ISSN: 3026-4596
Journal of Computer-based Instructional Media, Vol. 2, No. 2, pp. 54-68, 2024

Unlocking the limitedness on promotion: Augmenting a web-based mobile promotional media for delivery services at a homeware company

Normaliza[1], Novi Hendri Adi*[1], Weni Lestari Putri[1] and Win Thu Zar[2]

[1] Department of Informatic Engineering, Universitas Ibnu Sina, **Indonesia**
[2] Department of Electronic Engineering, Yangon Technological University, **Myanmar**

*Corresponding Author: novihendriadi@gmail.com
Received 16th August 2024; Revised: 06th October 2024; Accepted: 09th October 2024

https://doi.org/10.58712/jcim.v2i2.131

Abstract: As information technology develops, the utilization of the internet as a business platform has increased significantly, allowing companies to promote their products and services more widely and efficiently. This research explores the development of a mobile website for a homeware company in Batam, which currently relies on online platforms such as Shopee and Tokopedia. This dependency causes limitations in reaching customers optimally. Therefore, this research proposes the development of mobile web-based promotional media using the Waterfall method, which includes the stages of need analysis, system design, implementation, testing, and maintenance. This method was chosen to ensure a systematic approach in designing and developing a responsive and appropriate website. Using Unified Modeling Language (UML) in system design possibly allows clear visualization and effective stakeholder communication. The implementation conducted by employing PHP, MySQL, and CodeIgniter framework resulted in a website which is expected to be able to fulfil the functional and non-functional needs of the company. The results show that developing this mobile web-based promotion system can potentially increase the company's market reach and operational efficiency as well as provide easy access for customers. This research provides an innovative model for similar companies to adopt digital technology to improve their business competitiveness.

Keywords: Information technology; Digital promotion; Mobile-based website; System development; Decent work and economic growth

1. Introduction

Along with the rapid development of technology, the utilization of information technology facilities as a business platform is increasingly widespread (Shree et al., 2021; Şimşek et al., 2022). The Internet now serves as an effective branding and promotion medium and a marketing tool to increase transactions, sales, and purchases for large companies and home industries (Yim, 2020). Internet technology, primarily through websites, makes it easier to order goods and services with access that can be done from various devices connected to the Internet, such as computers and smartphones. Websites have evolved into a significant promotion, sales, and service provision tool in Indonesia, as seen in companies operating in the field of household appliances in Batam (Dewi et al., 2022).

In this modern era, almost every institution worldwide has a website for information, communication, and promotion of their business activities (Fraccastoro et al., 2021; Melović et al., 2020). One of the main advantages of the Internet is its ability to reach global markets without distance, space, or time constraints (Luo, 2021; F. Wang, 2020). The company, which operates in the homeware sector and is located in Batam, has not optimally utilized digital promotional media. Observations in November 2022 showed that companies operating in the homeware sector still rely on online store platforms such

as Shopee and Tokopedia for promotion and sales. As a result, information about products and companies is less accessible to customers from within and outside the region.

Additionally, existing websites such as Shopee and Tokopedia provide essential functions, including product catalogs and some company information, but lack the personalized customer engagement and brand representation that can help differentiate companies in a competitive market. The new website differentiation to be developed offers several key advantages: stronger brand identity, more personalized customer engagement, better mobile accessibility, and better operational efficiency through integrated data management. These improvements make it easier for the company to attract and retain customers while expanding its reach globally.

Therefore, it is necessary to develop a mobile website to improve the service and promotional reach of companies operating in household appliances. Several previous studies have shown that the development of promotional media systems, such as those conducted by (Florido-Benítez, 2022; Laitala et al., 2021), can expand promotion and increase sales through applications and websites. The Waterfall method, which includes the stages of requirements analysis, system design, implementation, testing, and maintenance, will be applied in the design of this promotional media (Prasetya et al., 2023; Rahim et al., 2024; Samala et al., 2024).

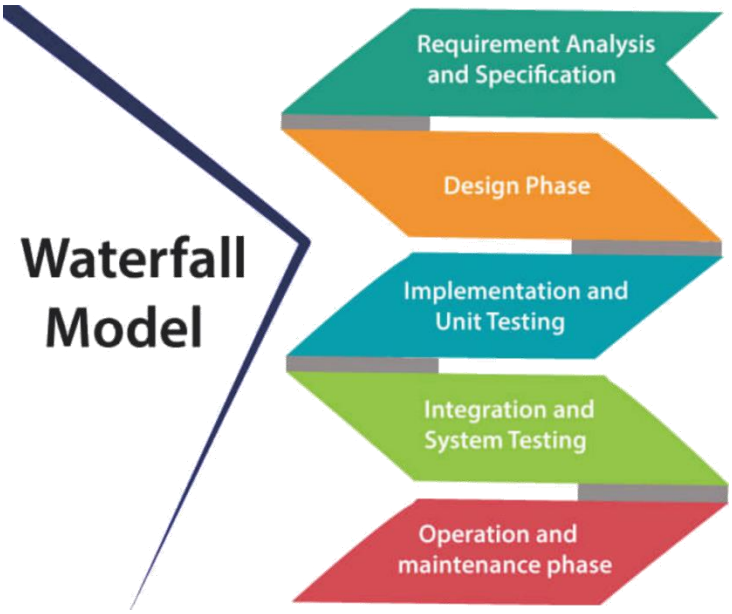
Based on this study, the authors identified an opportunity to provide an innovative solution in website design for a home appliance company. This research contributes by providing a data-driven approach to improve the effectiveness of promotion and service delivery. Besides that, the proposed website design is expected to improve user experience and operational efficiency by integrating responsive web and mobile technologies. By addressing both functional and non-functional needs, this solution can optimize the company's performance and expand market reach while offering ease of access for customers. Implementing this strategy can also be a model for companies in similar industries to adopt digital technology to improve their business competitiveness.

2. Methods

The researcher used the Unified Modeling Language (UML) design methodology and the Waterfall model for software development. UML, which is a graphical language used to visualize, specify, build, and document object-oriented software systems, plays an essential role in representing various aspects of software development (Abdelnabi et al., 2021; Ulia et al., 2024; X. Wang et al., 2021). Unlike programming languages, UML facilitates mapping software models to programming languages such as Java, thus streamlining the development process (Niarman et al., 2023). This is particularly important in creating artifacts, including models and descriptions, that are relevant to business processes and software systems (Primawati et al., 2024).

The Unified Modeling Language (UML) is crucial for a system analyst (Kusuma et al., 2023). UML provides various benefits, including managing system complexity, detecting potential errors during implementation, and explaining how the system works to stakeholders. UML includes different types of diagrams that each have specific functions. Use case diagrams to describe the interactions between actors and the system, focusing on variations and error sequences. Activity diagrams model the conditions or states in a system process, highlighting the relationships between certain aspects of system behavior. Sequence diagrams depict interactions between objects as temporally ordered messages, with the vertical dimension indicating time and the horizontal dimension indicating related objects. On the other hand, class diagrams describe a set of objects in terms of similar attributes, operations, methods, relationships, and behaviors.

Figure 1.
Waterfall model



In applying the waterfall method presented in Figure 1, some stages must be passed. The first stage is analysis, where system requirements are analyzed starting from the existing system, the problems faced, and functional and non-functional requirements. This process involves data collection, processing, and system and problem analysis. The second stage is system design, where system design is done by utilizing UML, including a use case diagram, activity diagram, sequence diagram, and class diagram. This stage also includes designing UML models, databases, table structures, and interfaces. After that, the writing of program code involves implementing the design into the software using the PHP programming language and MySQL database with the CodeIgniter framework. Program testing uses black box testing to ensure the results match the design expectations. The deployment stage includes limitations, software implementation, database, interface, program installation, and program use and maintenance. Finally, conclusions are drawn after the system has been successfully built, assessing whether the objectives have been achieved.

3. Results and discussion

3.1 Requirement analysis

Based on documentation and an interview with one of the employees of a company operating in the field of household appliances, a comprehensive overview of the company was obtained, including information on marketing methods and products offered. The data collected includes primary information from direct interviews and secondary data obtained from archives, files, and images, complementing the primary information to design the system. Data was processed by analyzing the collected data to design a mobile web-based promotional media. This process involves in-depth analysis, designing according to user needs, and testing the application to ensure its effectiveness.

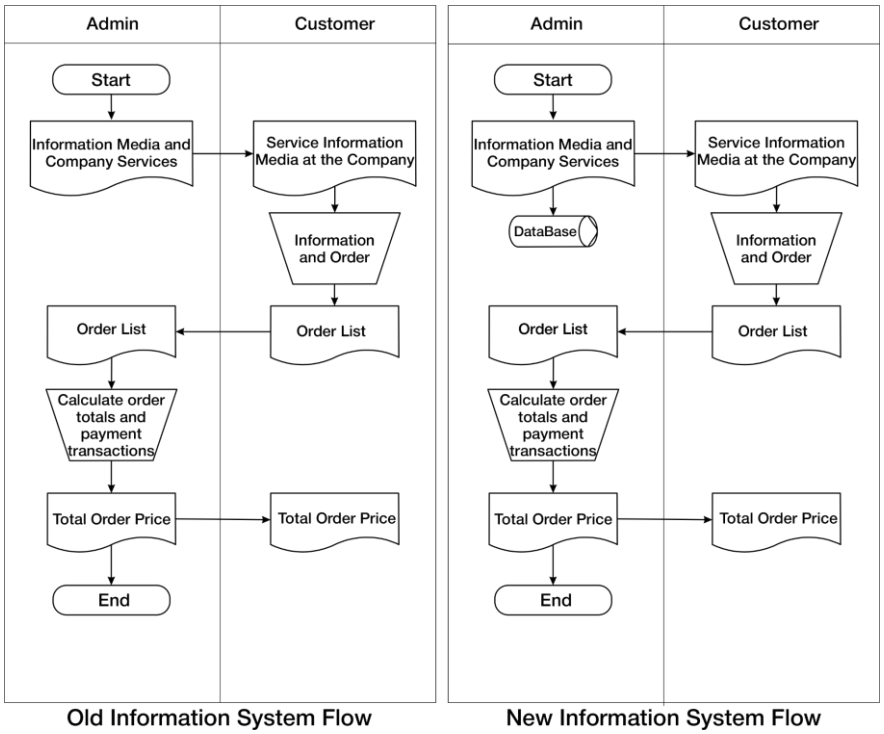
System analysis breaks down the information system into critical components to identify and evaluate problems, opportunities, and obstacles. The system to be developed is a web-based application that uses PHP as a server programming language and MySQL as a database. It also utilizes the CodeIgniter framework to facilitate development and maintenance. Analysis of the problem reveals that companies operating in the field of household appliances do not yet have effective promotional media, such as company profile websites, which results in customers not knowing the company's existence. Promotion still relies on online platforms with limited product information. The main problem is designing and implementing mobile web-based promotional media for the company.

The non-functional requirements analysis showed that the system must have an easy-to-use interface (usability), security features that include login and logout (security), and good data organization to facilitate information search (flexibility). Meanwhile, the functional requirements analysis details the minimum elements required, including the ability for admins to manage data and promotional media, as well as functions for members and general users to view data and conduct transactions.

3.2 Information system flow

Information system analysis involves a thorough evaluation to ensure the fulfillment of functional and non-functional needs and identify opportunities for improvement. Figure 2 compares the old and new systems in developing web-based and mobile promotional media for delivery services in a home appliance company.

Figure 2. Information system flow



The old information system had two parallel flows for 'Admin Start and Company Services' and 'Customer Service Information Media at the Company.' The admin process included calculating the order total and payment transactions, leading to 'Order Price' and 'End.' On the customer side, the flow goes directly from 'Information and Order' to 'Order List,' ending at 'End.'

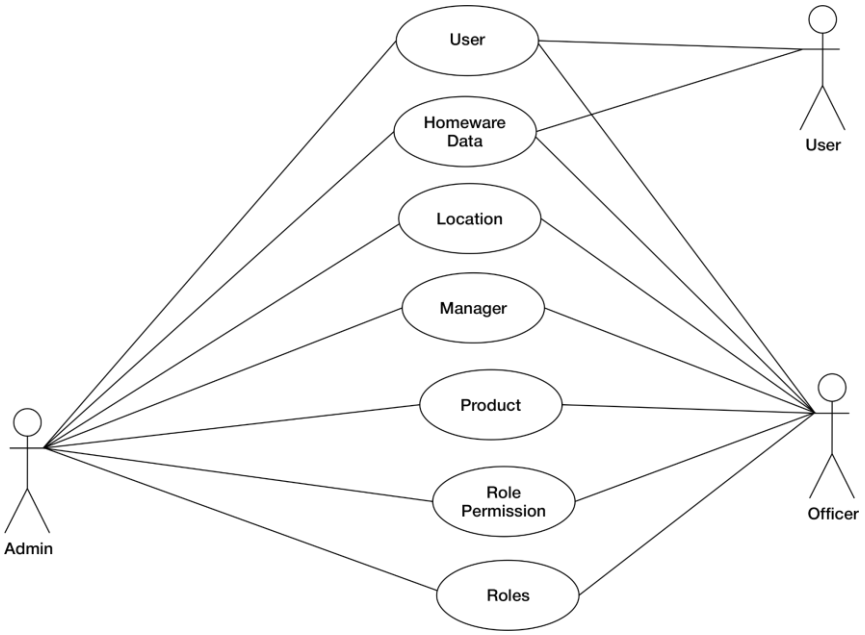
The new information system introduces a database as an intermediary between the admin and customer processes. On both sides, after starting at 'Admin Start and Company Services' or 'Customer Service Information Media at the Company,' there is a step to interact with the database before calculating the order total or creating an order list. This shows the integration of data management into the service delivery process.

Figure 2, showing the information system flow, is relevant because it visually illustrates how a company specializing in home appliances can expand its information system by incorporating web-based mobile technology. The new system appears to streamline operations by centralizing data storage and access, which can improve efficiency in processing orders and managing transactions (Aoun et al., 2021). This aligns with research on expanding promotional media for service delivery, indicating a shift towards more integrated digital solutions in business practices (Caliskan et al., 2021).

3.3 Use case diagram

Use Case Diagram of Promotional Media shows the interactions between various actors and system functions in expanding web-based and mobile promotional media for service delivery in companies engaged in household appliances.

Figure 3. Use case diagram of promotional media



The Use Case Diagram in Figure 3 includes actors such as 'User,' 'Admin,' and 'Officer,' as well as system functions such as 'Homeware Data,' 'Location,' 'Manager,' 'Product,' 'Role Permission,' and 'Roles.' The lines connecting actors to these functions show their interaction or relationship with each function.

Table 1. Definition of user roles in the promotional media use case diagram

Role	Description
Admin	The admin user can display data, bank, brand, customer page, category, cart, login attempts, menu, menu group, order details, product, courier king, setting, setting limit slider, size, user, user role, and color. Admin users can record data when making changes, adding, deleting, and searching data.
Member	Member users display brand data, customers, categories, orders, order details, products, and Rajaongkir courier. After prospective members register, they can place order transactions on the system.
General user	Member users can search and order goods according to the data on the system.

This diagram illustrates how various users would interact with a web-based mobile platform designed to promote homeware products. 'User' can access homeware data and location information, indicating features such as viewing product catalogs or finding store locations. 'Admin' has connections to all functions, which suggests comprehensive control over management aspects of the platform, such as overseeing product listings, managing roles and permissions, etc. Finally, 'Officer' appears to have specific roles in managing products or permissions within the platform.

Table 2. Definition of promotional website use case diagram

No	Use case	Description
1	Bank	This is the process of entering, editing, or deleting bank data done by the admin.
2	Brand	It is the process of entering, editing, or deleting brand data done by the admin.
3	Customer	It is the process of entering, editing, or deleting customer data done by the admin.
4	Page	This is the process of entering, editing or deleting page data done by the admin.
5	Category	Is the process of entering, editing, or deleting category data done by the admin
6	Cart	Is the process of entering, editing, or deleting cart data done by the admin
7	Login attempts	Is the process of entering, editing, or deleting login attempts made by the admin
8	Menu	Is the process of entering, editing, or deleting menu data performed by the admin
9	Group menu	Is the process of entering, editing, or deleting the group menu by the admin
10	Order	Is the process of entering, editing, or deleting order data performed by the admin
11	Order detail	This is the process of the admin entering, editing, or deleting order detail data.
12	Product	Is the process of entering, editing, or deleting product data done by the admin
13	Courier king	This is the admin's entering, editing or deleting courier kings.
14	Setting	This is the process of entering, editing, or deleting settings done by the admin.
15	Limit setting	This is the process of entering, editing, or deleting limit settings done by the admin.
16	Slider	This is the process of entering, editing or deleting sliders done by the admin.
17	Size	The admin enters, edits, or deletes size data.
18	User	Is the process of entering, editing, or deleting user data done by the admin
19	User role	Is the process of entering, editing, or deleting user role data performed by the admin
20	Color	Is the process of entering, editing, or deleting color data done by the admin

3.4 Activity diagram

This activity diagram illustrates part of the backend process for managing product information in promotional media applications. The Admin role involves selecting and loading product data into the application, which is then displayed by the system to the user. Simultaneously, this data is stored in the system and entered into the database for persistent storage. This ensures that users have access to the latest information about the homeware products offered by the company through their web-based mobile platform.

Figure 4. Product activity diagram

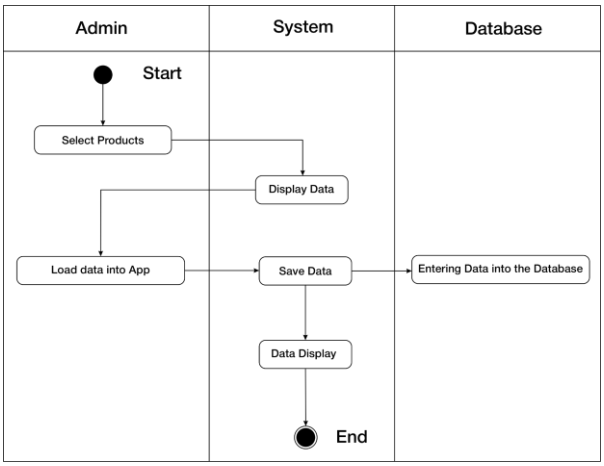
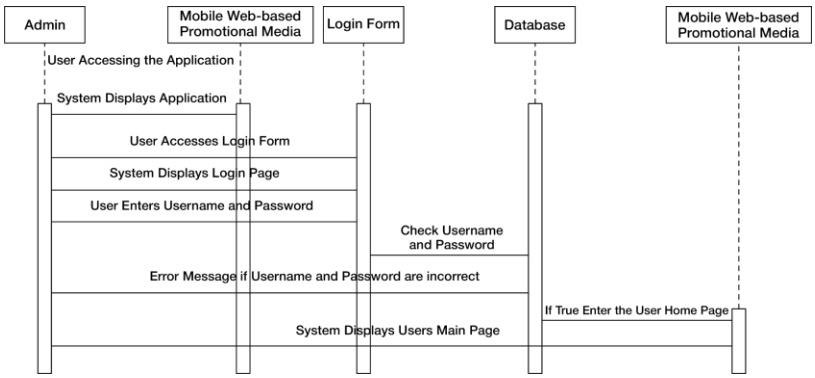


Figure 4 presents the Product Activity Diagram where Admin, System, and Database are in the process of managing products. The admin starts the process by selecting a product. This action leads to two parallel activities: 'Load data into App' under Admin and 'Display Data' under the system. From 'Load data into App,' the flow continues to 'Save Data' under the system, which then connects to 'Entering Data into the Database' under the database. The system also directly flows from 'Display Data' to 'Display Data.' Finally, all actions converge at the endpoint, marked as 'End.' This diagram is relevant because it visually outlines the product data management process, which is essential for understanding how product information is integrated and presented in web-based and mobile promotional media, which is the main focus of this research.

3.5 Sequence diagram

Sequence Diagram for Promotional Media' shows the interaction between Admin, Mobile Web-based Promotional Media, Login Form, Database, and Mobile Web-based Promotional Media as entities in the system.

Figure 5. Sequence diagram for promotional media

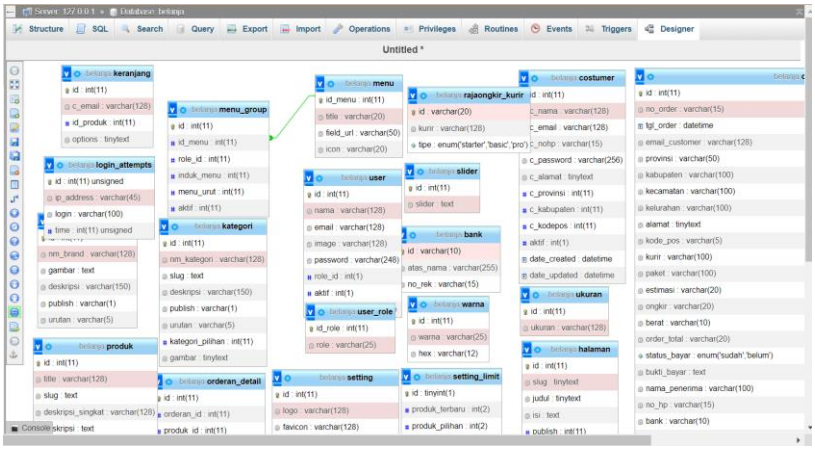


The process starts with 'User Accessing the Application' under admin and ends with 'If True Enter the User Home Page' under Mobile Web-based Promotional Media. This diagram shows the messages sent between these entities, such as 'User Accesses Login Form,' 'System Displays Login Page,' 'User Enters Username and Password,' followed by a condition check against the database for the correctness of the username and password. If incorrect, an error message is displayed; if correct, the system displays the main page.

Specifically, this diagram details user authentication as a critical step to access a personalized service or promotion within a home appliance company's web-based mobile platform. This sequence ensures secure access to the promotional medium by validating the user's credentials against the database before

granting access to the main page customized for the authenticated user. This diagram is relevant as it visually outlines the user authentication process, which is essential for understanding how users can access personalized services in web-based and mobile promotional media, which is the main focus of this research.

Figure 6. Class diagram for promotional media



The database design to support the development of promotional media and services for companies engaged in mobile web-based household appliances is detailed in Table 3. This design includes the essential table structure, relationship scheme between tables, and relevant data attributes to ensure the efficiency and effectiveness of the system. Organizing the database systematically is expected to facilitate accurate data management, support application functionality, and speed up information access and processin (Chen et al., 2021; Munawar et al., 2020). This design also aims to ensure data integrity and provide optimal support for promotion and service processes so companies can operate more effectively digitally.

Table 3. Promotional media database

No	Name	Description
1	Bank	Bank data repository
2	Brand	Brand data repository
3	Customer	Customer data store
4	Page	Page data place
5	Category	Category data place
6	Cart	Cart data store
7	Login Attempts	Login attempts data place
8	Menu	Where to save menu data
9	Group Menu	Where to save menu group data
10	Order	Where to save order data
11	Order Detail	Where to save order detail data
12	Products	Where to save product data
13	Courier King	Where to save Courier King data
14	Setting	Where to save setting data
15	Setting Limit	Where to save setting limit data
16	Slider	Slider data place
17	Size	Size data place
18	User	User data place
19	User Role	User role data place
20	Color	Color data place

Figure 7. Design the dashboard page

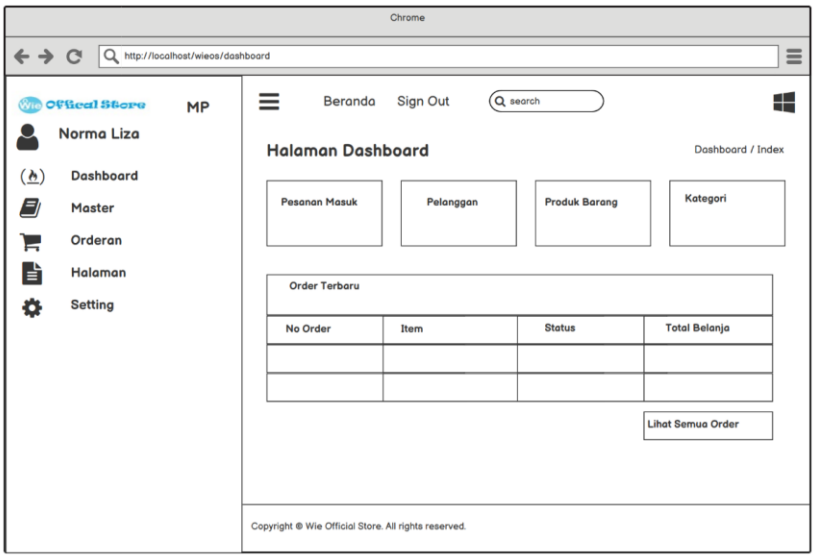
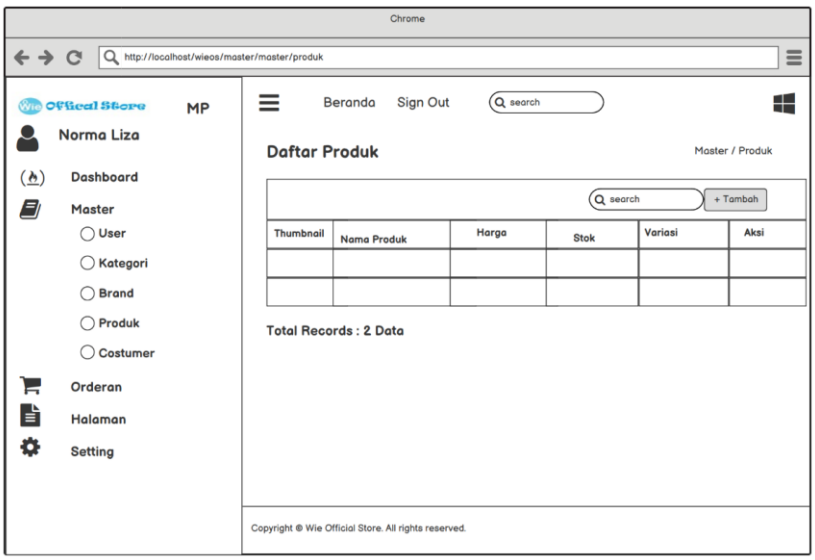


Figure 8. Design product list page



3.6 Writing program code

The program code writing stage is a critical phase in the system or application development, which involves creating code by utilizing software and hardware per the analysis and design carried out (Arvanitou et al., 2021; Islam & Storer, 2020). This process transforms the analysis and design results into a functional and integrated system. System implementation uses the PHP programming language and MySQL database for data processing, while Adobe Dreamweaver and Notepad++ are tools for writing and testing code (Vijayasarveswari et al., 2021). After the completion of the coding stage, evaluation and testing are carried out to ensure that the system functions following the specifications that have been designed and fulfils the needs and objectives of the project to develop promotional media and services for companies operating in the field of mobile web-based household appliances.

3.7 Testing

Testing is done with a black box approach that covers the entire system development process, especially at the program code testing stage. The black box method assesses the system's suitability with predetermined functional specifications without considering the system's internal structure or

source code. This test aims to ensure that all functions of promotional media and services in companies operating in mobile web-based household appliances function as they should and meet the criteria expected in the functional documentation. With this approach, an evaluation is conducted to ensure that each system component operates effectively and delivers results per the planned objectives. The testing process was successfully conducted, with full details in Table 4.

Table 4. Testing the promotional media website page

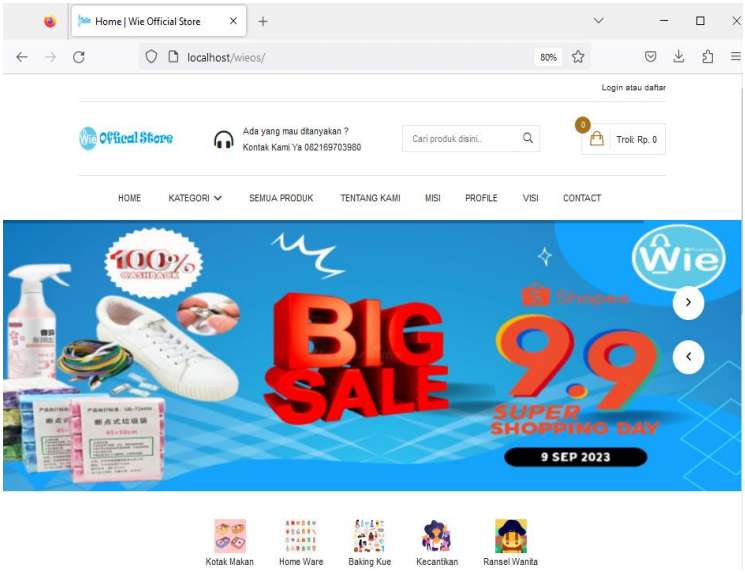
Testing activity	Expected realization	Results
Main page	Login menu	Success
Dashboard	Display dashboard data	Success
Bank	Display bank data	Success
Add bank	Display bank add form data	Success
Change bank	Display bank change data	Success
Delete bank	Appear bank delete command	Success
Search bank	Display bank search data	Success
Brand	Display brand list data	Success
Add brand	Display brand add form data	Success
Change brand	Display brand change data	Success
Delete brand	Display brand delete command	Success
Search brand	Display brand search data	Success
Customer	Display customer data	Success
Add customer	Display customer add form data	Success
Change customer	Display customer change data	Success
Delete customer	Display the delete customer command	Success
Search costumer	Display customer search data	Success
Page	Display page data	Success
Add page	Display page add form data	Success
Change page	Display page change data	Success
Delete page	Display page delete command	Success
Search page	Display page search data	Success
Categories	Display category data	Success
Add category	Display category, add form data	Success
Change category	Display category change data	Success
Delete category	Appear category delete command	Success
Search categories	Display category search data	Success
Cart	Display basket data	Success
Add cart	Display basket add form data	Success
Change cart	Display cart change data	Success
Delete cart	Display basket delete command	Success
Search cart	Display basket search data	Success

3.8 Program implementation

Implementing the home user page in Figure 9, especially in the service promotion media system for companies engaged in mobile web-based home appliances, is designed with features that support effective navigation and interaction. The home page includes important menus such as the home page, product category, list of all products, information about the company, mission, profile, vision, and contact. In addition, there are also options for user registration and login, which allows for more personalized and integrated access to the system. With a clear and organized menu structure, the home page aims to provide an optimal user experience, simplify browsing, and speed up access to relevant

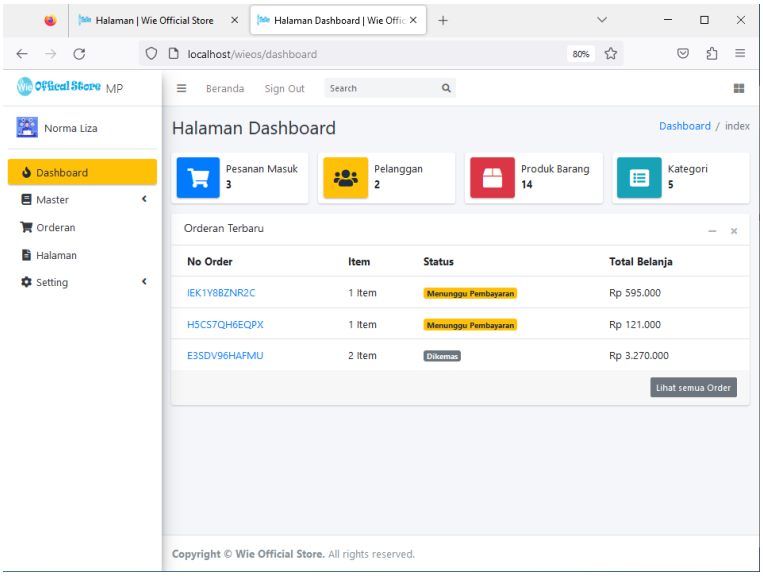
information and services. The implementation of this page is expected to increase user engagement and facilitate more efficient accessibility of the company's product and service information.

Figure 9. Implementation of home user page



Implementing the admin-dashboard page in Figure 10 that presents the service promotion media system features a dashboard interface designed to present data in an integrated and comprehensive manner. The dashboard is a control center that provides a comprehensive overview of system operations, including performance statistics, data analysis, and current reports. The features contained in the dashboard are designed to make it easier for users to monitor and manage various essential elements of the system efficiently. In addition, the dashboard also allows administrators to access real-time information, make configuration settings, and assess the effectiveness of the promotional strategies implemented. Thus, this dashboard page improves operational efficiency and provides valuable insights into strategic decision-making for developing service promotion media.

Figure 10. Admin dashboard



3.9 Contribution and recommendations

This research contributes significantly to understanding the importance of digitalizing promotional media, especially for companies engaged in home appliances in Batam. By proposing the development

of a mobile-based website using the Waterfall methodology, this study provides data-driven guidance to optimize marketing reach and service effectiveness by integrating responsive web and mobile technologies. The proposed design includes utilizing various Unified Modeling Language (UML) tools, such as a use case diagram, activity diagram, sequence diagram, and class diagram, to design an efficient information system. In addition to improving user experience and operational efficiency, this research also underscores the importance of functional and non-functional requirements in system development.

Although there is promising progress in developing mobile-based websites for companies in the home appliance sector, there are some shortcomings, such as the study being limited to one company in Batam, which may limit the generalizability of the findings. Furthermore, this study used black box testing to evaluate basic functionality, and it did not conduct a comprehensive assessment of the system performance under various load conditions. Although this study emphasized the importance of responsive web and mobile technologies, it did not explore the integration of advanced technologies such as artificial intelligence (AI) and data analytics.

Recommendations for further research include several important aspects: Firstly, other companies in similar sectors are advised to consider adopting similar digital technologies to enhance their competitiveness in an increasingly connected global market. Second, further research could explore implementing other technologies, such as artificial intelligence (AI) and data analytics, to enrich customer experience and optimize marketing strategies. Third, further studies are needed on the impact of mobile-based website implementation on increasing customer satisfaction and loyalty, especially in the home industry sector. By paying attention to these aspects, companies can maximize the benefits of digital transformation and improve business sustainability and growth in today's digital era.

4. Conclusion

This research shows that the development of a mobile-based website can potentially improve the promotion and services for companies operating in the field of home appliances in Batam. Using internet technology, especially websites, has proven to be an efficient branding, promotion, and marketing tool, allowing more comprehensive access to local and global customers. Using a software development approach based on the Waterfall model and Unified Modeling Language (UML), the system is designed to fulfil functional and non-functional requirements, such as security, flexibility, and ease of use. Implementing this new system can optimize data management, speed up the transaction process, and improve user experience. This sets an example for other companies adopting more integrated digital solutions to improve their competitiveness in an increasingly competitive market.

This study has several limitations that need to be considered. Firstly, this study only focuses on one company in the home appliance sector in Batam, so the findings and solutions generated may not fully apply to other companies in different industries or locations. Secondly, testing methods like black box testing are limited to testing basic functionality without evaluating system performance under high load conditions or security attacks. Thirdly, this research did not explore the cost and time required for a full-scale implementation of the proposed system. Therefore, further research is needed to evaluate the effectiveness and efficiency of this system implementation in a broader context and with additional considerations such as cost, time, and security.

Acknowledgement

We would like to express our deepest gratitude to everyone who contributed to the success of this

research. First, we sincerely appreciate our academic advisors at the Department Informatic Engineering, Universitas Ibnu Sina, for their continuous guidance and valuable feedback throughout this research project. We are also grateful to the company operating in the homeware sector in Batam for their collaboration, providing essential data, insights, and support that allowed us to conduct this study on expanding digital promotional media.

Declarations

Author contribution

Normaliza: Conceptualization, formal analysis, supervision, project management, writing - original draft, and writing - review & editing. Weni Lestari Putri: Data curation, investigation, methodology, writing - original draft and writing - review & editing. Novi Hendri Adi and Win Thu Zar: Validation, visualization, software development, system testing and writing - review & editing.

Funding statement

The research is independent and not funded by any person or institution.

Conflict of interest

No conflicts of interest in this research

Ethical clearance

There are no human subjects in this manuscript and informed consent is not applicable. The research company has agreed to carry out the research and is willing if the results of this research are published.

References

Abdelnabi, E. A., Maatuk, A. M., & Hagal, M. (2021). Generating UML Class Diagram from Natural Language Requirements: A Survey of Approaches and Techniques. *2021 IEEE 1st International Maghreb Meeting of the Conference on Sciences and Techniques of Automatic Control and Computer Engineering MI-STA*, 288–293. https://doi.org/10.1109/MI-STA52233.2021.9464433

Aoun, A., Ilinca, A., Ghandour, M., & Ibrahim, H. (2021). A review of Industry 4.0 characteristics and challenges, with potential improvements using blockchain technology. *Computers & Industrial Engineering*, *162*, 107746. https://doi.org/10.1016/j.cie.2021.107746

Arvanitou, E.-M., Ampatzoglou, A., Chatzigeorgiou, A., & Carver, J. C. (2021). Software engineering practices for scientific software development: A systematic mapping study. *Journal of Systems and Software*, *172*, 110848. https://doi.org/10.1016/j.jss.2020.110848

Caliskan, A., Özkan Özen, Y. D., & Ozturkoglu, Y. (2021). Digital transformation of traditional marketing business model in new industry era. *Journal of Enterprise Information Management*, *34*(4), 1252–1273. https://doi.org/10.1108/JEIM-02-2020-0084

Chen, J., Ramanathan, L., & Alazab, M. (2021). Holistic big data integrated artificial intelligent modeling to improve privacy and security in data management of smart cities. *Microprocessors and Microsystems*, *81*, 103722. https://doi.org/10.1016/j.micpro.2020.103722

Dewi, E. N. H. B. S., Depari, I. J., Pramita, N., Syafrina, I., & Haryanto, H. (2022). Demand Management and Production Capacity in Service Sector MSMEs in Batam City. *Journal of Humanities, Social Sciences and Business*, *1*(4), 153–160. https://doi.org/10.55047/jhssb.v1i4.321

Florido-Benítez, L. (2022). International mobile marketing: a satisfactory concept for companies and users in times of pandemic. *Benchmarking: An International Journal*, *29*(6), 1826–1856. https://doi.org/10.1108/BIJ-06-2021-0303

Fraccastoro, S., Gabrielsson, M., & Pullins, E. B. (2021). The integrated use of social media, digital, and traditional communication tools in the B2B sales process of international SMEs. *International Business Review*, *30*(4), 101776. https://doi.org/10.1016/j.ibusrev.2020.101776

Islam, G., & Storer, T. (2020). A case study of agile software development for safety-Critical systems projects. *Reliability Engineering & System Safety*, *200*, 106954. https://doi.org/10.1016/j.ress.2020.106954

Kusuma, W., Adi, N. H., Afrina, & Jimenez, J. R. A. (2023). Development of Web-Based Goods Inventory Information System to Improve Efficiency and Effectiveness of Inventory Management at Batam Cable Vision Company. *Journal of Computer-Based Instructional Media*, *1*(2), 82–98. https://doi.org/10.58712/jcim.v1i2.110

Laitala, K., Klepp, I. G., Haugrønning, V., Throne-Holst, H., & Strandbakken, P. (2021). Increasing repair of household appliances, mobile phones and clothing: Experiences from consumers and the repair industry. *Journal of Cleaner Production*, *282*, 125349. https://doi.org/10.1016/j.jclepro.2020.125349

Luo, Y. (2021). New OLI advantages in digital globalization. *International Business Review*, *30*(2), 101797. https://doi.org/10.1016/j.ibusrev.2021.101797

Melović, B., Jocović, M., Dabić, M., Vulić, T. B., & Dudic, B. (2020). The impact of digital transformation and digital marketing on the brand promotion, positioning and electronic business in Montenegro. *Technology in Society*, *63*, 101425. https://doi.org/10.1016/j.techsoc.2020.101425

Munawar, H. S., Qayyum, S., Ullah, F., & Sepasgozar, S. (2020). Big Data and Its Applications in Smart Real Estate and the Disaster Management Life Cycle: A Systematic Analysis. *Big Data and Cognitive Computing*, *4*(2), 4. https://doi.org/10.3390/bdcc4020004

Niarman, A., Iswandi, & Candri, A. K. (2023). Comparative Analysis of PHP Frameworks for Development of Academic Information System Using Load and Stress Testing. *International Journal Software Engineering and Computer Science (IJSECS)*, *3*(3), 424–436. https://doi.org/10.35870/ijsecs.v3i3.1850

Prasetya, F. P., Syahri, B. P., Rahmadhani Fajri, B. P., Ema Wulansari, R. P., Fortuna, A. P., & Prasetya, F. (2023). Utilizing Virtual Laboratory to Improve CNC Distance Learning of Vocational Students at Higher Education. *TEM Journal*, *12*(3), 1506–1518. https://doi.org/10.18421/TEM123-31

Primawati, Wulansari, R. E., Primandari, S. R. P., Erizon, N., Mulyanti, Purwantono, Kurniawan, A., Prasetya, F., Rozi, F., Habibie, F., & Fortuna, A. (2024). *Comparing the effects of flipped classroom approach with YouTube videos and conventional method on student learning in calculus: A Quasi-experimental study in mechanical engineering*. 020013. https://doi.org/10.1063/5.0217167

Rahim, B., Ambiyar, A., Waskito, W., Fortuna, A., Prasetya, F., Andriani, C., Andriani, W., Sulaimon, J., Abbasinia, S., Luthfi, A., & Salman, A. (2024). Effectiveness of Project-Based Learning in Metal Welding Technology Course with STEAM Approach in Vocational Education. *TEM Journal*, *13*(2), 1481–1492.

Samala, A. D., Govender, T., Tsoy, D., Bojic, L., Samala, A. G., Samala, M. P., Prasetya, F., Tri, D., Yanto, P., Zainul, R., & Fortuna, A. (2024). 3D Visualizations in Learning : An Evaluation of an AR + Core Application for Computer Hardware Education using the Hedonic Motivation System Adoption Model. *TEM Journal*, *13*(1), 466–475. https://doi.org/10.18421/TEM131-48

Shree, D., Kumar Singh, R., Paul, J., Hao, A., & Xu, S. (2021). Digital platforms for business-to-business markets: A systematic review and future research agenda. *Journal of Business Research*, *137*, 354–365. https://doi.org/10.1016/j.jbusres.2021.08.031

Şimşek, T., Öner, M. A., Kunday, Ö., & Olcay, G. A. (2022). A journey towards a digital platform business model: A case study in a global tech-company. *Technological Forecasting and Social Change*, *175*, 121372. https://doi.org/10.1016/j.techfore.2021.121372

Ulia, R., Setyawan, D., & Afrina. (2024). Designing an information system for recapitulating goods received transactions. *Journal of Computer-Based Instructional Media*, *2*(1), 1–10. https://doi.org/10.58712/jcim.v2i1.126

Vijayasarveswari, V., Chyin, L. J., Wafi, N. M., & Iszaidy, I. (2021). Development of E-Healthcare Management System using PHP, Javascript and Cascading Style Sheets. *Journal of Physics: Conference Series*, *1962*(1), 012030. https://doi.org/10.1088/1742-6596/1962/1/012030

Wang, F. (2020). Digital marketing capabilities in international firms: a relational perspective. *International Marketing Review*, *37*(3), 559–577. https://doi.org/10.1108/IMR-04-2018-0128

Wang, X., Gao, T., Zhu, Z., Zhang, Z., Liu, Z., Li, J., & Tang, J. (2021). KEPLER: A Unified Model for Knowledge Embedding and Pre-trained Language Representation. *Transactions of the Association for Computational Linguistics*, *9*, 176–194. https://doi.org/10.1162/tacl_a_00360

Yim, K.-H. (2020). A Study on Digital Marketing Promotion Strategy and Implementation Strategy Implementation Plan of Global SMEs. *Journal of Digital Convergence*, *18*(11), 195–205. http://dx.doi.org/10.14400/JDC.2020.18.11.195