



DEVELOPMENT AND EVALUATION OF A MOBILE-RESPONSIVE E-COMMERCE PLATFORM WITH MARKETPLACE INTEGRATION FOR DIGITAL MARKETING AND SALES MANAGEMENT: A CASE STUDY OF SNACKWAR

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Abstract

The rapid development of digital technology has encouraged micro, small, and medium enterprises (MSMEs) to adopt e-commerce platforms to improve marketing and sales activities. This study aims to develop and evaluate a mobile-responsive web-based e-commerce system for Snackwar, integrating digital product promotion with the Shopee marketplace. The system was developed using the Waterfall methodology, consisting of requirements analysis, system design, implementation, testing, and maintenance. Unified Modeling Language (UML) diagrams were employed to model system functionality, while PHP, MySQL, HTML, CSS, and JavaScript supported system implementation. The developed platform provides product catalogs, detailed product information, promotional features, and marketplace purchasing links. System evaluation incorporates black-box testing and user questionnaires to assess functionality, usability, and user satisfaction. The proposed system is expected to improve product accessibility, simplify promotional activities, and support digital sales management. This research contributes a practical mobile commerce solution for strengthening MSME digital transformation and marketplace connectivity.

1.0 INTRODUCTION

The technological developments that are happening today cannot be avoided by all circles of society, one of which is in the fields of business and sales. Currently, business founders use *E-commerce* as a medium for sales and promotion of their products. *E-commerce* It also has the understanding that all trading activities are carried out using electronic media. *E-commerce* has developed rapidly from year to year, because it makes it easier for customers to choose goods and use fast and precise payments. This is proven by the Statista Data Insight data *E-commerce* in Indonesia reached 158.65 million in 2021 and increased by 12% in 2022 to 178.94 million users. This is expected to continue to increase at the end of 2023 reaching 196.47 million. Data from BI (Bank Indonesia) also recorded that in 2021 the number of transaction activities *E-commerce* in Indonesia reached 401 trillion, experienced an increase of 18.8% in 2022 to reach 476.3 trillion, and is estimated to increase by 20% in 2023 to reach 572 trillion [1]

Based on data from the Central Statistics Agency in 2022, the number of *E-commerce* in Lampung Province reached 2.99 million people who carried out sales transactions using *E-commerce* and Lampung is included in the top 10 categories that make sales using *E-commerce* then it will increase in 2023 [2] In several previous studies that used *Mobile Commerce* to increase sales and promotion, such as research conducted by [3] Implement revenue increases using *Mobile Commerce* in the members of the gentiaras cooperative with the results of the research

facilitate the sale of cooperative member products and make it easier for consumers to find the location of the store. Research [4] obtained the results of the implementation that *Mobile Commerce* can increase household business income in the gentiaras cooperative group and sellers can interact directly with buyers through system COD (Cash on Delivery) to be safer. Research according to [5] *Mobile Commerce* to increase sales at Narescraft UMKM located in Tulung Agung obtained the results of research that *Mobile Commerce* helps reduce promotional costs, increase sales and expand marketing beyond the city[3]. Research conducted by [6] Promote and sell with *E-commerce website system* concluded that this research can increase product sales, gain the trust of customers and design good is the key to the success of a. And research from [7] *Mobile Commerce* using android on Natasya Batik gets research results that can make it easier for sellers to data management and make it easier for buyers to obtain information about Natasya Batik. Based on the data above, the Snackwar Store wants to use and implement mobile commerce-based sales and promotions. The problem that occurs in the Snackwar store is that it does not have an *official e-commerce website* to increase sales at the Snackwar store, therefore this research was made. Snackwar already has a sales store in the shoppe but does not yet have an *official website* to sell.

Stores have successfully used Shopee to sell their products online, the drawbacks of having a *website* can be a barrier in building a strong brand identity and reaching customers outside of those *e-commerce platforms*. Additionally, without a *website*, stores may miss out on the opportunity to expand market reach and build direct relationships with customers through content and direct interactions. Based on the above conditions, a website-based information system is needed to try to help increase sales and promotion of the Snackwar store. Customers who want to order products from Snackwar such as basreng, banana melted, macaroni and others can use a web-based information system and at the same time do promotions. With this web-based information system, it is hoped that customers can easily order and choose products according to their wishes, customers can also interact directly with the store. The store can also recap sales reports, expand the market, build brand identity, and build direct relationships with customers.

2.0 THEORETICAL

2.1 Previous Research

The bibliometric network visualization presented in Figure 1 illustrates the intellectual structure and thematic relationships within e-commerce research through a keyword co-occurrence mapping approach using VOSviewer. The visualization identifies e-commerce as the central research theme, interconnected with several important topics, including electronic commerce, trust, customer satisfaction, digital marketing, supply chain management, social media, information technology, and machine learning. The different node sizes represent the relative frequency of keywords, while the connecting lines indicate their co-occurrence relationships within the analyzed publications. Furthermore, the colors distinguish thematic clusters that reflect different research concentrations. According to van Eck and Waltman [1], VOSviewer facilitates the identification and visualization of bibliometric networks, enabling researchers to explore the relationships among scientific concepts and emerging research directions. In the context of the Snackwar web-based e-commerce system, this visualization provides a theoretical foundation for understanding how digital commerce platforms integrate technological functionality, marketing strategies, customer relationships, and business management to support digital transformation among micro, small, and medium enterprises (MSMEs).

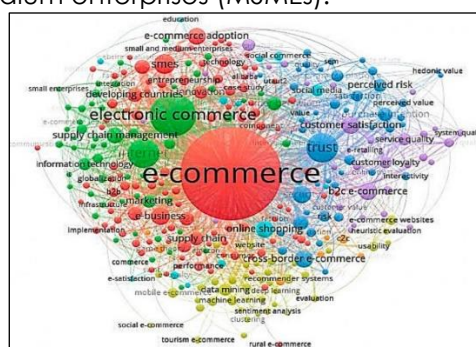


Figure1. Analysis of Results of Previous Research

The bibliometric visualization highlights the multidisciplinary nature of e-commerce research, with e-commerce and electronic commerce emerging as central themes interconnected with digital marketing, small and medium enterprises (SMEs), customer satisfaction, trust, information technology, and supply chain management. These relationships emphasize the importance of digital transformation in improving business efficiency, market accessibility, and customer engagement. Sagala and Őri [2] and Purnomo et al. [3] emphasized the role of technological capabilities and digital adoption in strengthening SME competitiveness, while Gefen et al. [4] and DeLone and McLean [5] identified trust, system quality, and service quality as essential factors influencing e-commerce success. Furthermore, Hajli [6] and Verhoef et al. [7] highlighted the significance of social commerce, digital marketing, and integrated business strategies in enhancing customer interactions and purchasing intentions. The visualization also identifies technology-oriented themes, including machine learning, recommender systems, and usability, suggesting opportunities for further innovation in e-commerce platforms. Based on these findings, the proposed Snackwar web-based e-commerce system integrates mobile-responsive product catalogs, digital promotion, product information management, and Shopee marketplace connectivity to support online marketing and sales activities. This research aims to contribute to MSME digital transformation by developing an accessible and integrated e-commerce platform, while emphasizing the need for functional testing, usability evaluation, and customer satisfaction assessment to validate its effectiveness and potential business benefits.

2.2 Theoretical Framework

1. Information Systems

According to Husein and Wibowo, information systems are related components and have a function to process, collect, and store information as a support for decision-making and control in the organization [8]. According to [9] Information system is a collection of various systems in an organization that processes storing and collecting information as an organizational decision-maker. Information systems are also useful for managing information and data in a way that makes it easier for users and admins [6].

2. E-commerce

[10] *E-commerce* or Electronic trade is a trading activity that is carried out on the internet and the internet is a medium for spreading, buying, selling, and marketing goods. Existing components are applied into *E-commerce* namely customer service, product services, promotion and payment. The development of the internet is a factor in the development of *E-commerce*. [11] *E-commerce* is a trading activity through an electronic system with or the internet network as a medium to buy, distribute, market goods, and sell with electronic fund transfer payment methods. *Electronics Trade* is a new concept that is used or described by the process of buying and selling or exchanging goods, services and information through internet information networks. The development of the internet in the current era has used technology *Mobile Commerce*, which can be done with a mobile phone. So all activities of buying and selling products will be done using fingers only.

3. Promotion and Sales

Promotion is an activity carried out by sellers and buyers with the aim of offering our products to consumers by providing information, communicating and convincing consumers of our products. Promotions are also expected to affect the desire for product or service demand. Sales according to Sumiyati and [12], which is a good or service that is sold from one person to another by exchanging money from that party. That way selling means measuring an item and replacing it with money with a certain price value. Sales is the transfer of ownership between the seller and the buyer, whether it is goods or services at a price that has been agreed upon by both parties.

4. Web Service

Web is a service used by users of computers connected to the internet. Web is a service that can be used by computers that are already connected to the internet, be it text, audio or visual or video and have the advantage of connecting a document to other documents that can be accessed in the browser. To be able to connect to a computer that has the internet, it usually uses TCP/IP (*Transmission Control Protocol/ Internet Protocol*). Each connected computer has an address such as 192.168.14.96.

When viewed from the creation of the *website*, it is formed in several components, namely:

- a. PHP
Php is one of the programming languages used to communicate to servers and then transfer the results to clients. Php was first coined by Rasmus Lerdof in 1994.
- b. MYSQL
MYSQL is a tool used for the implementation system of relational data management systems (RDBMS). MYSQL is used as an open-source tool to develop a SQL language (*Structured Query Language*).
- c. Html
HTML (*Hyper Text Markup Language*) is a markup language used to create a *website* page by typing in the coding of HTML tags. Html is also called the body of the *website* and usually HTML is created with the help of CSS (*Cascading Style Sheet*) which is usually used to beautify *website design*.
- d. CSS
CSS (*Cascading Style Sheet*) is used to beautify the look of a *website's* design. CSS was first used to separate content and web structures that are inseparable. CSS first appeared in 1997.
- e. Bootstrap
Bootstrap is one of the *frameworks* that was created to speed up and simplify *website* development and to prioritize the appearance of a mobile phone. Bootstrap uses html and css languages to provide various javascript effects by using jquery.
- f. XAMPP
Xampp is a tool that provides software packages into a single package. Xampp also functions to run *websites* and to process MYSQL data on local computers.

2.3 Research Flow Framework

The research flow framework is a research flow design that is arranged in stages and structured and applied through drawings that are in accordance with what stages will be carried out in conducting a research. The following is a picture of this flow framework

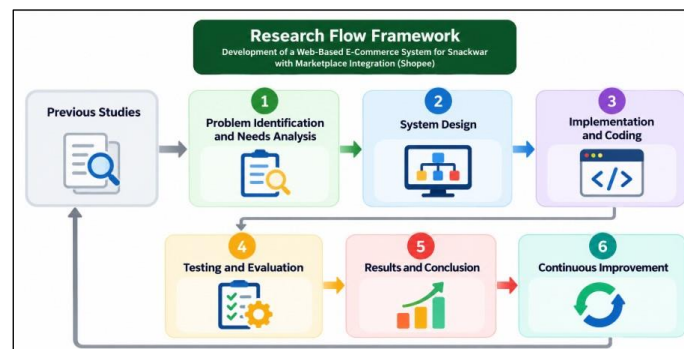


Figure 1. Research Flow Framework

Description:

1. Stage 1 that the author does is to determine the problems that exist in the background of the problem, namely not having a *website* and analyzing the needs of the store, which is a forum for *website-based* sales and promotion media.
2. Stage 2 the author determines a system design that is suitable for sales and promotional media and is ready to implement system coding using the PHP, html, css programming language with mysql or Xampp databases using the waterfall method and using uml diagrams or structured diagrams.
3. Stage 3, the author conducts a trial with *black box texting* and questionnaires to see how far the application is ready to run. The results will also be seen if there are obstacles or if they succeed, then the author is ready to release this *website-based* information system.

3.0 METHODOLOGY

3.1 Data Collection Methods

Data collection techniques are an effort made to obtain data or documentation needed in the research process. This research uses several data collection methods as follows:

1. Observations

The observation method was carried out to find out directly the problems that occurred at the research object. Data collection was carried out at the Snackwar store on April 27-30, 2024.

2. Literature Study

Literature study is a method of data collection that is carried out by searching and reviewing information related to thesis proposals, either from previous articles or research or from websites with reference for 2019-2024.

3. Interview

Interviews are a research method that is carried out directly by asking directly to the store owner or store employee. In this study, which was conducted on April 28-30, 2024, the researcher submitted to Mr. Gita Tiffani as the owner of the Snackwar store by asking several questions as data that will be researched by the researcher.

3.2 System Development Methods

This research method uses effective development design to increase the effectiveness of online promotional and sales media. The waterfall method describes a systematic and sequential approach in software development, such as a waterfall flow. This model was chosen because each stage is done in a structured and systematic manner from top to bottom before moving on to the next stage.

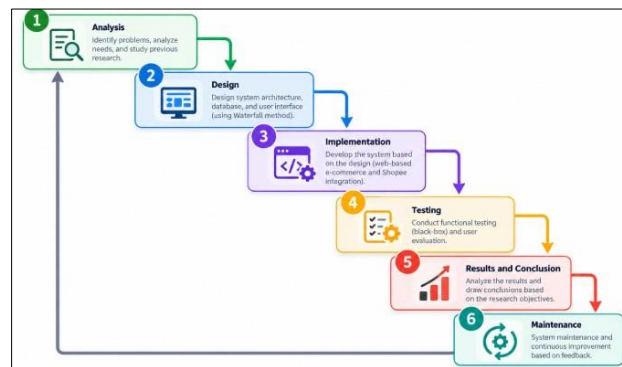


Figure 2. Waterfall Method

In the *waterfall* method, there are the stages, which are as follows:

1. This stage of analysis involves collecting information and conducting a system needs analysis. In this case, the author uses literature studies, observations and system needs analysis to design a framework that suits the needs of the system.
2. This stage of design involves designing a system based on the analysis of user needs. In this case, the author designs a website-based information system with a sales and promotion system that suits the needs of the store.
3. Implementation at this stage is the implementation and implementation that combines existing systems into the implementation from the beginning of the program unit into one.
4. This stage of testing explains the testing of the information system carried out whether it has been approved by the Snackwar store or the consumer and validates it to the system maker.
5. Maintenance
This stage is carried out after testing which is then approved by snackwar and takes care to keep it running properly as well as fix bugs and errors that were not found during the test. This is done so that the website that is created continues to run and has good security so that this website can be used continuously until the goal of the Snackwar store is achieved.

4.0 RESULTANTS

4.1 System Design

The design of this system is a stage to find out what UML (*unified modelling language*) design is used by the author to form a system.

Use Case Diagram

A use case diagram is a diagram used to describe the interaction between actors and systems in an information system

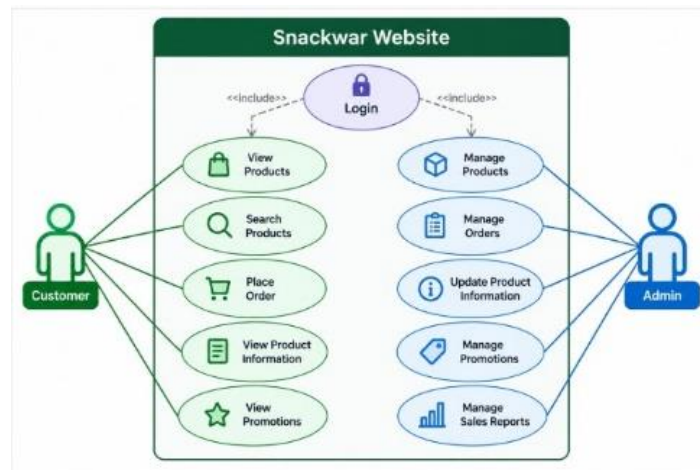


Figure 4. Use Case Diagram

The above Use Case diagram can be concluded that Snackwar can be accessed by both actors, namely customers and admins. Customers can access in the form of logging in to select products, viewing products, ordering products and looking for information about the products to be ordered, while for the admin to manage the product, manage order data, manage financial data when the product order has been completed, and provide product information so that customers know what the product is about.

4.2 System Implementation

After designing with a structured model using DFD Level 0, the next stage of implementation using the MySQL and HTML programming language can be seen from the image below



Figure 7. Website Start Page Display

In the appearance of the first page, there are several elements, namely the store name, store logo, and product name. To find out the price and product information, customers can scroll down and a page will appear like the image below.

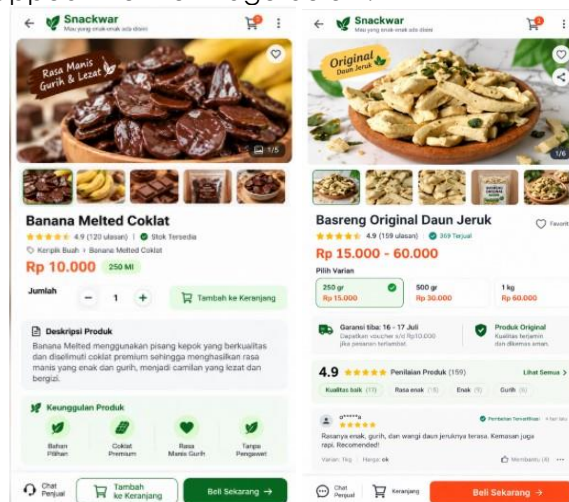


Figure 8. Price Display and Product Information

For customer product orders will be directed to Shopee as a medium of payment and ordering, the author uses the Shopee platform as a medium of ordering and payment can be accessed with the image below. The order page display has several elements, namely cart, contact customers and buy now. This page is also linked on the shoppee platform. In addition, the product ratings contained on this page provide how satisfied customers are with the products sold by the Snackwar store.

4.3. Discussion

The results of this study demonstrate the potential of a mobile-responsive web-based e-commerce system to support digital promotion, product information management, and online sales activities at Snackwar. The developed system incorporates essential features, including product catalogs, detailed product descriptions, pricing information, promotional content, and purchasing links connected to the Shopee marketplace. The mobile-responsive interface enables customers to access product information through smartphones, providing a more flexible shopping experience compared with conventional promotional methods. Furthermore, the administrator interface supports the management of product information and promotional activities through a centralized platform. These findings are consistent with Sagala and Ōri [1], who emphasized that digital transformation among small and medium enterprises requires technological solutions aligned with organizational capabilities and business needs. Similarly, Purnomo et al. [2] highlighted the importance of digital technology adoption in improving MSME competitiveness and operational efficiency. Therefore, the Snackwar platform represents a practical approach to supporting digital business transformation through an accessible and integrated e-commerce information system.

From the perspective of system functionality and user experience, the Snackwar website was designed to provide intuitive navigation, structured product information, and convenient access to marketplace transactions. The application of the Waterfall development methodology facilitated a systematic process involving requirements analysis, system design, implementation, testing, and maintenance. The system design incorporates Unified Modeling Language (UML) diagrams to represent interactions between customers and administrators, while the mobile interface emphasizes accessibility and ease of use. These characteristics are supported by Davis [3], who identified perceived usefulness and perceived ease of use as important determinants of technology acceptance. Furthermore, DeLone and McLean [4] explained that system quality, information quality, and service quality contribute to information system success and user satisfaction. Accordingly, black-box testing and user questionnaires are appropriate evaluation methods for assessing whether the Snackwar platform meets functional requirements and user expectations. However, quantitative conclusions regarding usability, satisfaction, and system performance require actual testing results and respondent data.

The integration of the Snackwar website with the Shopee marketplace provides an additional digital marketing channel by connecting product promotion with an established online purchasing platform. Through this approach, customers can explore Snackwar products on the website before continuing their transactions through Shopee, potentially improving purchasing convenience and expanding digital market accessibility. This strategy is consistent with Hajli [5], who demonstrated the importance of social commerce mechanisms in influencing consumer trust and purchase intentions. Furthermore, Verhoef et al. [6] emphasized that digital transformation involves the integration of digital technologies into business processes, customer interactions, and organizational strategies. Compared with previous studies that primarily focused on standalone sales information systems, the proposed Snackwar platform combines mobile-responsive product presentation, promotional management, and marketplace connectivity within a unified digital environment. The principal contribution of this research is therefore the development of an integrated e-commerce approach tailored to the operational needs of a small snack business. Nevertheless, its effectiveness in increasing sales transactions, customer satisfaction, and business performance should be validated through comparative transaction records and empirical user evaluations.

5.0 CONCLUSION

This study presents the development of a mobile-responsive web-based e-commerce system designed to support digital marketing, product promotion, and sales management at Snackwar. The system was developed using the Waterfall methodology, encompassing requirements

analysis, system design, implementation, testing, and maintenance. The proposed platform integrates essential functionalities, including product catalogs, detailed product information, pricing, promotional content, and purchasing links connected to the Shopee marketplace. These features provide an integrated digital environment that facilitates product accessibility and supports more efficient business operations. Furthermore, the mobile-responsive interface enables customers to explore products conveniently through smartphones, while administrative functionalities simplify product information management and promotional activities. The integration with Shopee offers an alternative purchasing channel without requiring a fully independent transaction infrastructure. From a technological perspective, the proposed system demonstrates the applicability of web-based commerce solutions for supporting digital transformation among micro, small, and medium enterprises. However, further empirical evaluation through black-box testing, usability assessments, customer satisfaction surveys, and sales performance analysis is necessary to establish its effectiveness. Future research should explore automated inventory synchronization, secure payment integration, personalized product recommendations, and data-driven marketing analytics. Overall, this study provides a practical foundation for developing accessible, scalable, and sustainable digital commerce solutions for MSMEs.

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