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Design and Implementation of a Web-Based Information System to Enhance Inventory and Service Management in Pet Retail Businesses

Jefri Ramadi[1*], A Walfajri fachriza[1], Dhifa Arifan[1], Rafael Oscar[1] and Yogi Wahyu[1]

[1] Informatics Engineering, Faculty of Computer Science, Universitas Muhammadiyah Riau, Riau, **Indonesia**

*Corresponding Author Email: 230402036@student.umri.ac.id
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Abstract: The development of digital solutions for small and medium-sized enterprises (SMEs) is essential in supporting operational efficiency and customer engagement. This study presents the design and implementation of the Givan Petshop Information System, a web-based platform developed using a sequential linear methodology. The system aims to centralize and streamline business processes including inventory management, promotional campaigns, grooming service scheduling, and customer interactions. The development process encompassed thorough needs analysis, structured database modeling, and responsive user interface design for both admin and client users. Key features include real-time dashboards, dynamic product and service management, and integrated contact information access. The system was built using Visual Studio Code, MySQL, and XAMPP on a Windows-based environment and tested through interface simulations and functional evaluations. Results indicate that the system effectively supports business administration and improves the accessibility of information for users. While the system functions as intended in the development environment, limitations include the absence of real-user feedback and scalability testing. Future research is recommended to conduct usability testing in real-world settings, integrate mobile and cloud functionalities, and explore smart automation features to further enhance performance.

Keywords: Petshop; Web-Based System; Information System; Admin Interface; User Interface; Business Process Automation.

1. Introduction

Information systems are integrated assemblies of components that collect, process, store, and disseminate data to support decision-making and operational processes [1], [2]. These systems typically include software, hardware, network infrastructure, and trained human resources that work together to transform raw data into valuable information [3]–[5]. In the digital

economy, web-based information systems have become critical tools for organizations of all sizes due to their accessibility, scalability, interoperability, and cost efficiency [6]–[8]. These platforms, which operate over HTTP/HTTPS protocols, allow users to interact with rich multimedia content including text, images, audio, video, and animations [9]–[11]. The utilization of websites has expanded significantly, serving not only as marketing tools and communication channels but also as transactional systems, data repositories, and decision-support platforms [12].

In recent years, the global pet care industry has experienced rapid growth, driven by increasing pet ownership and changing consumer behavior. The industry's market value reached approximately USD 269 billion in 2022 and is projected to exceed USD 350 billion by 2027 [13], [14]. This expansion has increased the demand for digital transformation in pet-related businesses. However, many small-to-medium enterprises (SMEs), particularly those in the pet retail sector, still rely on manual or partially computerized systems to manage inventory, record sales, and schedule services [15], [16]. These traditional practices are susceptible to human errors, delays, and disorganized data management, ultimately affecting customer satisfaction and reducing operational efficiency.

Inventory management plays a central role in supporting retail business operations. Inefficient inventory tracking can lead to stock shortages, overstocking, inaccurate reporting, and increased operational costs [17], [18]. Manual processes hinder the ability to monitor stock in real-time and complicate data analysis, making it difficult for business owners to make timely and informed decisions [19]. In contrast, web-based inventory systems allow businesses to automate stock entry and tracking, generate real-time alerts for low stock levels, and integrate transaction data seamlessly across departments [20], [21]. These capabilities are especially important for pet shops, which often deal with fast-moving goods, perishable items, and service appointments that require precise scheduling.

Several existing studies have explored web-based systems for retail and pet-related services. One system, designed for a pet store, enabled customers to order products online while automatically sending confirmations via SMS and email [22]. Another study developed a stock tracking system based on the FEFO (First Expired, First Out) method to manage perishable goods more effectively [23], [24]. Meanwhile, other systems have integrated modules for purchasing, grooming, and customer databases but often lack holistic reporting features or customization for SMEs with limited technical capacity [25], [26]. These limitations highlight the need for a more tailored, integrated solution for small-scale pet businesses.

This study addresses that gap by designing and implementing a comprehensive web-based information system that combines inventory tracking, sales

processing, promotional campaign management, and service scheduling. The goal is to improve operational efficiency, reduce data entry errors, and enhance the overall customer experience. The system is developed using the Linear Sequential Model, a traditional yet systematic approach to software engineering that involves sequential stages of requirement analysis, design, implementation, and testing [27], [28]. PHP is selected as the core programming language due to its compatibility with open-source databases like MySQL, flexibility in server-side scripting, and strong community support [29].

The research contributes to the field by offering an applied example of how structured software engineering methodologies can be adapted to real-world SME environments. It demonstrates the role of digital solutions in transforming traditional businesses and provides a foundation for future scalability through integration with mobile platforms, real-time analytics, and potentially AI-powered decision support systems. Overall, this system is designed not only to solve immediate problems in operational management but also to prepare the business for more advanced digital integration in the future.

2. Material and methods

This research adopts the Linear Sequential Model, commonly referred to as the Waterfall Model, as the system development methodology. The model is known for its structured, phase-based approach, where each stage must be completed before the next one begins. This method is suitable for projects with clearly defined requirements and is widely used in software engineering due to its systematic workflow and emphasis on documentation [30]. In this study, the Waterfall Model guided the development process of a web-based information system for Givan Petshop, encompassing five main stages: requirement analysis, system design, implementation, testing, and deployment.

The overall methodological framework followed in this study is illustrated in Figure 1, which presents each phase of the system development lifecycle in a linear sequence.

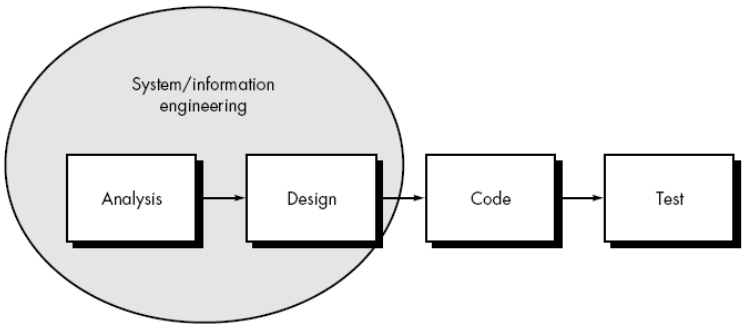

Figure 1. Phases of the Linear Sequential Model used in system development

The development process commenced with the requirement analysis phase, which focused on identifying the functional and non-functional requirements of the proposed system. Primary data were collected through interviews and observations at Givan Petshop, where existing manual procedures for inventory tracking, customer service, and transaction recording were analyzed. The collected data helped define system specifications and user expectations, which were later translated into detailed system models.

Subsequently, the design phase involved the creation of structural representations of the system. Three main components were addressed during this phase: the use case model, database design, and interface design. The use case diagrams were developed to capture the interactions between the system and its actors, such as administrators and customers, outlining functionalities including login, sales input, stock management, grooming schedule arrangement, and promotional updates. These diagrams provided a functional overview of how users would interact with various modules of the system.

The database design was carried out using the MySQL relational database system. The database schema was structured to support data normalization and integrity, with tables defined for key entities including administrators, customers, inventory stock, grooming services, payments, promotions, and contact details. Entity relationships were established to enable efficient query processing and ensure consistency in data management.

The interface design aimed to enhance usability and accessibility for both administrative staff and customers. The front-end mockups were created to ensure intuitive navigation and responsive interaction. The user interface accommodated key functionalities such as catalog browsing, real-time stock updates, grooming bookings, and order tracking. The interface was designed using HTML5, CSS3, and JavaScript to deliver a clean and responsive user experience across devices.

During the implementation phase, the system was developed using PHP as the server-side programming language due to its flexibility, open-source nature, and compatibility with MySQL. The development environment utilized XAMPP for local hosting, and version control was maintained throughout to ensure stability during coding iterations. Each module was developed incrementally, tested locally, and integrated with the database to validate its operational accuracy.

Finally, the system underwent testing to verify that it met all specified requirements. Both functional and non-functional tests were conducted to evaluate performance, data integrity, usability, and security. The testing process included black-box testing for user interaction scenarios and white-box testing for code correctness. Feedback from stakeholders during pilot testing sessions was collected and incorporated into minor revisions prior to deployment.

The use of the Linear Sequential Model ensured that all development activities proceeded in an orderly and traceable manner. This method was particularly advantageous for the Givan Petshop case, where operational needs were clearly identified, and the focus was on implementing a stable and maintainable information system. By applying this model, the study successfully delivered a fully functional web-based application tailored to the needs of pet retail SMEs, contributing both to operational efficiency and customer satisfaction.

Explaining research chronological, including research design, research procedure (in the form of algorithms, Pseudocode or other), sample or speciment, tool or machine, how to test and data acquisition. The description of the course of research should be supported by references, so the explanation can be accepted scientifically.

3. Results and discussion

This section outlines the outcomes of system analysis, design, and interface implementation for the development of the Givan Petshop Information System.

3.1 System Analysis

3.1.1 Hardware Requirements

The development of the Givan Petshop Information System was conducted using a computer equipped with hardware capable of supporting application design and database management. The processor used was an 11th Gen Intel(R) Core(TM) i5-11400H with a base frequency of 2.70GHz, offering efficient performance for coding, compiling, and running simulations. The system was supported by 8 GB of RAM, which provided adequate memory for multitasking and smooth operation of development tools. For storage, a 288 GB Solid State Drive (SSD) was employed, allowing for faster data access and improved system responsiveness.

3.1.2 Software Requirements

The software environment utilized in this research was built on the Windows 11 operating system, which ensured compatibility with various development tools. The development process was facilitated using Visual Studio Code as the primary code editor, MySQL for database creation and management, and XAMPP for integrating the Apache web server and MySQL database services. Additionally, Google Chrome was used to run and test the web-based system, ensuring compatibility and functionality across modern browsers.

3.2 System Design

3.2.1 Use Case Diagram

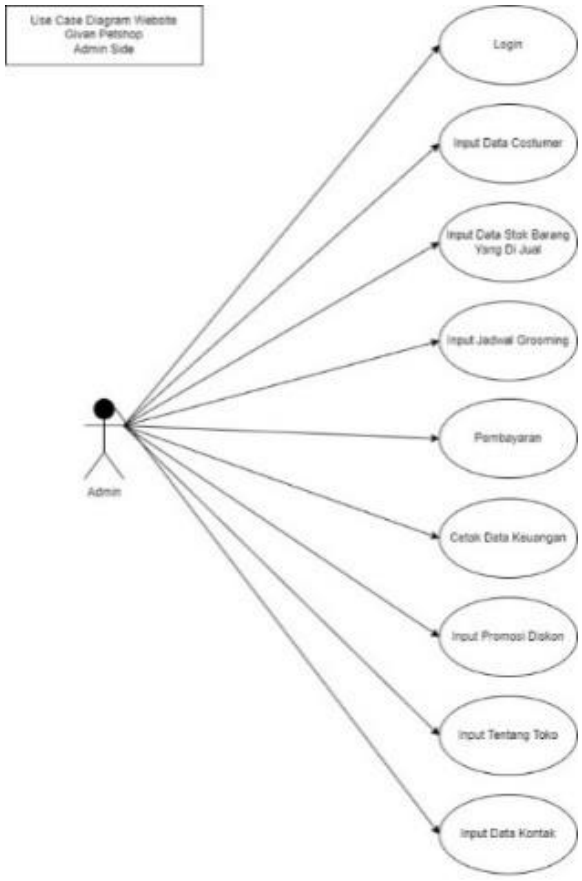

Figure 2. Admin Use Case Diagram

The admin use case diagram illustrates the full range of functionalities accessible to an administrator within the Givan Petshop Information System. These functionalities include logging into the system, entering and managing product data, monitoring stock levels, adding promotional offers or discounts, inputting sales records, printing sales reports, and managing store profile information such as "About Us" and contact details. This comprehensive access ensures that the admin can efficiently maintain the operational integrity of the platform and monitor all critical business activities in a centralized manner.

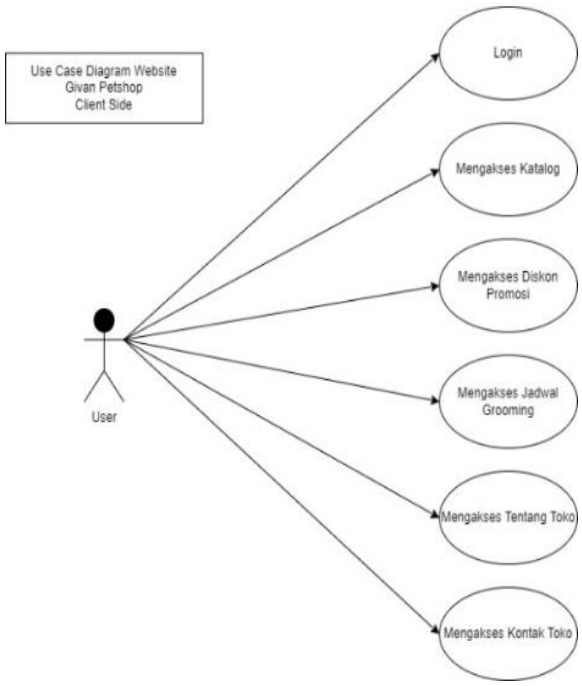

Figure 3. Client Use Case Diagram

The client use case diagram represents the key interactions available to users (clients) of the Givan Petshop platform. These interactions include the ability to log into the system, browse the product catalog, view current promotional offers, check the grooming service schedule, and access both store contact information and background descriptions. This set of features supports a smooth user experience by offering easy navigation and access to essential services and information tailored for customers.

3.2.2 Database Design

The database for the Givan Petshop Information System was developed using MySQL and consists of several primary tables designed for effective and structured data management. The tb_admin table stores administrator credentials, including the admin ID, username, and password. The tb_pembayaran table manages transaction records by capturing payment IDs, item IDs, customer IDs, payment dates, total amounts, and payment methods. The tb_customer table contains customer-related data, such as customer IDs, full names, and phone numbers.

The tb_stok table maintains product inventory information, including product names, categories, quantities in stock, and unit prices. For grooming services, the tb_grooming table tracks customer appointments, including customer names, pet types, selected services, service dates, and charges. Promotional information is stored in the tb_promo table, which includes promo names, descriptions, discount values, and the start and end dates of the promotions.

The tb_tentang table provides details about the business, such as the store description, address, email, and phone number. Meanwhile, the tb_kontak table stores contact information for customer support, including names, email addresses, and phone numbers. All table structures were carefully designed with appropriate data types to ensure data consistency, integrity, and efficient access and retrieval across the system.

3.3 Interface Design

This stage involves the development of user interface components to meet the operational needs of both administrators and end-users (clients). Each interface was designed with an emphasis on usability, responsiveness, and alignment with the system's functional goals, ensuring intuitive access and smooth navigation across all system features in the Givan Petshop Information System.

3.3.1 Admin Interface

The Login Page (Figure 4) serves as the entry point for administrators. It contains two input fields—username and password—and a login button. This page is designed to be minimalistic yet secure, providing a straightforward gateway for authorized personnel to access the system.

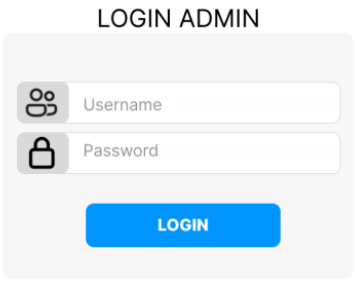

Figure 4. Admin Login Page

This figure illustrates the authentication interface where only verified administrators can log in to access system functionalities. The simple layout minimizes user error while enhancing security protocols.

Once authenticated, administrators are directed to the Dashboard (Figure 5), which summarizes financial information such as total income, expenses, and monthly trends through interactive charts and visual indicators. This dashboard supports real-time data monitoring and informed decision-making.

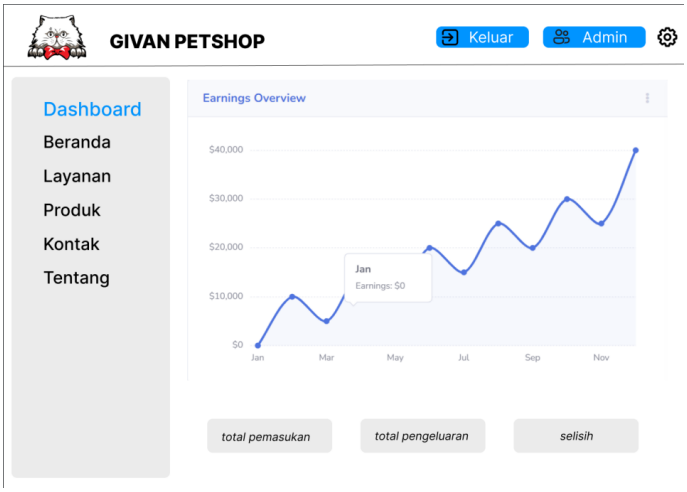

Figure 5. Admin Dashboard Page

The dashboard provides a consolidated overview of business performance. With visual cues and statistical summaries, it allows administrators to assess operational trends and make strategic choices effectively.

The Homepage (Figure 6) allows admins to manage promotional products. Through this interface, they can add new items for promotion, update promotion durations, or remove items once promotions expire or are no longer relevant.

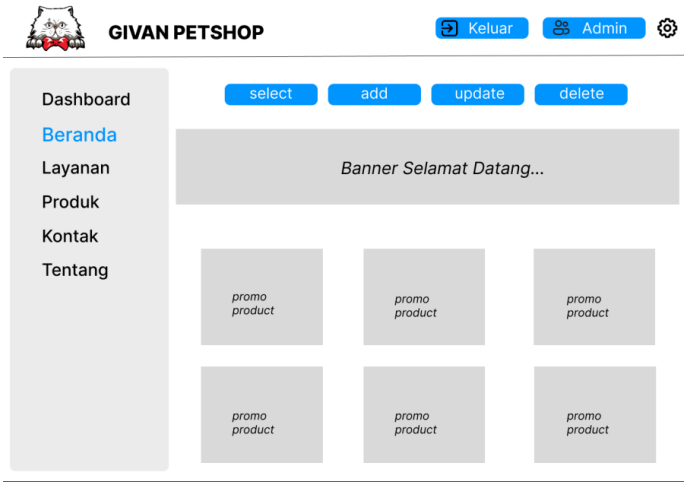

Figure 6. Admin Homepage

This figure highlights centralized promotion management. It empowers admins to maintain up-to-date promotional content and dynamically respond to marketing needs.

The Services Page (Figure 7) enables management of all service-related offerings such as grooming. Admins can add, modify, or delete services based on availability and relevance to customer demand.

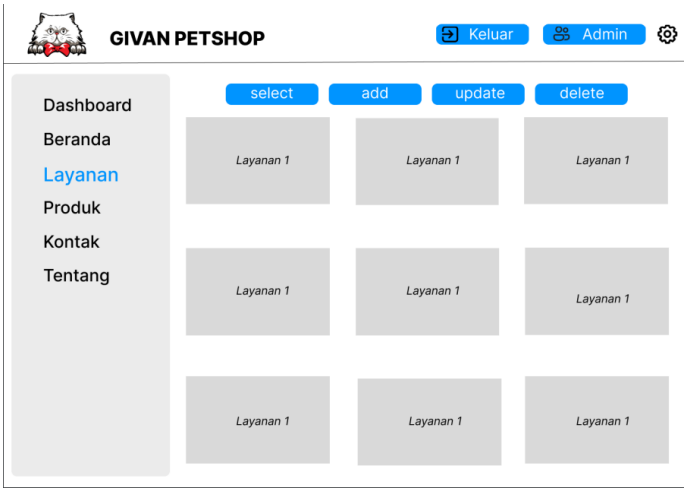

Figure 7. Admin Services Page

This interface ensures that the service catalog remains relevant, accurate, and aligned with customer expectations, enhancing operational flexibility.

The Products Page (Figure 8) displays all products available in the inventory, whether or not they are under promotion. Admins can perform CRUD operations (create, read, update, delete) directly from this page.

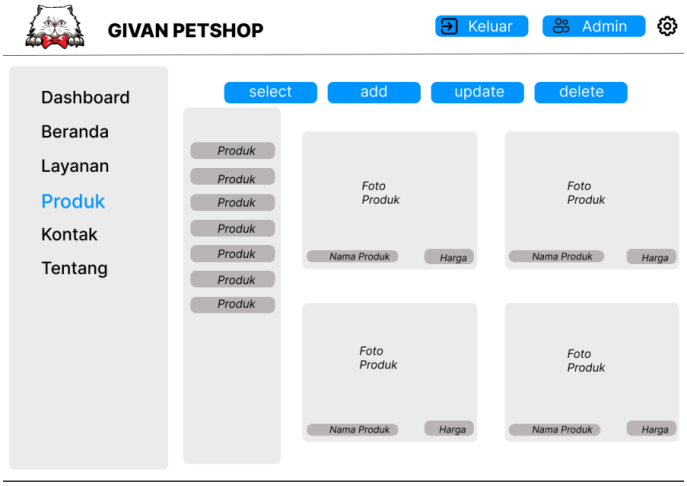

Figure 8. Admin Products Page

The product management interface allows for comprehensive control over inventory, ensuring that product data remains current and accurate.

Through the Contact Page (Figure 9), administrators can update store contact information such as email, phone number, and social media links. This page ensures that customers can always reach the store for inquiries or support.

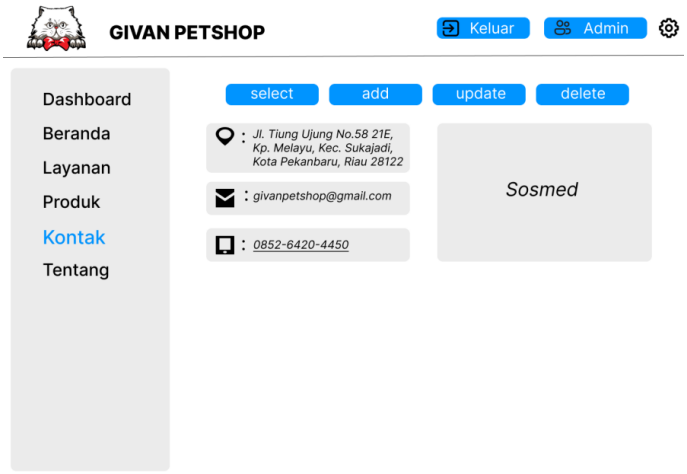

Figure 9. Admin Contact Page

The figure emphasizes the importance of maintaining open communication channels with customers, helping build trust and engagement.

Finally, the About Page (Figure 10) allows the admin to provide and update information about the store, including its business profile, vision, and mission statements. This content plays a critical role in establishing brand identity and credibility.

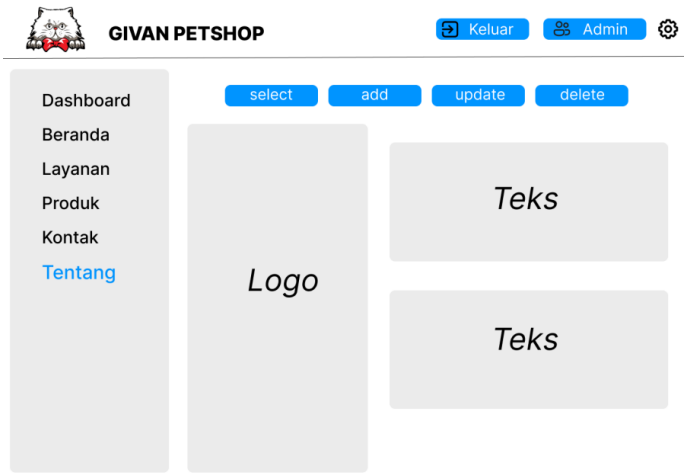

Figure 10. Admin About Page

This interface reinforces the store's values and goals to both existing and potential customers, supporting brand positioning and long-term relationship building.

3.3.2 User Interface

The Homepage for users (Figure 11) is the first screen that appears upon accessing the system. It prominently features current promotions, including

product images, descriptions, and promotional periods, providing immediate value to users.

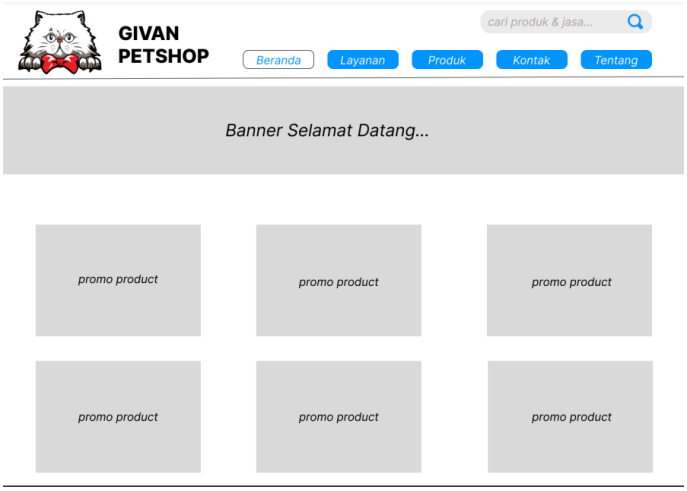

Figure 11. User Homepage

This layout is designed to attract attention to ongoing deals and create a positive first impression, encouraging user engagement from the outset.

The Services Page (Figure 12) presents a full list of grooming and pet care services offered by the store. Each service is clearly described to help users make informed decisions.

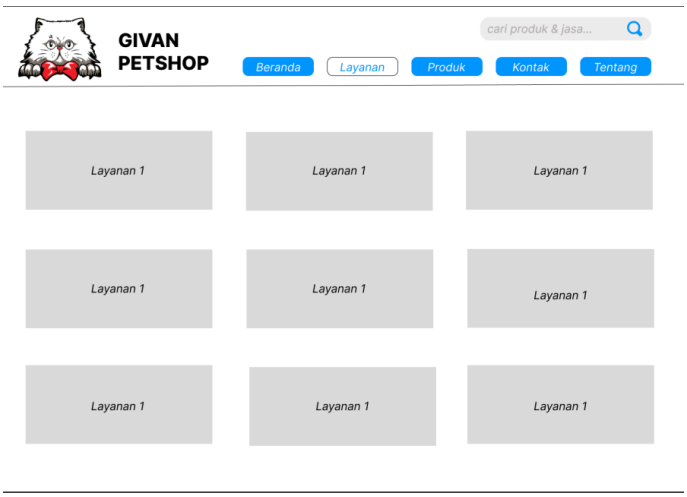

Figure 12. User Services Page

The figure showcases the system's ability to communicate service details transparently, helping users select options that meet their pet's needs.
The Products Page (Figure 13) provides users with a complete view of all available products. Each item is accompanied by images and pricing information to facilitate comparison and purchasing decisions.

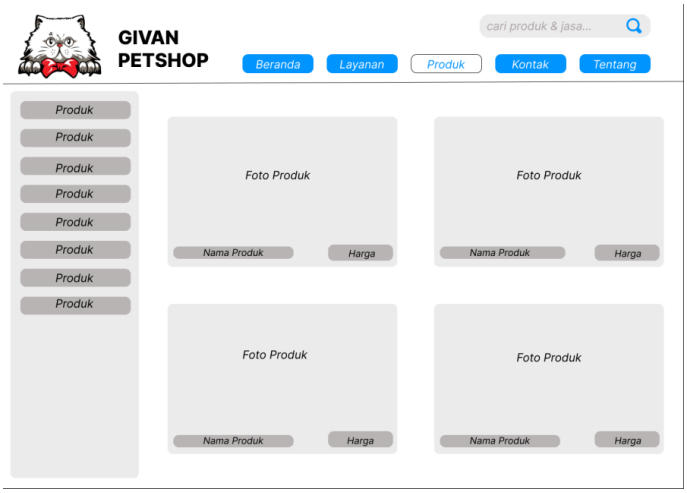

Figure 13. User Products Page

This user-friendly layout supports effective product browsing, allowing users to evaluate options visually and financially.

The Contact Page (Figure 14) lists essential contact information such as the store's address, telephone number, and social media links. This facilitates direct communication and access to additional updates.

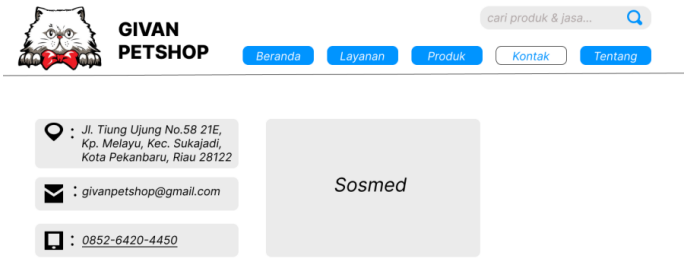

Figure 14. User Contact Page

The figure ensures that customers can connect with the store effortlessly, fostering trust and customer support accessibility.

Lastly, the About Page (Figure 15) outlines the store's background, including its mission, vision, and core values. This information enhances transparency and strengthens the emotional connection between the store and its customers.

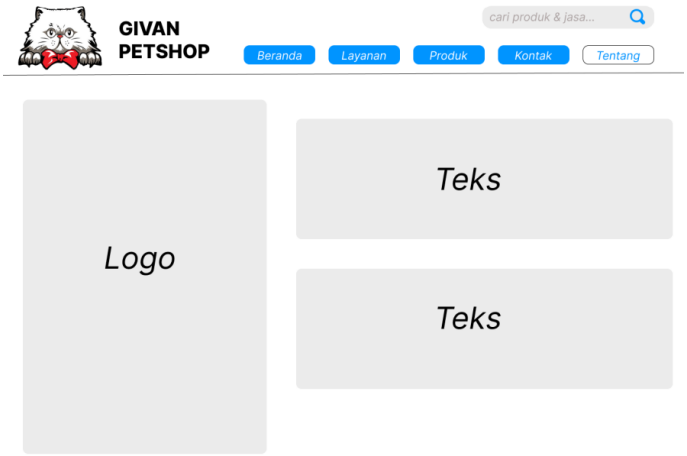

Figure 15. User About Page

This page helps users better understand the business, which can increase loyalty and confidence in the store's services and products.

3.4 Discussion

The development of the Givan Petshop Information System demonstrates the application of structured system analysis and design principles to enhance operational efficiency and user experience. The sequential linear method adopted in this study ensured a systematic flow from requirement analysis to interface deployment, resulting in a functional and scalable web-based application.

From a technical standpoint, the use of modern technologies such as MySQL for database management and Visual Studio Code for development aligned with best practices in web application development. The modular structure of the database—consisting of tables for users, payments, products, services, promotions, and store information—supports data integrity, scalability, and ease of maintenance. This structure reflects the recommendations from prior studies on information system architecture [31]–[33].

The use case diagrams effectively capture the distinct roles of administrators and clients. The admin interface integrates comprehensive management tools for product input, inventory control, promotional management, and transaction processing. This level of functionality addresses the operational complexity faced by small- to medium-sized retail businesses [34]. In contrast, the client interface was designed for accessibility, focusing on intuitive browsing and information transparency, which are key factors in enhancing customer satisfaction and engagement.

In terms of usability, the interface was developed with a focus on clarity and responsiveness. Admins are provided with analytical tools like dashboards and

financial summaries, enabling real-time decision-making. For end users, the interface allows easy access to essential services such as promotions, grooming schedules, and contact information. The design principles employed are in line with established usability heuristics, ensuring the system is intuitive and minimizes user error.

Moreover, this study emphasizes the importance of integrating business profiles and contact visibility into digital platforms. Features such as the "About" and "Contact" pages not only increase transparency but also contribute to building trust with potential clients. Prior research has highlighted that providing contextual information about businesses enhances credibility and user retention [35]–[38].

However, this study has certain limitations. The system was tested in a controlled development environment and not yet deployed in a real-world setting with actual users. Usability testing involving real customers and staff members could yield deeper insights into performance, responsiveness, and acceptance. Furthermore, scalability tests under high traffic conditions were not conducted.

For future research, it is recommended to implement automated analytics for user behavior, integrate mobile compatibility, and explore cloud-based deployment for improved accessibility and performance. A comparative study involving similar systems in other industries could also provide a broader validation of the design approach used.

4. Conclusion

This study successfully developed the Givan Petshop Information System using a sequential linear method that involved systematic stages of analysis, design, implementation, and interface development. The resulting web-based application effectively meets the operational needs of the business by providing a centralized platform for managing inventory, promotions, grooming services, sales transactions, and customer engagement. The system offers a dual interface: one for administrators, which includes comprehensive management tools and real-time dashboards, and another for users, which emphasizes accessibility, clarity, and convenience. The integration of detailed database design and structured interface layout supports ease of use, data accuracy, and efficient workflow, ultimately contributing to enhanced business operations and customer experience.

However, the research has several limitations. The system was only tested in a development environment and has not yet undergone live deployment with actual end users. Additionally, the performance of the system under high user traffic conditions remains untested. Usability evaluations were conducted from

a design and functionality perspective, but did not involve empirical feedback from real customers or store staff.

Future research should focus on conducting user acceptance testing (UAT) to evaluate real-world usability and satisfaction. It is also recommended to implement mobile responsiveness to expand access across device types, and to explore cloud-based deployment for scalability and enhanced performance. Furthermore, integrating features such as automated notifications, real-time analytics, or AI-based product recommendations could further optimize system functionality and user engagement.

Author's declaration

Author contribution

Jefri Ramadi contributed to the overall system design and led the manuscript preparation. **A Walfajri Fachriza** was responsible for the development and integration of the application's backend components. **Dhifa Arifan** managed the interface design and conducted testing for user experience. **Rafael Oscar** participated in the database design and data flow modeling. **Yogi Wahyu** contributed to the analysis of system requirements and coordinated the documentation of the project.

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Competing interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Ethical clearance

This study did not involve any human participants, animals, or sensitive data that require ethical approval.

AI statement

Artificial intelligence tools, including ChatGPT by OpenAI, were used to assist in improving the structure, clarity, and language of the manuscript. All content was reviewed and verified by the authors to ensure accuracy and integrity.

Publisher's and Journal's note

Universitas Negeri Padang as the publisher and Editor of Jurnal Vokasi Informatika (JAVIT) state that there is no conflict of interest towards this article publication.

References

[1] G. U. Akpan *et al.*, "Conclusions of the African Regional GIS Summit (2019): using geographic information systems for public health decision-making," *BMC Proc.*, vol. 16, no. 1, pp. 1–24, Apr. 2022, https://doi.org/10.1186/s12919-022-00233-y.

[2] K. Aggarwal *et al.*, "Marketing information system based on unsupervised visual data to manage transportation industry using signal processing," *Expert Syst.*, vol. 42, no. 1, p. e13384, Jan. 2023, https://doi.org/10.1111/exsy.13384.

[3] M. Javaid, A. Haleem, R. P. Singh, and A. K. Sinha, "Digital economy to improve the culture of industry 4.0: A study on features, implementation and challenges," *Green Technol. Sustain.*, vol. 2, no. 2, p. 100083, May 2024, https://doi.org/10.1016/j.grets.2024.100083.

[4] V. N. Annapareddy, "The Intersection of Big Data, Cybersecurity, and ERP Systems: A Deep Learning Perspective," *J. Artif. Intell. Big Data Discip.*, vol. 2, no. 1, pp. 45–53, Mar. 2025, https://doi.org/10.70179/Z385T072.

[5] X. Li, Y. Tian, P. Ye, H. Duan, and F. Y. Wang, "A Novel Scenarios Engineering Methodology for Foundation Models in Metaverse," *IEEE Trans. Syst. Man, Cybern. Syst.*, vol. 53, no. 4, pp. 2148–2159, Apr. 2023, https://doi.org/10.1109/TSMC.2022.3228594.

[6] L. D. Williams, "Concepts of Digital Economy and Industry 4.0 in Intelligent and information systems," *Int. J. Intell. Networks*, vol. 2, pp. 122–129, Jan. 2021, https://doi.org/10.1016/j.ijin.2021.09.002.

[7] A. Torab-Miandoab, T. Samad-Soltani, A. Jodati, and P. Rezaei-Hachesu, "Interoperability of heterogeneous health information systems: a systematic literature review," *BMC Med. Inform. Decis. Mak.*, vol. 23, no. 1, pp. 1–13, Dec. 2023, https://doi.org/10.1186/s12911-023-02115-5.

[8] S. Huang and K. C. Desouza, "The new management logic of digital megaprojects: An agenda for information systems research," *J. Strateg. Inf.*

Syst., vol. 34, no. 3, p. 101911, Sep. 2025, https://doi.org/10.1016/J.JSIS.2025.101911.

[9] K. Gupta, D. Oladimeji, C. Varol, A. Rasheed, and N. Shahshidhar, "A Comprehensive Survey on Artifact Recovery from Social Media Platforms: Approaches and Future Research Directions," *Inf.*, vol. 14, no. 12, p. 629, Nov. 2023, https://doi.org/10.3390/info14120629.

[10] S. Hasan and S. Panda, "From Shelves to Servers: Revamping Collection Development Policies for a Digital-First Approach," *SSRN Electron. J.*, Apr. 2025, https://doi.org/10.2139/SSRN.5257996.

[11] A. Aurelio and V. S. di Carlo, "Digital Demonstrators' Development," *Eur. Green Deal Educ.*, pp. 109–123, Jan. 2024, https://doi.org/10.4324/9781003492597-10.

[12] A. M. Shah, W. Muhammad, K. Lee, and R. A. Naqvi, "Examining different factors in web-based patients' decision-making process: Systematic review on digital platforms for clinical decision support system," *Int. J. Environ. Res. Public Health*, vol. 18, no. 21, p. 11226, Oct. 2021, https://doi.org/10.3390/ijerph182111226.

[13] A. Kalinin, R. Rudnik, A. Tsvetov, K. Bondarenko, and A. Shuranova, "Emerging Markets Decoded 2024," *SSRN Electron. J.*, Jun. 2024, https://doi.org/10.2139/ssrn.4862785.

[14] A. Durand-Morat, W. Mulimbi, and S. Bairagi, "International Rice Outlook_ International Rice Baseline Projectio," *AAES Res. Reports Res. Bull.*, no. May, May 2023, Accessed: Jul. 03, 2025. [Online]. Available: https://scholarworks.uark.edu/aaesrb/58.

[15] D. Kretzschmann, G. Park, A. Berti, and W. M. P. van der Aalst, "Overstock Problems in a Purchase-to-Pay Process: An Object-Centric Process Mining Case Study," *Lect. Notes Bus. Inf. Process.*, vol. 521, pp. 347–359, 2024, https://doi.org/10.1007/978-3-031-61003-5_29.

[16] D. O. Hassan and B. A. Hassan, "A comprehensive systematic review of machine learning in the retail industry: classifications, limitations, opportunities, and challenges," *Neural Comput. Appl.*, vol. 37, no. 4, pp. 2035–2070, Dec. 2024, https://doi.org/10.1007/s00521-024-10869-w.

[17] F. E. Putra, M. Khasanah, and M. R. Anwar, "Optimizing Stock Accuracy with AI and Blockchain for Better Inventory Management," *ADI J. Recent Innov.*, vol. 6, no. 2, pp. 190–200, Mar. 2025, https://doi.org/10.34306/AJRI.V6I2.1200.

[18] A. Ngoma and B. Getrude Mutono-Mwanza, "Evaluating the Effectiveness of Inventory Management Systems in Local Government: A Case Study of Nchelenge Town Council," *African J. Manag. Bus. Res.*, vol. 18, no. 1, pp. 167–180, Feb. 2025, https://doi.org/10.62154/AJMBR.2025.018.010574.

[19] M. Paramesha, N. Rane, and J. Rane, "Big data analytics, artificial

intelligence, machine learning, internet of things, and blockchain for enhanced business intelligence," *SSRN Electron. J.*, vol. 1, no. 2, pp. 110–133, Jul. 2024, https://doi.org/10.2139/ssrn.4855856.

[20] T. Balaji, V. Hari, S. Lathifunnisa, P. Ganesh, and P. Arupya, "Optimizing Web-based Inventory Management system using QR code Technology," *Proc. Int. Conf. Circuit Power Comput. Technol. ICCPCT 2024*, pp. 751–756, 2024, https://doi.org/10.1109/ICCPCT61902.2024.10673103.

[21] F. Ugbebor, M. Adeteye, and J. Ugbebor, "Automated Inventory Management Systems with IoT Integration to Optimize Stock Levels and Reduce Carrying Costs for SMEs: A Comprehensive Review," *J. Artif. Intell. Gen. Sci. ISSN3006-4023*, vol. 6, no. 1, pp. 306–340, Nov. 2024, https://doi.org/10.60087/JAIGS.V6I1.257.

[22] C. K. Lim, "E-pet service apps for Kampar residential mobile application," 2024.

[23] C. A. Suárez, W. A. Guaño, C. C. Pérez, and H. Roa-López, "Multi-objective optimization for perishable product dispatch in a FEFO system for a food bank single warehouse," *Oper. Res. Perspect.*, vol. 12, p. 100304, Jun. 2024, https://doi.org/10.1016/j.orp.2024.100304.

[24] A. dos S. Formiga and V. Silveira Júnior, "Effects of gaseous hydrogen peroxide on quality, shelf life and distribution management strategy F.E.F.O. (first expired, first out) of guavas cv. Pedro Sato," *Food Control*, vol. 165, p. 110677, Nov. 2024, https://doi.org/10.1016/j.foodcont.2024.110677.

[25] F. Pausan, "Designing a customizable product lifecycle management system for an SME to reach data singularity," 2021.

[26] T. Saharinen, "Success factors of digitalization and process optimization in indirect procurement categories : development of a stronger function," 2025, Accessed: Jul. 03, 2025. [Online]. Available: https://lutpub.lut.fi/handle/10024/169270.

[27] A. Mishra and Y. I. Alzoubi, "Structured software development versus agile software development: a comparative analysis," *Int. J. Syst. Assur. Eng. Manag.*, vol. 14, no. 4, pp. 1504–1522, Aug. 2023, https://doi.org/10.1007/s13198-023-01958-5.

[28] J. Leong, K. May Yee, O. Baitsegi, L. Palanisamy, and R. K. Ramasamy, "Hybrid Project Management between Traditional Software Development Lifecycle and Agile Based Product Development for Future Sustainability," *Sustain.*, vol. 15, no. 2, p. 1121, Jan. 2023, https://doi.org/10.3390/su15021121.

[29] S. Sotnik, V. Manakov, and V. Lyashenko, "Overview: PHP and MySQL Features for Creating Modern Web Projects," *International Journal of Academic Information Systems Research*, vol. 7, no. 1. IJAISR, pp. 11–17, 2023. Accessed: Jul. 03, 2025. [Online]. Available: www.ijeais.org/ijaisr.

[30] E. M. Arvanitou, A. Ampatzoglou, A. Chatzigeorgiou, and J. C. Carver, "Software engineering practices for scientific software development: A systematic mapping study," *J. Syst. Softw.*, vol. 172, p. 110848, Feb. 2021, https://doi.org/10.1016/j.jss.2020.110848.

[31] C. Wu, F. Wu, Y. Huang, and X. Xie, "Personalized News Recommendation: Methods and Challenges," *ACM Trans. Inf. Syst.*, vol. 41, no. 1, Jan. 2023, https://doi.org/10.1145/3530257.

[32] K. Shih, Y. Han, and L. Tan, "Recommendation System in Advertising and Streaming Media: Unsupervised Data Enhancement Sequence Suggestions," Mar. 2025, Accessed: Jul. 03, 2025. [Online]. Available: http://arxiv.org/abs/2504.08740.

[33] H. Xia, Z. Liu, M. Efremochkina, X. Liu, and C. Lin, "Study on city digital twin technologies for sustainable smart city design: A review and bibliometric analysis of geographic information system and building information modeling integration," *Sustain. Cities Soc.*, vol. 84, p. 104009, Sep. 2022, https://doi.org/10.1016/j.scs.2022.104009.

[34] H. Kim, "Performance from building smart factories of small- and medium-sized enterprises: the moderating effects of product complexity and company size," *Int. J. Oper. Prod. Manag.*, vol. 42, no. 10, pp. 1497–1520, Sep. 2022, https://doi.org/10.1108/IJOPM-10-2021-0654.

[35] A. Felix and G. D. Rembulan, "Analysis of Key Factors for Improved Customer Experience, Engagement, and Loyalty in the E-Commerce Industry in Indonesia," *APTISI Trans. Technopreneursh.*, vol. 5, no. 2Sp, pp. 196–208, Sep. 2023, https://doi.org/10.34306/att.v5i2sp.350.

[36] T. T. Le, "Corporate social responsibility and SMEs' performance: mediating role of corporate image, corporate reputation and customer loyalty," *Int. J. Emerg. Mark.*, vol. 18, no. 10, pp. 4565–4590, Nov. 2023, https://doi.org/10.1108/IJOEM-07-2021-1164.

[37] R. K. Behera, P. K. Bala, and A. Ray, "Cognitive Chatbot for Personalised Contextual Customer Service: Behind the Scene and beyond the Hype," *Inf. Syst. Front.*, vol. 26, no. 3, pp. 899–919, Jul. 2024, https://doi.org/10.1007/s10796-021-10168-y.

[38] B. Li, S. Mousa, J. R. R. Reinoso, H. M. Alzoubi, A. Ali, and A. D. Hoang, "The role of technology innovation, customer retention and business continuity on firm performance after post-pandemic era in China's SMEs," *Econ. Anal. Policy*, vol. 78, pp. 1209–1220, Jun. 2023, https://doi.org/10.1016/j.eap.2023.05.004.