



## **ENHANCING SME DIGITAL MARKETING THROUGH A WEB-BASED E-COMMERCE SYSTEM WITH AUTOMATED WHATSAPP ORDERING**

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### **Abstract**

This study examines the implementation of a web-based mobile e-commerce system integrated with automated WhatsApp ordering for UMKM Barokah to enhance digital marketing and customer service quality. Using a quantitative approach, data were collected through observation, interviews, system implementation, and questionnaires distributed to 76 customers during July–September 2025. The developed platform enables customers to browse products, communicate directly with sellers, and complete transactions efficiently through WhatsApp automation. The evaluation results indicate a high level of user acceptance, with overall customer satisfaction reaching 89.1%. The system achieved scores of 90.2% for perceived ease of use, 87.4% for interface appearance, 89.3% for interactive communication, and 92.1% for transaction speed. The findings demonstrate that integrating e-commerce with WhatsApp automation improves marketing effectiveness, customer engagement, transaction efficiency, and repurchase intention while reducing manual transaction errors. The system also increases operational efficiency, making it a suitable digital transformation model for MSMEs in the digital business era.



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## **I. INTRODUCTION**

Along with the rapid progress in the field of information and communication technology, there have been significant changes in the patterns of social interaction, lifestyle, and economic activities of the community. One of the impacts can be seen in the emergence of online markets or better known as E-commerce. E-commerce is a buying and selling activity that is carried out online through the internet. Now, the use of e-commerce media is one of the latest innovations that is able to provide services without an indefinite time, present information immediately, and increase sales more effectively.

The e-commerce phenomenon in Indonesia has experienced very significant growth. According to the Ministry of Communication and Digital (Kemkomdigi), based on research published by Google, Temasek, and Bain & Company in 2022, the projected value of the digital economy in Indonesia is expected to reach USD 77 billion, or equivalent to IDR 1,197.8 trillion (Indonesia's digital economy remains "NGACIR" 2023). making it the highest in the Southeast Asian region. This shows that the digital trade sector has the potential to be developed, especially in supporting economic growth and creating new business opportunities, especially for small and medium businesses. Micro, Small, and Medium Enterprises (MSMEs) play an important role in the national economy. According to information from the Indonesian Chamber of Commerce and Industry (KADIN) in 2023, there are around 66 million MSME actors who contribute around 61% to the Gross Domestic Product (GDP) and absorb up to 97% of the domestic workforce (Indonesian MSMEs 2023). With this large contribution, MSMEs are one of the strategic sectors that need special attention, especially in terms of the implementation of digitalization and the use of information technology to increase competitiveness.

Barokah MSMEs are home-based businesses that focus on snack products and patchwork. In its operational activities, this business only uses social media for promotion and has not used the website in the sales process. Customers place orders manually, which is sometimes wrong if there are quite a lot of orders. That way, the solution to this problem is to integrate the e-commerce system by using the ordering feature using automatic chat through the WhatsApp application. With the implementation of this system, it can facilitate transactions and simplify the ordering process.

This is in line with research conducted by Hendriyati & Yusta (2021) discussing the implementation of web-based e-commerce applications by producing website-based e-commerce applications that are useful to make it easier for customers to shop, interact, and view products in detail. The author does not provide advice on this e-commerce system (Hendriyati and Yusta 2021). Supriatman & Sidiq (2022) discuss the design of a web-based goods ordering system for MSMEs in Ciamis Regency. This research resulted in a system that is now applied in independent business premises using the manual method. Only as a system that is used for promotion and ordering goods or products is only limited to social media. But the author does not provide suggestions to improve the features in the system. The design of this system is needed because it can make it easier for business owners to increase business promotion and obtain and manage data efficiently as well as reports that are prepared to be effective as planned (Supriatman and Sidiq 2022)

According to Hadi & Darujati (2023) discussing the analysis and implementation of e-commerce, this research produces an android-based shopping application with features that make it easier for its users, but in this system it has drawbacks such as it is still limited to basic features, the absence of a complex grouping feature and no measurement of customer satisfaction. In this study, the author provides suggestions for adding commodity quantity features and adding customer satisfaction features to stores or products (Hadi and Darujati 2023).

The difference in this study compared to the previous research lies in the ordering method used, where the previous research relied on direct input in the application or web, while in this study the ordering process was carried out through automatic chat on WhatsApp which is a popular communication medium and has been very commonly used by the public. In addition, the difference can

also be seen from the focus of users where the previous research prioritized the use of the system by general customers, while this research was specifically aimed at local MSMEs, namely Barokah and its customers so that the solutions developed were more specific and according to the needs of micro businesses. Other differences: Previous research generally used Android or web-based platforms that were only used for product promotion and ordering manually or through social media. Meanwhile, this study uses a web-based e-commerce approach that is integrated with the automatic ordering feature through WhatsApp which allows the transaction process to run more practically, quickly, and in real-time. These three aspects are a strong foundation that the system proposed in this study presents an innovative and relevant approach in meeting the needs of MSMEs in the digital era.

## II. LITERATURE REVIEW

### 2.1. Previous Research

As a foundation in the development of the system to be built, the researcher examined several previous studies related to the theme of e-commerce for MSMEs. This study aims to find out the methods used, the results achieved, and the limitations of each study. By understanding the advantages and disadvantages of previous research, researchers can design a system that is creative and meets the needs of Barokah MSMEs. The summary of previous research is shown in the following table:

Table.1 Analysis of Results of Previous Research

No	Author(s) and Year	Research Title	Method	Results	Disadvantages
1	Azwar, Hamria, & Elisya Muksin (2021)	Design of a Website-Based E-Commerce System for Sales Transactions at Bumdes Limbato Clothing Store, Boalemo Regency	Observation, interviews, and secondary data collection	Produced an e-commerce application to support data management, marketing, and promotion to the public.	The system has not integrated external communication media such as WhatsApp, and the marketing coverage remains local.
2	Jon Idrison Molina, Lasarus P. Malese, & Deni W. Nomate (2022)	Design of an E-Commerce System for Bamboo Craft Products in Air Kenari Village	Interviews, literature study, and Web Engineering	The system assists bamboo craftsmen in marketing products efficiently and accurately to target consumers.	Direct communication features between customers and sellers are not yet available.
3	Lailatul Akmal & Tata Sutabri (2023)	Prototype-Based E-Commerce Information System Design at Sehati Store	Prototype Method	The system facilitates promotion, transactions, sales recording, and digital reporting.	There are no automated ordering features and no evaluation of user experience.
4	Sri Priyanti Ningsih & Endang Wahyuningsih (2024)	Implementation of a Web-Based E-Commerce System for Batik SMEs in Kebumen (Case Study: Batik Slamet)	4D Method and UML	The system simplifies online purchasing, expands market reach, and improves operational efficiency.	Testing focused only on system functionality without measuring user comfort and satisfaction.

<b>No</b>	<b>Author(s) and Year</b>	<b>Research Title</b>	<b>Method</b>	<b>Results</b>	<b>Disadvantages</b>
<b>5</b>	Chaffey & Ellis-Chadwick (2021)	Digital Marketing, E-Commerce, and Customer Engagement in SMEs	Systematic Literature Review	The integration of e-commerce and digital marketing enhances customer engagement and increases SME sales.	The study does not discuss customer communication automation through instant messaging applications such as WhatsApp.
<b>6</b>	Dwivedi et al. (2021)	Setting the Future of Digital and Social Media Marketing Research	Literature Review and Conceptual Framework	Social media and digital communication effectively improve customer loyalty and online purchasing decisions.	The research focuses more on social media and does not integrate automated transaction features in e-commerce systems.
<b>7</b>	Verhoef et al. (2021)	Digital Transformation: A Multidisciplinary Reflection and Research Agenda	Conceptual Research	Digital transformation through online platform integration improves the competitiveness of SMEs.	The study does not discuss the technical implementation of WhatsApp-based automated ordering systems.
<b>8</b>	Kraus et al. (2022)	Digital Transformation in SMEs: A Systematic Literature Review	Systematic Literature Review	The use of digital platforms improves marketing effectiveness and operational efficiency in SMEs.	The study does not examine user experience or customer service automation.
<b>9</b>	Pantano et al. (2022)	Competing During a Pandemic? Retailers' Ups and Downs During the COVID-19 Outbreak	Quantitative Analysis	E-commerce helps SMEs maintain sales through digital marketing strategies.	The research does not integrate real-time communication features using WhatsApp Business API.
<b>10</b>	Al-Omoush et al. (2023)	The Role of Digital Technologies in Business Resilience of SMEs	Mixed Method	Digital technologies improve business resilience and expand SME market reach globally.	There is no development of automated ordering features and direct customer notification systems.

Based on the results of several previous studies, most of the research focuses on the development of web-based *e-commerce* systems and mobile applications that aim to support the transaction process, promotion and management of sales data. From several previous studies, there are only those that focus on the promotion function and no one has integrated with popular communication media such as WhatsApp. That way, this research has a difference by carrying the concept of an e-commerce system by having an automatic ordering feature through the WhatsApp application. This is a solution for the need for fast communication between MSME actors and customers and

takes advantage of applications that are very commonly used by the Indonesian people. Previous research, most of the research only focused on the development of basic *e-commerce* systems for the digitization of transactions and marketing of MSME products. Previous research has not integrated WhatsApp-based automated communication features as an interactive medium between customers and sellers. In addition, most of the research only focuses on the functional aspects of the system without comprehensively testing *the user experience* and effectiveness of digital marketing strategies. (Azwar, Hamria, and Muksin 2021). (Molina, Malese, and Nomate 2022). (Akmal and Sutabri 2023). (Ningsih and Wahyuningsih 2024). The research to be conducted has an update on the integration of web-based e-commerce systems with *the WhatsApp auto-order* feature as part of the MSME digital marketing strategy. The system not only supports online transactions, but also provides automation of customer communication, order notifications, digital promotions, and improved customer interaction in real-time. Thus, this research is expected to be able to provide more adaptive, interactive, and effective digital marketing solutions for the development of Barokah MSMEs.

## **2.2. Theoretical Framework**

### **1. E-Commerce**

E-Commerce refers to the process of disseminating, buying, selling, and marketing goods and services through electronic media such as the internet or television, www or other computer networks (Hafizh, Aspriyono, and Akbar 2024). In Indonesia, e-commerce is one of the main drivers of digital transformation, especially in the midst of the industrial revolution 4.0. The implementation of e-commerce in MSMEs has been proven to increase competitiveness, expand market reach, and increase operational efficiency, although it is still faced with challenges such as digital literacy and limited infrastructure (Mumtaz et al. 2024). The implementation of *e-commerce* is a crucial strategy in helping MSMEs adapt to the demands of this digital era. MSMEs as the backbone of the Indonesian economy utilize *e-commerce* to access a wider market and increase their income. e-commerce provides a significant increase in turnover, market access, and competitiveness of MSMEs. However, obstacles such as lack of digital skills and internet connectivity are still major obstacles (Ayem et al. 2024). This shows that the implementation of *e-commerce* requires support in the form of training and infrastructure.

The application of e-commerce is very beneficial for business actors because it can expand market reach without geographical limitations, speed up the transaction process, reduce operational costs and provide customer and transaction data in a structured manner. However, challenges such as data security, digital literacy and internet connectivity are problems that need attention, especially for micro, small and medium enterprises (MSMEs).

### **2. Website**

A website is an internet facility that connects documents in a local and remote scope (Prionggo Hendradi and Muhammad Ilham Rizki 2022). A website is a platform that can be used to store various kinds of information

such as text, sound, images, and animations that can be accessed by a computer via the internet. A website is a means of information based on a computer network that can be accessed anytime and anywhere at a low cost (Firmansyah and Herman 2023). In general, a website consists of two main parts, namely the front-end and the back-end. The front-end is an area that is viewed by the user that includes visual displays as well as interactive elements such as buttons, navigation menus, and images. Meanwhile, the back-end is the part that governs the data processing process including database management, system logic, and control over application flows. These two parts are integrated with each other so that the website can run according to its function.

In the modern business world, especially in the digital era like today, websites are the main means in the development of e-commerce systems. The website allows business actors to display products, accept orders, and provide complete and easily accessible information to consumers. In addition, the website can also be connected to a fast communication system such as WhatsApp API so that customers can immediately place orders without having to go through a manual process.

### 3. Whatsapp

WhatsApp is one of the most widely used instant messaging applications globally, including by e-commerce users (Guyen and Prihanto 2025). This application is very popular in Indonesia and has become a part of people's daily digital lives. In the business context, WhatsApp provides two main services, namely WhatsApp Business (standalone application) and WhatsApp Business API. Both are designed to assist business actors in communicating with customers in a more effective and structured manner. In the journal Welfare Journal of Community Service, the implementation of WhatsApp Business API has been proven to be able to accelerate customer responses, support automatic notifications, and improve the operational efficiency of MSMEs (Nisa et al. 2025). Connecting WhatsApp Business API with a web-based e-commerce system allows the system to send automated messages such as order confirmations, order details, and delivery information directly to customer chats or to sellers. With a system like this, the ordering process becomes faster and in accordance with the habits of Indonesian users who are very familiar with the chat application.

### 4. UMKM (Usaha Mikro, Kecil dan Menengah)

MSMEs are a type of productive business run by individuals, households or small-scale business entities. According to Law No. 20 of 2008, MSMEs are defined as business entities that meet certain criteria based on the value of assets and annual income. MSMEs are divided into three categories (Haddawi 2024).

Table 2. UMKM

Category: UMKM	Maximum Assets	Annual Turnover
<b>Micro Enterprises</b>	IDR 50 million (Excluding land and buildings where the business is located)	turnover ≤ IDR 300 million
<b>Small Business</b>	IDR 500 million to IDR 2.5 billion	IDR 300 million to 2.5 billion
<b>Medium Business</b>	IDR 2.5 billion to IDR 10 billion	IDR2.5 billion to IDR50 billion

MSMEs make a major contribution in various aspects of the economy, more than 97% of the workforce in Indonesia is absorbed and contributes more

than 60% to the national GDP. This shows its very important role in the economy. Especially in supporting increased financial inclusion, especially in remote areas that are difficult to reach by large companies. In the digital era, it provides a great opportunity for MSME actors to grow through technology adoption. The digitalization of MSMEs has been proven to increase operational efficiency, expand market access and strengthen business competitiveness. technology-based systems encourage the sustainability of MSME businesses, although this transformation process is still faced with challenges such as digital literacy, limited infrastructure, and financial constraints (Santoso et al. 2025)

## 5. Digital Marketing

Digital marketing is a modern marketing concept that utilizes digital technology and the internet as the main medium in promoting products, building communication with customers, and increasing sales effectively and efficiently. Digital marketing not only focuses on promotional activities through online media, but also includes interactive strategies that allow for a two-way relationship between business actors and consumers in real-time. Digital marketing involves using websites, social media, search engines, email marketing, marketplaces, and instant messaging apps to create business value and improve the customer experience. This concept is growing as the use of the internet and mobile devices in digital trading activities increases.

Theoretically, digital marketing is closely related to modern customer-oriented marketing theory. In this theory, companies are required to understand customer needs through the use of digital data and online consumer behavior. The digital marketing approach allows MSMEs to build more personalized, fast, and measurable communication than conventional marketing. Strategies such as *Search Engine Optimization (SEO)*, *Social Media Marketing*, *Content Marketing*, and *Mobile Marketing* are important parts of increasing product visibility and expanding market reach globally. The implementation of web-based e-commerce integrated with WhatsApp is also part of the *direct digital communication* strategy that can increase customer interaction and speed up the transaction process.

In the context of MSMEs, digital marketing plays an important role in increasing business competitiveness through promotion efficiency and market expansion. According to research by Kraus et al., digital transformation in MSMEs is able to increase marketing effectiveness, operational efficiency, and customer loyalty through the use of integrated digital platforms. The study explained that MSMEs that utilize digital technology have a greater opportunity to reach new consumers than businesses that still use traditional marketing. However, many MSMEs still face obstacles in the implementation of interactive communication technology and customer service automation.

Another study conducted by Dwivedi et al. explains that digital marketing based on social media and digital communication has a significant influence on consumer purchase decisions. Fast, responsive, and personal interaction through digital platforms can increase customer trust in a product or service. Therefore, the integration of order automation features through WhatsApp in the e-commerce system can be an effective strategy in improving the quality of customer service while supporting more adaptive digital marketing. Research by Verhoef et al. confirms that digital transformation in modern business must be able to create a better customer *experience* through the integration of digital communication technology. The use of WhatsApp as a business communication

medium is considered effective because it has a high level of use, is easily accessible, and supports direct communication between customers and sellers. This makes WhatsApp one of the potential digital marketing media to increase customer engagement in MSMEs.

Based on this theoretical description, it can be understood that digital marketing is a digital technology-based marketing strategy that not only functions as a promotional medium, but also as a means of communication, customer service, and strengthening business relationships in a sustainable manner. Therefore, the implementation of a web-based e-commerce system with an automatic ordering feature via WhatsApp for Barokah MSMEs is a form of implementing digital marketing that is innovative and relevant to today's modern business needs.

### **III. RESEARCH METHODS**

#### **3.1. Data Collection Methods**

In this study, several data collection techniques were applied to obtain accurate and relevant information related to the condition of Barokah MSMEs and the needs of the system to be developed. The methods used include observations, interviews, questionnaires, and literature studies.

1. Observations

Observation involves observing information about available procedures, documents used and needed information, as well as other data that supports the design and development of the application system created (Nurhayati, Sucahyo, and Selawati 2021). Observations were carried out to see directly the operational activities of barokah MSMEs, especially in promotion, sales and product orders. Observe how the manual system has been used in ordering and interacting with customers. This observation aims to identify problems that occur in the field and understand the real workflow that will be the basis for system design.

2. Interview

The interview is conducted by asking questions that have been prepared to the owners or managers of MSMEs to dig up as much information as possible about the obstacles faced. with the aim of an e-commerce system that will be built according to the conditions and capabilities of users and provide real solutions to existing problems.

3. Literature Study

Literature study is a data collection technique that is carried out to support the research process. The literature study used was taken according to the research topic, which came from several sources, such as journals, books, articles, and official documents related to e-commerce, information systems, WhatsApp API, and digitization of MSMEs.

4. Questionnaire

Questionnaire is a method of data collection carried out by giving a series of questions to respondents. The answers from these respondents are used to evaluate the results of research or the results of the system that is being developed.

#### **3.2. System Development Methods**

The model used in this system is the waterfall model. The waterfall model or often known as the waterfall model is one of the models in *the Software Development Life Cycle* (SDLC). The waterfall model is a work approach that emphasizes regular and systematic stages. It is known as a waterfall because

the process of flowing one direction downwards like a waterfall, where the steps must be followed in order according to the specified stages (Setiawan 2021).

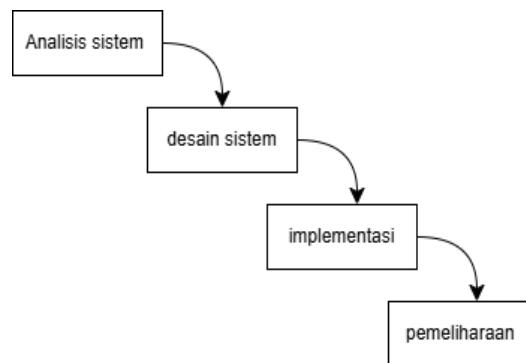


Figure 1. Waterfall Method

1. System analysis  
The initial stage is the analysis of the needs of the system to be built. This stage is carried out through observation and interviews with Barokah MSME actors to find obstacles in the product ordering process and the main needs of the e-commerce system.
2. System design  
The system design stage is a stage that focuses on system design based on the results of needs analysis. With the aim of planning and describing the framework of the system to be developed. In the system design process, the UML (*Unified Modeling Language*) approach is used which includes several types of diagrams, such as Use Case diagrams, Activity diagrams, Class diagrams and Sequence diagrams.
3. System implementation  
This stage is the process of programming an e-commerce system that is built according to predetermined needs. The process of developing this system utilizes basic programming languages such as HTML, CSS and JavaScript. As well as testing the system to see if it can be used by users and ensure that the system runs properly according to the functions that have been determined
4. Maintenance  
After the system is used by the user, system maintenance will be carried out regularly to ensure that the system performance runs stably and according to the user's needs.

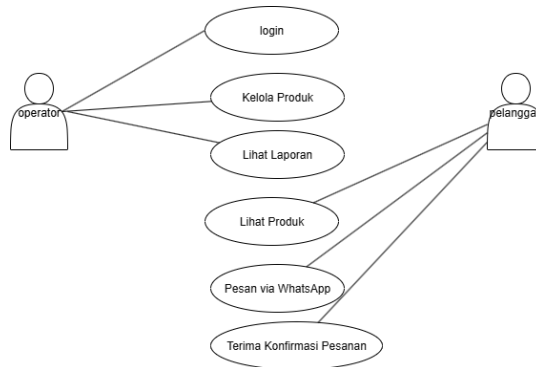
## IV. RESULTS

### 4.1. System design

System design is a design stage in system development that is designed according to the needs of the system. In this study, it is described using *Unified Modeling Language* (UML). UML is a standard language used to model, design, and document software systems and object-based systems (Horizon 2024).

#### a. Use case diagram

A use case diagram is a modeling to show the behavior of information systems that will be disrupted (Adawiyah and Sulianta 2024). This diagram is the initial stage for the user to see the initial appearance of a system.



Gambar 2. Use Case Diagram

The use case in this e-commerce system has two actors, namely operators and customers. Operator actors can log in to the system, Manage products and view reports. Meanwhile, customers can view products, orders via whatsapp and receive order confirmation.

**b. Activity diagram**

An activity diagram is a diagram that functions to model the processes that take place in a system, the sequence of which is described vertically. (Intern 2021) The following is a diagram of activities in this study.

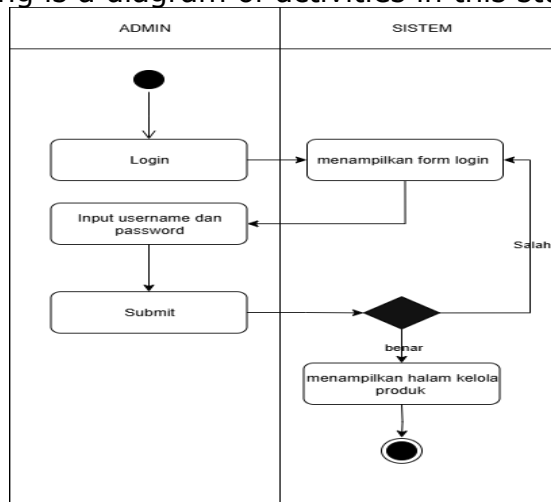


Figure 3. Activity diagram login

The activity diagram in the image above explains the admin login process to the system, starting with the input of the username and password, after the input it will be confirmed whether the username password is correct or false, if it is correct then the product management page will be displayed and if it is wrong it will be returned to the login form page. Next below is an activity diagram for customer product orders.

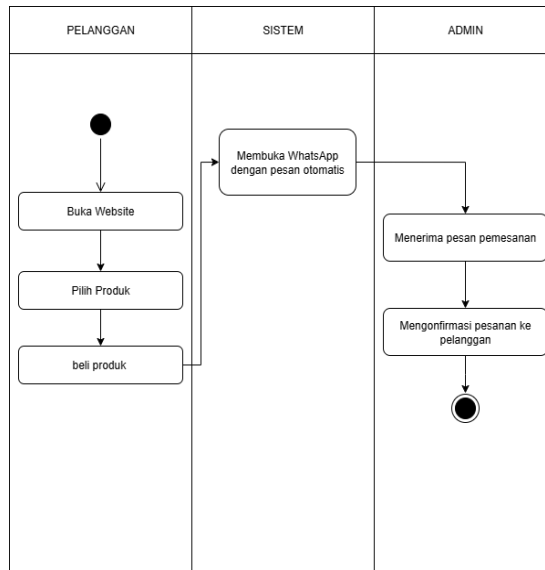
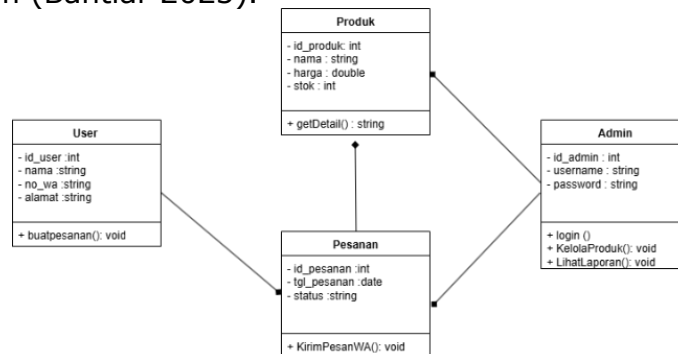


Figure 4. Activity diagram of customer product ordering

The activity diagram in figure 4 explains how customers order products, starting with customers opening the website, selecting products and purchasing products. After clicking buy the product, the customer will be directed to whatsapp to place an order, the admin will receive a message and will confirm the order to the customer.

**c. Class diagram**

Class diagrams are used to describe objects and relationships in the system, as well as their static-based structures. They can use it to design a database that will store information, the total structure of the system, and the area of the system (Bahtiar 2023).



Gambar 5. Class diagram

The class diagram in figure 5 is an overview of the data structure of the barokah MSME e-commerce system. By having 4 classes, namely, user, order, admin, and product. The relationship of each class shows that users can create orders, admins can manage products and orders, and orders have references to the products ordered.

**d. Sequence diagram**

A sequence diagram is a diagram used to visualize the interactions between objects in a system in a sequence. This diagram depicts the message or instruction sent between objects and the time of their implementation (Prasatya 2025).

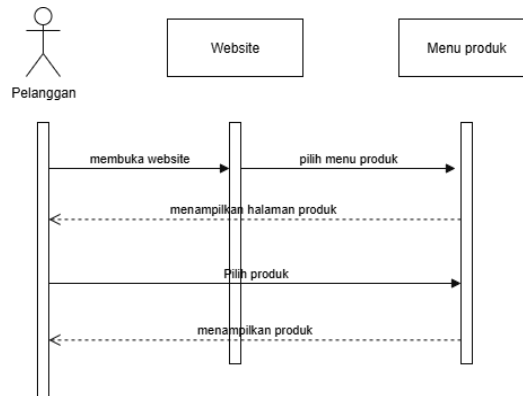


Figure 6. Sequence diagram view product

A product view sequence diagram illustrates the customer's process in viewing a product. Starting by opening the website then selecting the product menu so that the system will display several products in Barokah MSMEs.

## 4.2. Implementation

### 1. Menu Home (Beranda)

The Home Menu is the main page on the Barokah MSME *Mobile E-Commerce Web* platform which is designed as a center for information and product promotion. On this page, users can see promotional banners, product categories, popular products, and the latest products displayed dynamically. The system works by displaying product data from the database automatically so that customers can obtain product information quickly and in real-time. In addition, the product search feature makes it easy for customers to find products as needed without having to manually search through the entire catalog.



Figure 7. Main Menu Page

In terms of digital marketing, the home page functions as the main branding and promotional media for Barokah MSMEs. Promotional banners are used to draw customers' attention to specific featured products, discounts, or promos. The placement of popular categories and the latest products is a *visual marketing* strategy that can increase customer buying interest through attractive and responsive product displays on mobile devices. With a simple yet interactive design, this page helps improve the *user experience* and expand the reach of online MSME digital marketing.

## 2. Menu Products

The Product Menu functions as a digital catalog that displays all Barokah MSME products in a structured manner based on certain categories. The system works by taking product data from the database and then displaying information in the form of product images, product names, prices, ratings, and stock of goods. Customers can filter and search for products so that the search process becomes faster and more efficient. In addition, the system also supports a mobile-based responsive display so that customers can shop comfortably using smartphones.

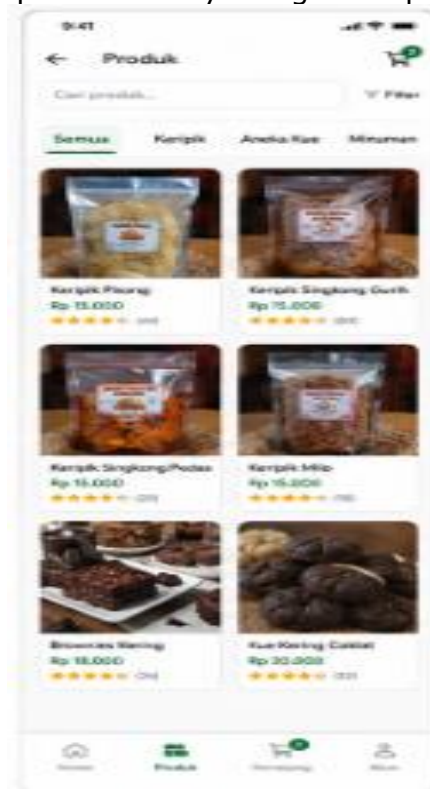


Figure 8. Product Display Menu and Customer Rating Reting

From the marketing aspect, the product menu plays an important role in increasing the visual appeal of the product through the display of quality photos and clear price information. This strategy supports the concept of *digital product display* that is able to increase customer trust in MSME products. The existence of customer ratings and reviews is also part of a *social proof marketing* strategy, which is to build the confidence of potential buyers through previous customer experiences. Thus, product pages are not only a medium of transactions, but also an effective means of digital promotion.

### 3. Product Detail Menu

The Product Details menu is used to display product information in a more complete and specific manner. The system works by displaying product details such as large-size product photos, product descriptions, prices, stock, product variations, as well as direct order buttons. On this page, customers can specify the purchase amount before proceeding with the ordering process. The system also provides the integration of the "Message via WhatsApp" button that automatically connects customers with sellers through the WhatsApp application.



Figure 9. Product Review Details

In terms of digital marketing, the product detail page functions to increase *customer engagement* through the presentation of complete and attractive product information. A clear product description helps customers understand the quality and benefits of the product, thereby increasing the chances of a purchase transaction. In addition, the use of attractive product images is a *visual content marketing* strategy that can increase customer interest. WhatsApp integration is also a form of *direct marketing communication* that allows for quick communication between customers and sellers in real-time.

### 4. Online Message Menu Direct to WhatsApp Seller

The Online Message Menu is the main feature that integrates the e-commerce system with WhatsApp as an automatic communication medium between customers and sellers. The system works by automatically sending order data to the seller's WhatsApp when the customer presses the "Send Message via WhatsApp" button. Information such as product name, purchase amount, subtotal, and customer message will be sent directly to the Barokah MSME admin WhatsApp number. With this system, customers

do not need to manually retype orders so that the transaction process becomes faster and more practical.

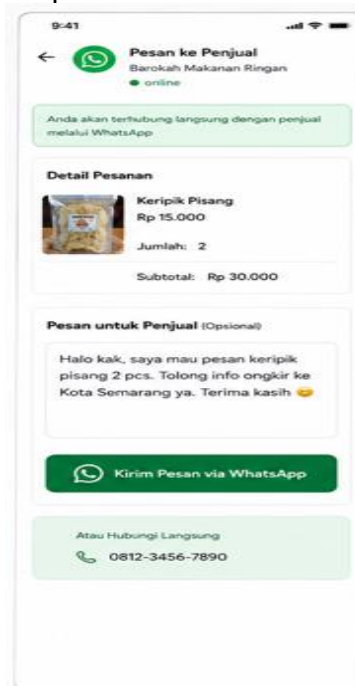


Figure 10. Fast Order with WhatsApp Feature

From the marketing side, the WhatsApp feature is a *conversational marketing* strategy that is very effective in increasing customer interaction. WhatsApp has a high usage rate so that business communication becomes easier and more personalized. In addition, this feature supports *customer relationship marketing* strategies because customers can directly ask about products, stock, or delivery. WhatsApp integration also increases customer trust because of direct communication with sellers so that it can increase the sales potential of MSMEs digitally.

#### 4.3. Analysis of research results

The results of the study show that the implementation of *the Barokah MSME Mobile E-Commerce Web* system has a positive influence on increasing the effectiveness of digital marketing and customer service. The test was conducted on 76 active customers who used the app during the period of July to September 2025. The research instrument used a questionnaire based on the Likert scale with indicators of ease of use of the system, interface display, transaction speed, quality of communication via WhatsApp, customer satisfaction, and repurchase interest. Based on the results of quantitative data processing, a user satisfaction level of 88.6% was obtained with the category of "very good". These results show that the developed system is well received by Barokah MSME customers. In the aspect of *perceived ease of use*, the results of the study showed a percentage value of 90.2%. The majority of respondents stated that the application is easy to understand and easy to use even though it is accessed through a smartphone device with standard specifications. These findings are in line with the concept of the Technology Acceptance Model (TAM) which explains that ease of use is the main factor in the acceptance of technology by users. The results of this study support research conducted by Davis (1989), Verhoef et al. (2021), and Kraus et al. (2022) which states that

a simple and responsive digital system is able to increase user acceptance of digital-based e-commerce platforms.

Based on the user *interface indicator*, the study obtained a score of 87.4%. Respondents assessed that the application design has an attractive appearance, easy to understand navigation, and a more informative product presentation than conventional marketing methods. A clear visual display of the product is able to increase the interest of customers to make a purchase. This is in accordance with research by Chaffey and Ellis-Chadwick (2022) who explain that visual design in digital marketing has a great influence on customer purchase decisions. In addition, research by Pantano et al. (2022) also shows that the quality of e-commerce displays can significantly improve the user *experience*.

In the indicator of transaction speed and the automatic ordering process through WhatsApp, a score of 92.1% was obtained, which is the highest score in this study. Customers feel that the automatic ordering feature makes it easier to communicate with sellers without having to do manual recording. The system is able to send order details directly to the WhatsApp admin so that the transaction process becomes faster and more efficient. These results support the research of Dwivedi et al. (2021) who stated that digital communication based on instant messaging applications is able to increase the effectiveness of customer service and speed up the online business transaction process. From the aspect of customer interactive communication, a score of 89.3% was obtained. Customers feel more comfortable because they can communicate directly with Barokah MSME admins via WhatsApp. This feature is considered to help customers in obtaining product information, shipping costs, and the latest promos quickly. Research by Al-Omouh et al. (2023) explains that the integration of digital communication technology in MSMEs is able to improve customer *relationship management* and consumer loyalty. Thus, the integration of WhatsApp in the e-commerce system is one of the important innovations in supporting MSME digital marketing strategies.

The results of the study also showed an increase in *repurchase intention* with a percentage value of 86.8%. Most customers expressed interest in making a repurchase because the ordering process is easier, faster, and more practical. The convenience factor of digital transactions is the main reason customers choose to use the Barokah MSME application instead of manual ordering through ordinary social media. These findings are in line with research by Verhoef et al. (2021) who stated that a positive customer experience in digital platforms can increase customer loyalty and sustainability of customer transactions. In the digital marketing effectiveness indicator, a score of 88.9% was obtained. Customers consider that the product information displayed through the system is more attractive and accessible than conventional promotional methods. The existence of promotional banner features, digital product catalogs, and direct communication through WhatsApp makes customers faster to find out the latest products and available promos. Research by Kraus et al. (2022) explains that the use of digital platforms in MSMEs is able to expand the market and significantly increase the effectiveness of promotions through the integration of digital technology.

The results of the analysis show that the use of a mobile web-based e-commerce system is able to increase the operational efficiency of Barokah MSMEs. Before the system was implemented, the order recording process was done manually through regular chat so that recording errors often occurred. After the implementation of the system, the order data is stored automatically

and is more organized. Based on the observation results, the error rate of order recording decreased by 73%. These results support the research of Molina et al. (2022) and Akmal & Sutabri (2023) who stated that the digitization of MSMEs is able to improve the efficiency of administration and management of business transactions. In terms of overall customer satisfaction, an average score of 89.1% was obtained with the excellent category. Customers stated that the system provides easy access to information, speed of service, and a more modern shopping experience. This shows that the implementation of the system not only affects the increase in transactions, but also the quality of MSME digital services. Research by Chaffey and Ellis-Chadwick (2022) explains that the quality of digital services is an important factor in the success of technology-based marketing strategies.

Based on the results of the overall quantitative testing, it can be concluded that the implementation of *the Mobile E-Commerce Web system* with the automatic ordering feature through WhatsApp has succeeded in increasing the effectiveness of digital marketing, customer communication, transaction efficiency, and customer satisfaction in Barokah MSMEs. The developed system has proven to be able to answer the weaknesses of previous research that has not integrated automated communication and WhatsApp-based interactive services. With a high user acceptance rate, this system has great potential to be further developed as a model of digital transformation of MSMEs based on mobile commerce and modern digital marketing.

## **V. CONCLUSION**

Based on the results of the research on the implementation of *the Mobile E-Commerce Web system* with the automatic ordering feature via WhatsApp in Barokah MSMEs, it can be concluded that the developed system has succeeded in significantly increasing the effectiveness of digital marketing, the quality of customer service, and the efficiency of sales transactions. The implementation of a mobile web-based system makes it easy for customers to access product information, search for products, view product details, and place orders directly through WhatsApp integration. This system is also able to provide a faster, more practical, and interactive transaction experience than conventional marketing and ordering methods. The results of quantitative testing of 76 customers during the period from July to September 2025 showed that the user acceptance rate of the system was in the very good category with an average satisfaction percentage of 89.1%. The usability indicator obtained a score of 90.2%, interface display of 87.4%, interactive communication via WhatsApp of 89.3%, and transaction speed and automatic ordering of 92.1%. The data shows that the integration of WhatsApp-based digital communication features is one of the main factors in improving customer comfort and the effectiveness of Barokah MSME services. In addition to improving the quality of customer service, this system is also able to support MSME digital marketing strategies through the display of digital product catalogs, promotional banners, and real-time communication with customers. The implementation of the system has been proven to help MSMEs expand market reach, increase customer repurchase interest, and facilitate the management of transaction data in an organized manner. The rate of order recording errors also decreased after the system was implemented, making business operations more efficient. This research shows that the implementation of a mobile web-based e-commerce system integrated with WhatsApp can be an innovative solution in supporting the digital transformation of MSMEs. This system not only increases the effectiveness of

digital marketing, but is also able to strengthen customer relationships and increase the competitiveness of Barokah MSMEs in the modern digital business era.

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