the Waterfall Method

Rafa Hadiya Pinasti[1*], Ika Nur Fajri[2]
[1,2]Department of Information Systems, Universitas Amikom Yogyakarta, Indonesia
[1*]rafahadiya@students.amikom.ac.id, [2]fajri@amikom.ac.id

Abstract: The pet shop industry continues to grow as people's interest in pets increases. However, many petshops face challenges in managing products and transactions that are still done manually. This is also experienced by Twins petshop, which still uses manual methods in managing product and transaction data, thus hindering data operational efficiency and market reach that has not been maximized. To overcome this problem, this study was made with the aim of designing and developing a website-based petshop sales information system, thereby helping to improve the efficiency of product and transaction data management. The development method used is the waterfall method which consists of several stages that must be carried out in stages, namely needs analysis, design, implementation, and testing. The tests are carried out using the balck-box testing method to ensure that all features run according to user needs. The results of the balckbox test show that of the eight scenarios tested, all succeeded with a 100% success percentage. Scenarios include admin logins with valid and invalid data, data editing and deletion, and adding products with invalid forms. The results of this study show that the website developed is able to increase the efficiency of product recording, transactions, and provide more complete information than the previous manual system.
Keywords: Waterfall method, System design, Petshop, Informatization system

1. INTRODUCTION

The pet sales industry or commonly called pet shops continues to grow and experience an increase in interest in the public. This increase occurred due to the trend of animal husbandry in 2021, especially in cats and dogs. Then this interest increased in 2022, based on data from the Eurominator Institute, as many as 4.80 million cats were kept. According to a GoodStat survey quoted from Cunsumer Report Indonesia, it shows that 53.9% of people have more than one pet, and 5.56% of people have pets. This also affects the increase in people's needs for pets and triggers rapid growth in the pet shop industry. The existence of the pet shop industry helps animal owners meet the needs of their pets such as food needs, medicines, vitamins, and animal accessories. [1]

Although the pet shop industry is growing rapidly, there are still many obstacles in managing its business. Many pet shops, including Twins pet shops, still use their business management system manually. Twins Petshop itself is a business engaged in the industry of selling animal products such as feed, vitamins, medicines and animal accessories, which has been operating since 2021. In its management, Twins petshop still collects product data, stock management, and records sales transactions that are carried out manually, which has the potential to cause recording errors. In addition, there is no sales website which causes the marketing area to be limited. Information about the products provided by petshops is not well conveyed to consumers, because the marketing methods used are only through social media. This hampers the purchasing process and causes limitations in operational efficiency and marketing reach.

However, along with the development of technology, efficiency in pet shop management is a top priority. Currently, Twins petshop is still facing various obstacles in its business development, so a website-based information system is needed that is able to increase efficiency and effectiveness in data

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

management at Twins petshop. To overcome these problems, this research was made with the aim of designing and developing a website-based information system to support and optimize the operation of Twins petshop. By applying the waterfall method in system development and utilizing technology through website creation, this system is expected to be a solution to improve operations in managing product, customer, and transaction data, as well as providing convenience for users in accessing information or making online purchases. The application of digital systems in sales has also been proven to increase operational efficiency by up to 40% and can expand market reach [2].

In the development of the information system, various methods can be used to ensure that the system built has a clear structure. In this study, the waterfall method was chosen because of its systematic and sequential approach, so that each stage of development is carried out in a structured manner and ensures that each phase must be completed first before doing the next phase. Compared to other methods such as agile and prototype methods, the waterfall method has the advantage of clear documentation and minimal risk of errors in system development. The agile method provides flexible convenience because the time required is short, allowing for changes during the development process. However, it is not suitable for use in projects with clearly structured needs because poor planning makes the final Figure of the system developed difficult to predict and poorly defined [3]. Meanwhile, prototypes provide convenience for the development team so that the results of the development system are in accordance with the desired. However, just like agile, prototypes continue to change so that they lack a clear flow from the beginning. Protoype also has a higher risk because it experiences iteration or repetition of steps until the desired result is achieved.

Several previous studies have examined the application of the waterfall method in the development of e-commerce websites or website-based information systems that are in accordance with the development of the system in Twins petshop. Previous research discussed the application of the waterfall method in the design of e-commerce website information systems for petshop developers. In this study, the researcher used the waterfall method as a research method and made a website design. This method is used to design systems that manage customers, products, and transactions. The study shows that the waterfall approach provides a clear structure and good documentation at every stage, from needs analysis to implementation. The result of this study is that the application of waterfall provides a clear structure, facilitates the system development process, and ensures that each phase is carried out completely before moving on to the next phase. Thus, the application of this method makes it easier for researchers in the system development process and reduces the risk of errors. [4]

The next previous research was to explain the application of the waterfall method which serves as an evaluation of the application of the waterfall method in the design of a website-based information system in seventy petshops. The use of the watefall method is aimed at ensuring that each cashier feature can be properly designed and implemented, such as financial statements and transaction reports. The result is the application of the waterfall method in this study, which is considered effective for structured projects, although there are limitations in changing needs during the development period. The waterfall method also helps in managing sales transactions, speeding up the reporting process, and improving operational efficiency. [5]

The previous next research was to discuss and examine the application of the waterfall method in the accounting information system for car service sales. This study shows the application of the waterfall model used to design a structured accounting system, manage sales data, and financial reports. The result of this study is that the use of the waterfall method has the advantage of providing a clear structure and stages that minimize the risk of errors and inconsistencies in the development of accounting systems. [6]

2. RESEARCH METHODOLOGY

2.1 Research Outline

A research framework or research stage is a structure that describes the stages or steps of research [7]. The stages of the research carried out are explained as shown in the following figure 1:

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

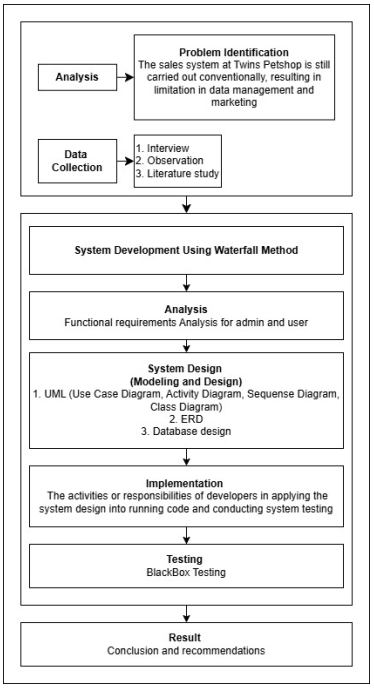

Figure 1. Research Outline

The research framework in figure 1 carried out in this study consists of several main stages, namely the problem identification stage, website development with the waterfall method, and the results and discussion. The first stage in this study is the analysis and identification of system needs problems. At this stage, observations and interviews are carried out to understand the business system problems faced by Twins petshop. In addition, literature studies are conducted to support and find the right solutions. After the analysis was completed, the research continued with the development of a system using the waterfall method. This method consists of several stages that must be carried out in order, namely needs analysis, system design, implementation, and testing. The last stage is the results and discussion that display and describe the findings in this study based on the implementation and testing of the system that has been developed. The results of the study were then analyzed to evaluate the extent to which the designed system was able to improve the operational efficiency of the Twins pet store compared to the previous manual method. The discussion was carried out by comparing the results of the research with previous research. In addition, the discussion also explained the extent to which the system was successfully implemented by looking at the results of the tests that had been carried out.

2.2 Data Collection Methods

In this study, to obtain the necessary data is carried out in several stages as follows:

2.2.1 Observation

The author made observations directly at the Twins petshop to collect relevant information. The observation was carried out with the aim of knowing and identifying problems that occurred in the Twins petshop, as well as understanding the business processes that took place.

2.2.2 Interview

The author conducted an in-depth interview with the owner of Twins petshop as well as the manager of Twins petshop to ask about information related to business operations, challenges faced, and necessary needs.

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

2.2.3 Study book

The author also conducts literature studies by reviewing various literature, articles, journals, and other sources related to the development of a website-based information system and the application of the waterfall model. Literature studies are also used to strengthen the theoretical foundations and methodologies used in research.

2.3 Metode Waterfall

The research was conducted using the waterfall method with a systematic and sustainable approach. In its implementation, each phase must be fully completed before the next phase begins. The research process consists of several stages as shown in figure 2 below:

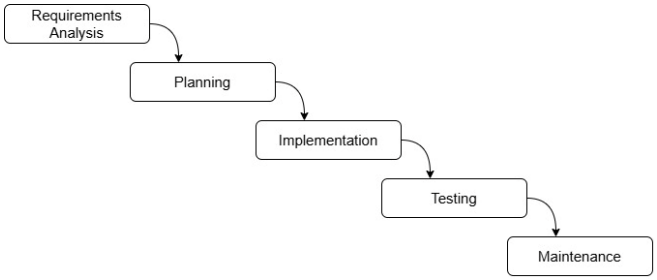

Figure 2. Metode Waterfall

1. Needs Analysis
   This stage is the first step in the process of identifying the needs of the system to be developed and, as a stage of data collection and information that will be used in the creation of a petshop website. This stage was obtained through interviews and observations with Twins petshop owners to understand in detail the business needs, the features needed, and the problems faced by users, both in terms of administration and customers.
2. Planning
   After the needs of the system are determined, the next stage is the planning stage. At the stage, it aims to design the system design. The system design that is made includes the design of the system and the database structure of each existing feature. The system design uses UML (Unified Modeling Language) diagrams which include the creation of Use Case diagrams, Activity diagrams, class diagrams, and sequence diagrams.
3. Implementation
   The next stage is the stage where the development team begins to convert the design results into program code using the Visual Studio Code application. In designing a petshop website, developers use the Ci framework to build a website according to the design that has been made. In its designers, PHP (Hypetext Preprocessor) and HTML (Hypertext Markup Launguage) are used as programming languages. Meanwhile, the creation of the database uses XAMPP MySQL as a connected data storage medium.
4. Testing
   After completing the coding implementation stage, the petshop website will be tested to ensure that the system runs according to the specified needs. The website that has been created will be tested using black-box testing to test the functionality of each feature. Testing is carried out by checking whether the system provides an output that matches the given input.
5. Maintenance
   Once the system is implemented and tested, the final step is maintenance. At this stage, improvements are made from problems that arise during the use of the system, the addition of features or data updates.

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

3. RESULTS AND DISCUSSION

3.1 Functional Needs Analysis

The analysis of the functional needs of the petshop website system is designed to meet the operational needs of admins in managing petshops, as well as provide convenience for users with online petshop services.

3.1.1 Admin Page

1. Admin can do registration and login
2. Admins can add category data, item data, and admin data
3. Admins can delete category data, item data, admin data, and user data
4. Admins can edit category data, item data, and admin data

3.1.2 User Page

1. Users can register and log in
2. Users can view product information and information about Twins petshop
3. Users Users can buy items sold at Twins petshop by logging in first
4. Users can view order history

3.2 Planning

Use Case Diagram serves to illustrate the limitations or scope of the system to be used, so that the end user can have a deeper understanding of the system to be created [8]. Figure 3 below shows the use case of the system played by two actors, namely the admin and the customer.

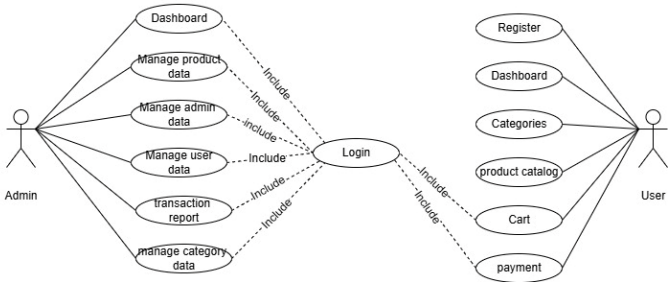

Figure 3. Use Case Diagram

ERD is a visual tool or concept that describes relationships in data storage or databases consisting of a collection of objects called entities, as well as relationships or relationships between these objects. Figure 4 below shows that the ERD created for a petshop website includes five main entities and five relationships that describe the relationships between these entities and cardinality values that indicate the relationships between existing entities.

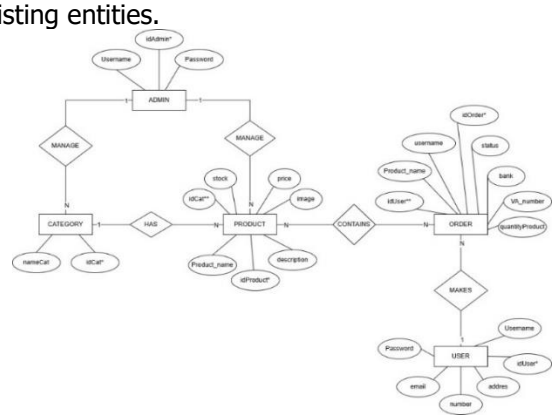

Figure 4. Entity Relationship Diagram

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

Figure 5 below is an overview of the database used in the petshop website information system on Twins petshop. It includes five main entities designed to make it easier to manage data on a regular basis. Each entity represents an important part of the system to maintain data accuracy and consistency, so that data retrieval can be carried out optimally.

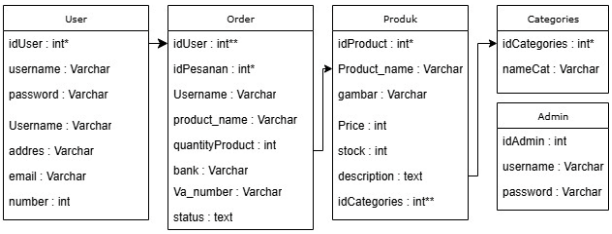

Figure 5. Database Design

This activity diagram describes the workflow or activity that occurs in a system, business process, or menu that exists on the device. [9]. The Activity Diagram in figure 6, illustrates the steps of the purchase process on the Twins petshop website, starting from logging in, selecting products, choosing payment methods, to displaying order data. This diagram shows the flow of user interaction in completing transactions.

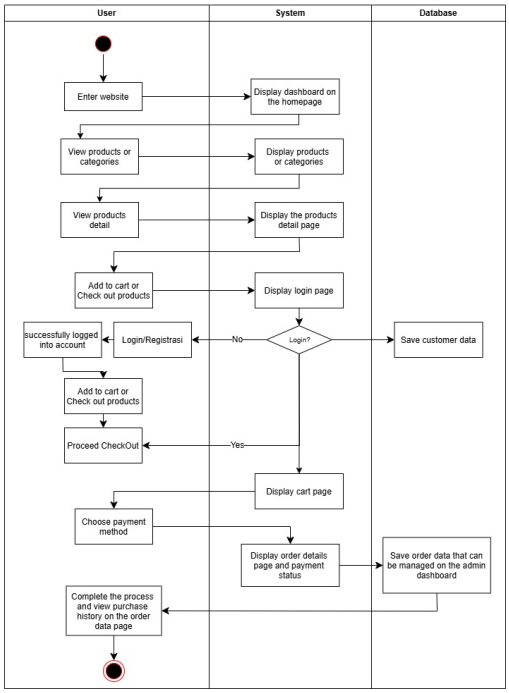

Figure 6. Activity Diagram Manage Users

Class diagrams are used to present the structure of the system including the system on the Twins petshop. The creation of this diagram class aims to provide an overview of the overall structure of the system [10]. Figure 7 below is the system structure created in Twins petshop consisting of five main entities, namely admin, customer, category, product, and order

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

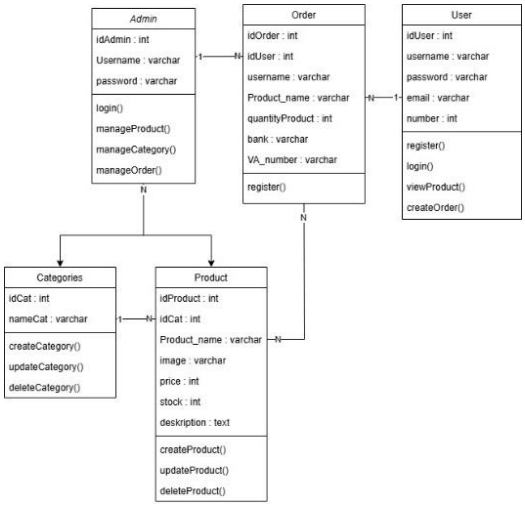

Figure 7. Classroom diagram design

Sequence diagrams describe the interactions between these objects in a system [11]. In the diagram sequence figure 8 there is one actor (customer) and six objects, namely, dashboard, auth service for login validation, login, cart, payment, and database.

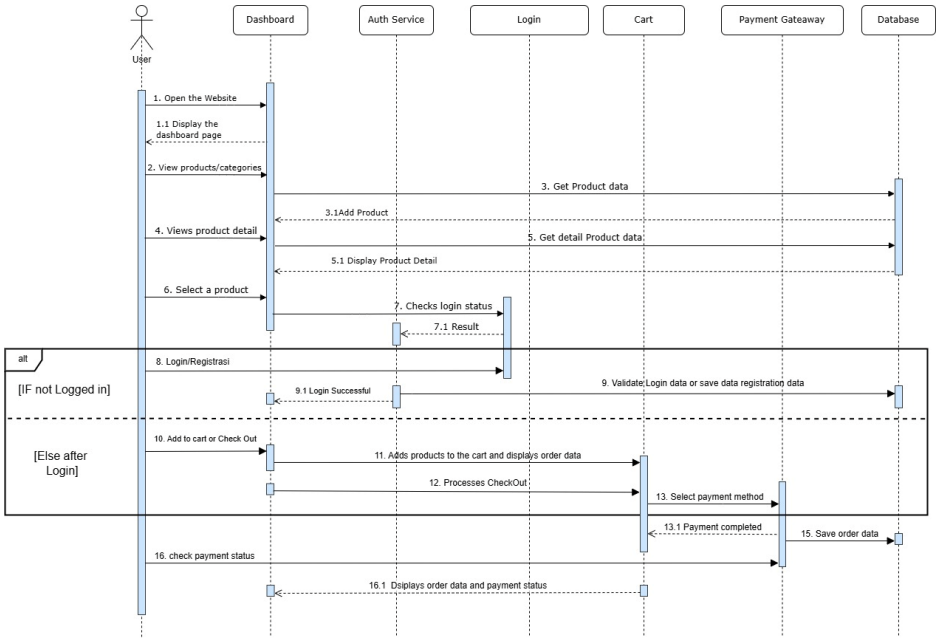

Figure 8. Sequence Diagram Users

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

3.3 Implementation

On the customer dashboard page, users can find the features offered by the Twins petshop website. In figure 10 below, users can see information about Twins petshop on the home page, product details, and available product categories.

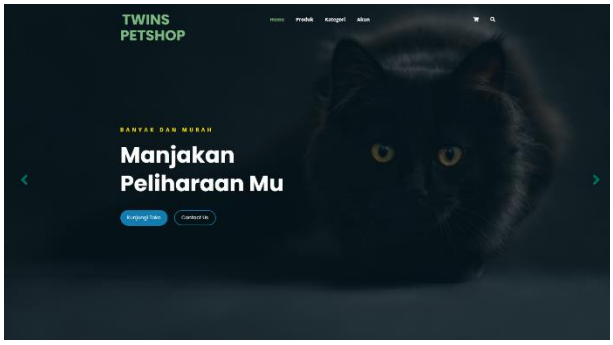

Figure 9. Dashboard Page View

In figure 10, which is the admin dashboard page, admins can find store management features such as manage categories, manage products, manage customer data, manage payments.

Figure 10. Admin Dashboard Page View

In figure 11 below, customers will be given complete information about the product which includes product name, product description, price, images, and categories. If the customer wants to proceed with the purchase, the customer can fill in the product quantity and click Add to Cart to proceed with the next process.

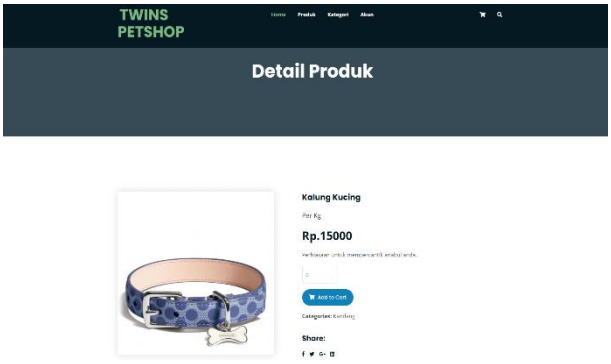

Figure 11. Product Detail Page

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

Figure 12 is the view of the cart page. On this page, customers will be presented with a list of products that have been input by customers. Before making a payment, customers can check the products that have been selected along with their information such as product name, quantity, price, and total. If it is considered correct, then customers can make a payment by clicking the Check Out button.

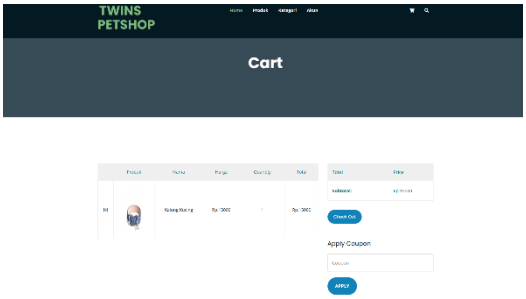

Figure 12. Cart Page View

The payment page is one of the important features in the petshop website that functions to facilitate the transaction process between customers and stores efficiently. In the display of figure 13, customers can easily make payments with the various methods provided by the Midtrans payment gateway.

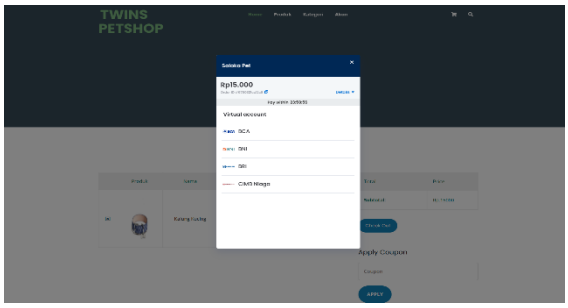

Figure 13. Payment Page View

In figure 14, the product management page display, presents the products that Twins petshop will offer to customers. On this page, admins can add products and can delete a product if the product is no longer in production.

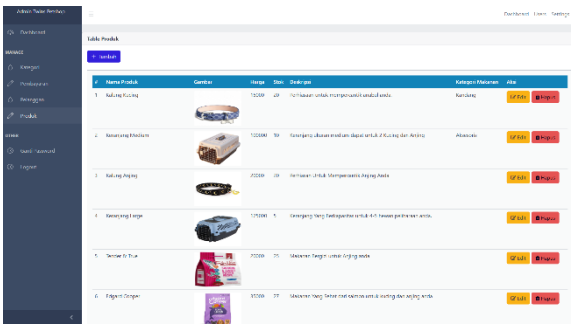

Figure 14. Manage Product Page Views

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

In figure 15 of the view of the manage payment page, the admin can see the payment status of customers who have purchased products on the Twins petshop website. Admins can only delete customer data to protect the privacy of customer data.

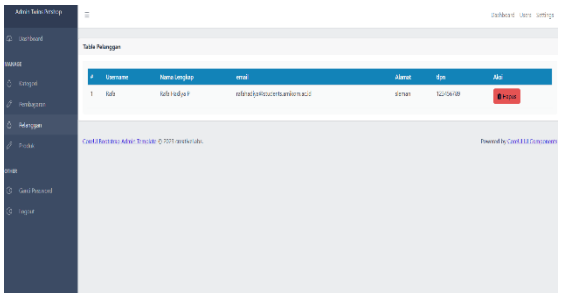

Figure 15. Manage Payments Page View

In figure 16 of the view of the manage customer data page, the admin can see customers who have registered on the Twins petshop website. Admins can only delete customer data to protect the privacy of customer data.

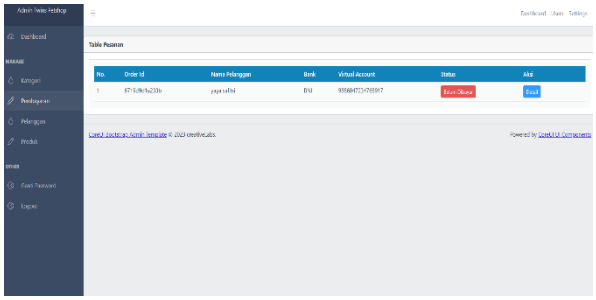

Figure 16. Manage Customer Data Page Views

3.4 Testing

The system test is carried out with the aim of evaluating and finding out if there is a non-conformity with the expected specifications and is free from errors [12]. The tests carried out in the study are presented in the following table 1.

Table 1. Twins pet store test Black-box website

It	Scenario	Expected Results	Test Results	Status
1	Admin login with valid data	Admins can log in and will display the admin dashboard page	Admin can enter username & password, and successfully log in to admin dashboard	Succeed
2	Admin login with invalid data	Admin can't log in and will be redirected to admin login page again	Admin cannot log in because the data entered is invalid, then will return to the login page	Succeed
3	Admin adds categories with valid data	Admins can add category data according to the form's instructions	Admins can add data according to the form's instructions	Succeed

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

4	Admin adds categories/products with invalid data	Admins can't add data and the view will remain on the add data form page	Admins can't add/save data that doesn't comply with the data add-on form's instructions	Succeed
5	Admin edit category	Admins can edit or update data categories	Admins can edit categories	Succeed
6	Admin editing products	Admins can edit or update data products	Admins can edit products	Succeed
7	Admin adds products by clearing multiple forms	Admins can't add products and the display will remain on the Add Data form page	Admins can't add products and the display will remain on the Add Data form page	Succeed
8	Admins can delete categories, products, customer data	Admins can delete categories, products, and customer data	Admin can delete data, and the screen will provide a notification with a "yes or no" option to delete the data	Succeed

Based on the results of the black-box test that has been carried out in table 1, the eight test scenarios carried out showed results that met expectations and managed to achieve a 100% success rate. Admin login testing with valid data can be done successfully and provide access to the dashboard page, while login testing using invalid data results in an appropriate response by returning the user to the login page. In addition, the add, edit, and delete categories and products feature has worked well, where the system only accepts data input that matches the instructions on the form. Data deletion is also confirmed in advance with a notification before action is taken, ensuring security in data management. Overall, the test results show that the Twins petshop website has functioned properly and met the needs of users without significant functional errors. This test also shows that the system has run well without any significant functional errors.

4. CONCLUSION

The results of the research that have been carried out show that website development for Twins petshop has a positive impact by providing ease in the operational management of product, customer, and sales transaction data. Processes that were previously carried out manually have been changed and managed digitally, making them more effective and structured. The application of the waterfall method in the development of this system has proven to be effective, with each stage from needs analysis to testing carried out systematically and well-documented. The Twins petshop website also makes it easier for admins to manage information and for customers to make transactions online, which ultimately improves the overall user experience. The black-box tests conducted to evaluate the performance of the system and of the eight test scenarios tested, all showed successful results with a success rate of up to 100%. The test results show that all the main features are working well and in accordance with the specified needs. With this, the Twins petshop website is stated to have met user needs and increased operational efficiency compared to the previous system.

5. REFERENCE

[1] N. Mayasari, A. Hiroyuki, D. C. Budinuryanto, I. Firmansyah, and M. R. Ismiraj, "Application of Animal Welfare Principles in Livestock Maintenance," *Dharmakarya*, vol. 12, no. 3, p. 360, 2023, doi: 10.24198/dharmakarya.v12i3.42686.

[2] P. Harsono, T. Tabroni, A. Bahits, and O. Romli, "Planning and Implementation of New E-Commerce Methods to Increase Sales of MSME Products in Serang City, Banten," *Indones. J. Econ. Business, Entrep. Financ.*, vol. 4, no. 1, pp. 207–217, 2024.

[3] A. B. Paksi, N. Hafidhoh, and S. K. Bimonugroho, "Comparison of Software Development Models for Vocational Program Final Project Projects," *J. Masy. Inform.*, vol. 14, no. 1, pp. 70–79, 2023, doi:

Rafa Hadiya Pinasti: * Corresponding Author

JURNAL INFORMATIKA DAN REKAYASA PERANGKAT LUNAK (JATIKA)
Volume 6, Number 1, March 2025, Page 72-83
E-ISSN 2797-2011 P-ISSN 2797-3492
https://publikasi.teknokrat.ac.id/index.php/jatika/index
DOI: https://doi.org/10.33365/jatika.v6i1.29

10.14710/jmasif.14.1.52752.

[4] E. K. Hazanah, A. Oktaviani, and R. Nurfalah, "Application of Waterfall Model in Web-Based Information System Design in Petshop Devan," *J. Responsive Ris. Science and Inform.*, vol. 4, no. 2, pp. 135–141, 2022, doi: 10.51977/jti.v4i2.613.

[5] A. Fitri Khoiry Tamami Salam and H. Septanto, "Designing a Web-Based Cashier System Application Using the Waterfall Method in Seventeen Petshop," *JATI (Journal of Mhs. Tek. Inform.*Vol. 8 No. 4 pp. 6163–7170, 2024, doi: 10.36040/caste.V8I4.10146.

[6] S. Sudirja, F. Faradillah, and H. A. Awanis, "Implementation of the Waterfall Model in the Accounting Information System for the Sales of Car Service Services," *J. Infortech*, vol. 2, no. 1, pp. 127–132, 2020, doi: 10.31294/infortech.v2i1.8287.

[7] D. Andrian, "Application of the Waterfall Method in Information System Design," *J. Inform. and Software Engineering*, vol. 14, no. 4, pp. 1–11, 2021, [Online]. Available: https://jurnal.umj.ac.id/index.php/semnastek/article/view/5238%0Ahttps://jurnal.umj.ac.id/index.php/semnastek/article/download/5238/3516

[8] I. R. Immasari and R. Rhamadhan, "Web-Based Information System for Admission of New Students at Mardiyuana High School," *J. Manj. Inform. Cheers*, vol. 3, pp. 98–113, 2023, [Online]. Available: https://www.academia.edu/download/57561989/Tugas_Akhir.pdf

[9] S. Ramdany, "Application of UML Class Diagram in the Design of Web-Based Library Information Systems," *J. Ind. Eng. Syst.*, Vol. 5, No. 1, 2024, doi: 10.31599/2E9AFP31.

[10] Setiaji and R. Sastra, "Implementation of UML (Unified Modelling Language) Diagram in System Design," *J. Tech. Trembling. Amic BSI*, vol. 7, no. 2, p., 2021, doi: 10.31294/jtk.v4i2.

[11] Dimas Indra Andhika, M. Muharrom, Edhi Prayitno, and Juarni Siregar, "Design and Build a Document Receipt System at Pt. Reasuransi Indonesia Utama," *J. Inform. and Komput Technology.*, vol. 2, no. 2, pp. 136–145, 2022, doi: 10.55606/jitek.v2i2.225.

[12] Muhammad Helmi Satria Fedianto, Firza Prima Aditiawan, and Muhammad Muharrom Al Haromainy, "Testing of Documentation and Information Network Systems Using Black Box Testing and White Box Testing," *J. Publ. Sist. Inf. and Manaj. Business*, vol. 3, no. 1, pp. 213–221, 2023, doi: 10.55606/jupsim.v3i1.2447.

[13] B. Hartono, *Easy and Fast Ways to Learn Information System Development*. 2021. [Online]. Available: https://penerbit.stekom.ac.id/index.php/yayasanpat/article/view/256

[14] F. L. D. Cahyanti, F. Sarasati, W. Widiastuti, and E. Firasari, "E-Commerce Design as a Marketing Media for Bamboo Crafts," *Edumatic J. Educator. Inform.*, vol. 5, no. 1, pp. 70–79, 2021, doi: 10.29408/edumatic.v5i1.3275.

[15] D. Anggoro and A. Hidayat, "Design and Build a Web-Based School Library Information System to Improve the Effectiveness of Librarian Services," *Edumatic J. Educator. Inform.*, vol. 4, no. 1, pp. 151–160, 2020, doi: 10.29408/edumatic.v4i1.2130.

[16] S. Supriyadi and N. Lutfiyana, "Web-Based Design of New Student Registration Information System at SMA Pusaka 1 Jakarta," *J. Inform. and Software Engineering*, vol. 2, no. 1, p. 62, 2020, doi: 10.36499/jinrpl.v2i1.3224.

[17] D. D. A. Suprapto, F. Fauziah, I. Fitri, and N. Hayati, "Development of Android-Based Online Smart Register Information System Application Using BruteForce Algorithm," *Edumatic J. Educator. Inform.*, vol. 4, no. 1, pp. 47–56, 2020, doi: 10.29408/edumatic.v4i1.2106.

Rafa Hadiya Pinasti: * Corresponding Author