

Utilization of Mobile Applications for Digital Marketing of MSMEs: Challenges and Opportunities in Central Lampung

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Abstract – This study aims to identify and recommend the development of a digital marketing application for MSMEs in Central Lampung, with a focus on addressing operational challenges and limited market access. Using the Systems Development Life Cycle (SDLC) approach with the Waterfall method, this research examines the necessary features to improve operational efficiency, expand market reach, and support data-driven decision-making. The key features recommended include a digital product catalog, payment integration, customer notifications, order tracking, and an analytics dashboard. This application is expected to reduce reliance on costly traditional promotional methods, while enhancing product visibility and customer interaction. However, challenges such as low digital literacy and limited internet infrastructure in some areas remain barriers that must be addressed through training, infrastructure improvement, and incentive strategies. The study suggests further research to evaluate the long-term impact and the potential application of advanced technologies to support more personalized and effective marketing strategies for MSMEs.

Keywords: Digital Transformation; Waterfall Method; SDLC; MSMEs; Application Development

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Abstrak – Penelitian ini bertujuan untuk mengidentifikasi dan merekomendasikan pengembangan aplikasi pemasaran berbasis digital bagi UMKM di Lampung Tengah, dengan fokus pada penyelesaian tantangan operasional dan akses pasar yang terbatas. Menggunakan pendekatan *System Development Life Cycle (SDLC)* dengan metode Waterfall, penelitian ini mengkaji kebutuhan aplikasi yang relevan untuk meningkatkan efisiensi operasional, memperluas jangkauan pasar, dan mendukung pengambilan keputusan berbasis data. Fitur utama yang direkomendasikan meliputi katalog produk digital, integrasi pembayaran, notifikasi pelanggan, pelacakan pesanan, dan dasbor analitik. Sehingga aplikasi ini diharapkan dapat mengurangi ketergantungan pada metode promosi tradisional yang mahal, serta meningkatkan visibilitas produk dan interaksi pelanggan. Meskipun demikian, tantangan seperti rendahnya literasi digital dan keterbatasan infrastruktur internet di beberapa wilayah menjadi hambatan yang perlu diatasi melalui pelatihan, perbaikan infrastruktur, dan strategi insentif. Penelitian ini menyarankan penelitian lanjutan untuk mengevaluasi dampak jangka panjang dan potensi penerapan teknologi canggih untuk mendukung strategi pemasaran UMKM yang lebih personal dan efektif.

Kata Kunci: Transformasi Digital, Metode Waterfall, SDLC, UMKM, Pengembangan Aplikasi.

I. INTRODUCTION

Digital transformation has become a crucial pillar in supporting economic growth, especially for Micro, Small, and Medium Enterprises (MSMEs) [1], which serve as the backbone of the economy in many regions, including Central Lampung. MSMEs in this area contribute significantly to job creation and community welfare. However, several major challenges, such as limited market access, low digital literacy, and a lack of understanding of data-driven marketing strategies, hinder the potential of MSMEs to compete in an increasingly competitive market [2].

According to data from the Central Lampung Regency Statistics Agency (BPS) (2022), there are currently 795 MSME units operating in the region. However, this number is in stark contrast to the total number of MSMEs in Lampung Province, which stands at 273,457. More alarmingly, only about 70% of these MSMEs have effectively adopted digital marketing strategies (Radar Lampung, 2022). This disparity highlights a significant digital gap, particularly in remote and rural areas such as Central Lampung, where around 30% of local MSMEs still rely on traditional marketing methods. This limits their ability to reach broader markets and compete effectively in an increasingly digital world.

Furthermore, existing digitalization efforts often prioritize national or even global markets [3], neglecting the specific challenges and characteristics that MSMEs in Central Lampung face. These challenges include limited access to advanced digital infrastructure, insufficient digital literacy, and the absence of locally tailored solutions that could empower MSMEs to fully leverage digital marketing. Therefore, there is an urgent need for

initiatives that address this gap by considering the region's context and providing affordable, user-friendly digital tools that are suitable for the operational realities of MSMEs.

Previous studies have shown that mobile application-based digital marketing can expand market reach [4], improve operational efficiency, and enhance MSME competitiveness. For instance, a report from the Indonesian Internet Service Providers Association (APJII, 2023) noted that 78% of MSMEs using digital platforms experienced a 30% increase in revenue. Additionally, a study by Chiu-ching Lin (2021) found that local e-commerce applications could increase the sales of rural MSMEs by 38% within a year [5]. However, many existing applications are designed generically and often overlook the specific needs of local MSMEs, such as limited connectivity and low technological literacy [6].

This research aims to bridge the digital gap faced by MSMEs in Central Lampung by providing recommendations for the development of a mobile-based digital marketing application specifically designed to meet their needs [7]. This study does not directly develop the application but provides recommendations on features that could be developed and implemented by application developers. This research adopts the Systems Development Life Cycle (SDLC) approach with the Waterfall method to ensure a systematic and structured process for application development based on user needs.

The Waterfall method was chosen because of its structured approach, allowing each phase, from needs analysis, system design, implementation, testing, and maintenance, to be completed sequentially [8]. In the needs analysis phase, this study conducts surveys and interviews with MSME actors to identify the main challenges they face in digital marketing, such as limited infrastructure, low digital literacy, and a lack of data-driven marketing strategies [9]. This information serves as the foundation for the system design phase, where the application is designed with features that are technically relevant, functionally effective, and easy to use by MSMEs.

Key features proposed for this application include an interactive product catalog, data-driven sales analytics, and an automated notification system, all aimed at helping MSMEs improve product visibility, accelerate transactions, and strengthen consumer engagement [10]. These features were chosen based on survey results indicating the urgent needs of MSMEs in Central Lampung.

The advantage of the Waterfall approach is that each development phase is completed fully before moving to the next, ensuring that each system component is optimally developed and tested [11]. In the implementation phase, the application will undergo user testing to assess its effectiveness in enhancing MSMEs' digital engagement. User feedback will be incorporated into the testing and evaluation phase to ensure the application is truly adaptable to local conditions and easily adopted by MSMEs with varying levels of digital literacy.

The uniqueness of this research lies in its application of the Waterfall method within the SDLC, enabling a systematic and needs-based development approach tailored to the specific challenges faced by MSMEs in Central Lampung. By considering digital infrastructure limitations, resistance to change, and low digital literacy, this study aims to provide an innovative, sustainable, and effective technological solution to drive MSME digital transformation. Moreover, by incorporating data-driven marketing strategies, this application is expected to enhance the competitiveness of local MSMEs and create a more inclusive and growth-oriented digital marketing ecosystem in Central Lampung.

II. METHOD

This study adopts the System Development Life Cycle (SDLC) approach using the waterfall method to understand the specific needs of MSMEs in Central Lampung within the context of digital marketing [12]. This approach is chosen as it allows for direct data collection from respondents, providing a comprehensive overview of the challenges and opportunities faced by MSME actors. The analysis results serve as the foundation for designing technology-based solutions tailored to their needs.

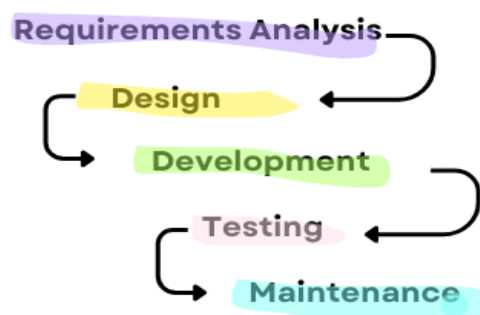


Figure 1. Software Development Life Cycle – Waterfall Models

A. *Development Stages*

The application development process in this research involves several key stages:

1. *Needs Analysis*

This stage focuses on identifying the digital marketing needs of MSMEs based on survey data [13]. The emphasis is on understanding the required application features, such as product catalogs, payment systems, and customer notifications. The analysis uses a descriptive approach to identify patterns of needs.

2. *Mobile UI Interface*

Based on the needs analysis results, the research team designed a mobile UI interface prototype by adopting user-centered design principles [14]. This design prioritizes usability, user-friendly interface, and compatibility with mobile devices. Tools such as Figma or Adobe XD are utilized to create wireframes and mockups.

3. *Application Testing*

Once the prototype is complete, the application undergoes functional testing and user testing [15]. Functional testing ensures that all features operate according to specifications, while user testing involves MSME actors to evaluate the application's usability and relevance.

B. *Research Subjects*

The research subjects consist of MSME actors in Central Lampung from various sectors, such as food and beverages, handicrafts, and apparel. The criteria for selecting subjects include:

1. MSMEs that have not yet optimized the use of digital technology.
2. MSMEs that are willing to enhance their marketing efforts through digital platforms.
3. MSMEs with potential for market expansion supported by technology.

A total of 80 MSME respondents were selected through purposive sampling to ensure adequate representation across various sectors.

C. *Survey Methodology and Implementation*

The survey conducted with MSMEs in Central Lampung aimed to identify their primary needs for a digital marketing application. The survey process was systematically designed to generate feature indicators using a structured questionnaire that measured the importance and satisfaction levels of various digital marketing features based on a Likert scale.

1. *Questionnaire Design:*

- 1) The questionnaire was designed to evaluate MSME needs across five key aspects: product catalog, payment integration, customer notifications, order tracking, and analytics dashboard.
- 2) Each feature was assessed based on its importance (how crucial it is for business operations) and satisfaction (whether existing solutions meet these needs) using a five-point Likert scale (1 = Not Important, 5 = Very Important).

2. *Survey Distribution:*

- 1) The survey was distributed both online and in person to ensure broad participation from MSMEs with varying levels of digital literacy.
- 2) A total of 80 MSMEs participated, representing various sectors such as retail, food & beverages, fashion, and handicrafts.

3. *Data Processing & Indicator Determination:*

- 1) The collected data was analyzed to determine the percentage of respondents who desired each feature, based on high scores (Likert scale 4 and 5).
- 2) A 50% or higher threshold was set to classify features as essential requirements for the application.

D. *Data Collection*

The data collection process in this research follows a structured approach based on the Systems Development Life Cycle (SDLC) using the Waterfall method, ensuring that each development stage is conducted systematically. The data collection methods used include:

1. *Needs Analysis through Interviews*

At the needs analysis stage, direct interviews are conducted with MSME actors to gather in-depth insights into their marketing challenges, technological limitations, and barriers to digital adoption. This stage is crucial for defining user requirements, which serve as the foundation for application development.

2. *Needs Assessment through Surveys with Questionnaires*

To quantify the specific needs of MSMEs, structured questionnaires are employed. These questionnaires utilize a Likert scale to measure the level of importance and satisfaction regarding various application features, ensuring that the system design aligns effectively with user needs.

3. *Validation through Focus Group Discussions (FGDs)*

During the system design stage, FGDs are conducted to refine and validate the conceptual framework and application prototype. This iterative feedback process ensures that the system architecture, user interface, and functionality meet the actual needs of MSMEs. The insights obtained from this stage guide the implementation and testing phases of the application.

By integrating these data collection methods into the SDLC framework using the Waterfall approach, the development process is structured, sequential, and user-oriented. This approach ensures that the final application is technically stable, functionally effective, and easily adopted by MSMEs [16]. This comprehensive methodology enhances the application's usability, aligns technological solutions with user expectations, and supports the sustainable digital transformation of MSMEs in Central Lampung.

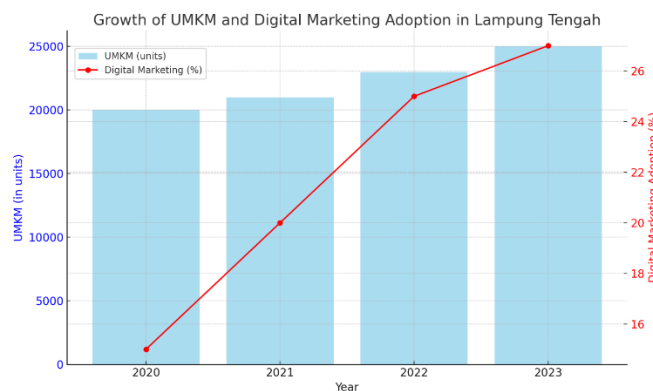


Figure 2. Growth of MSMEs and Digital Marketing in Central Lampung

The following data and chart represent the development of MSMEs in Central Lampung and the adoption of digital marketing:

TABEL 1
 GROWTH OF MSMEs IN CENTRAL LAMPUNG AND ADOPTION OF DIGITAL MARKETING

Year	UMKM in Lampung Tengah (in units)	Percentage Utilizing Digital Marketing (%)
2020	20,000	15
2021	21,000	20
2022	23,000	25
2023	25,000	27

The graph illustrates the growth in the number of MSMEs and the increase in digital marketing adoption in Central Lampung from 2020 to 2023.

E. *Reinforced Narrative*

1. *Introduction:* The graph and table support the introductory statement that the number of MSMEs in Central Lampung has been steadily increasing. Despite this significant growth, the rate of digital marketing adoption remains relatively low, reaching only 27% in 2023. This indicates a gap that needs to be addressed through technology-based solutions, such as the development of mobile applications.
2. *Literature Review:* The data also underscores the importance of adopting digital technology to address MSME marketing challenges. Previous studies indicate that MSMEs leveraging digital technology have the potential to increase sales by up to 30%. However, the low adoption rate of technology by MSMEs in Central Lampung highlights the urgent need to provide broader and more affordable access to technology

III. RESULTS AND DISCUSSION

The survey results provide a comprehensive identification of the key needs of MSMEs concerning digital marketing, highlighting areas where businesses require the most support and technological integration. Based on these findings, the application is designed with core features tailored to address these needs, including a user-friendly product catalog, integrated payment functionalities, and other essential tools that cater specifically to the operational requirements of MSMEs. In the discussion, an in-depth analysis explores how this application can play a pivotal role in enhancing MSME marketing strategies in Central Lampung, offering solutions to streamline business operations, improve customer engagement, and drive growth through efficient digital marketing tools.

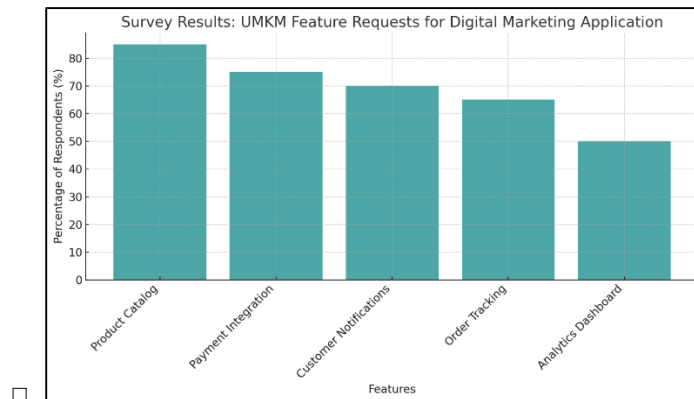


Figure 3. Survey Results: MSME Feature Requests for Digital Marketing Applications

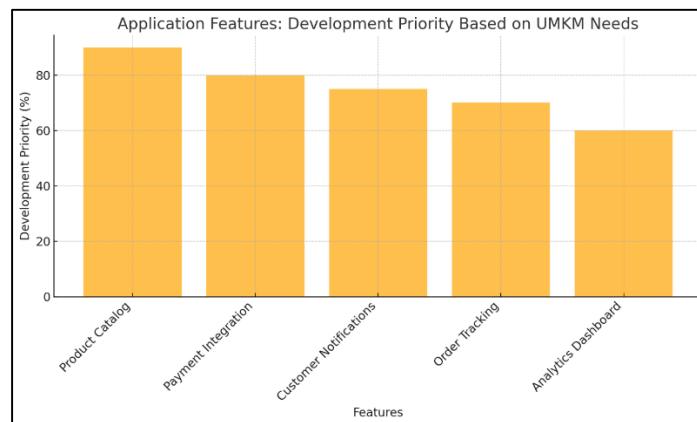


Figure 4. Application Features: Development Priorities Based on MSME Needs

Figure 3. shows the percentage of respondents who requested specific features for the digital marketing application and Figure 4. illustrates the priority development of application features based on the needs of MSMEs identified in the survey.

A. Survey Results

The survey conducted with MSMEs in Central Lampung identified the following primary needs for a digital marketing application:

1. *Product Catalog (85%)*: The majority of respondents desired this feature to systematically display their products. It is expected to make it easier for customers to find desired products without difficulty.
2. *Payment Integration (75%)*: The convenience of digital transactions, such as through e-wallets and bank transfers, was highlighted as a primary need.
3. *Customer Notifications (70%)*: This feature is considered crucial for providing real-time updates on orders or promotions to customers.

4. *Order Tracking (65%)*: Respondents expressed the need for this feature to enhance customer trust in the product delivery process.
5. *Analytics Dashboard (50%)*: Half of the respondents wanted analytics features to help them understand sales trends and customer preferences.

TABEL 2
 SURVEY RESULTS: MSME REQUESTED FEATURE

Features	Percentage of Respondents Requesting Feature (%)
Product Catalog	85
Payment Integration	75
Customer Notifications	70
Order Tracking	65
Analytics Dashboard	50

B. Application Design

Based on the comprehensive survey results, the application design was meticulously developed to address the primary needs of MSMEs, focusing on high-priority features identified as essential for improving operational efficiency and enhancing customer experience. These features were carefully tailored to ensure maximum impact in the digital marketing and operational management of MSMEs:

1. Product Catalog:

- 1) The application provides an intuitive and visually appealing interface for displaying products, organized by categories to facilitate easy navigation. Each product listing includes detailed descriptions, high-quality images, and clear pricing, enabling potential customers to make informed purchasing decisions.
- 2) This feature greatly enhances product discoverability, allowing customers to effortlessly browse and explore offerings, which is crucial in a competitive online market. The layout has been designed with user experience in mind, ensuring a seamless and engaging browsing process that encourages further interaction.

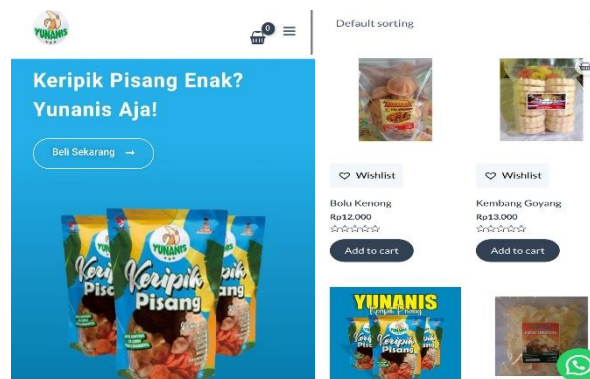


Figure 5. Product Catalog Design

2. Payment Integration:

- 1) The application supports a wide range of digital payment methods, including popular e-wallets such as OVO and GoPay, as well as traditional bank transfers. This flexibility provides customers with multiple options to complete their transactions, significantly enhancing convenience and accessibility.
- 2) Additionally, the payment integration ensures secure, fast, and seamless transaction processing, creating a trustworthy and reliable experience for both customers and MSMEs. This feature also helps to streamline financial operations for MSMEs, minimizing the risk of payment delays and enhancing cash flow management.

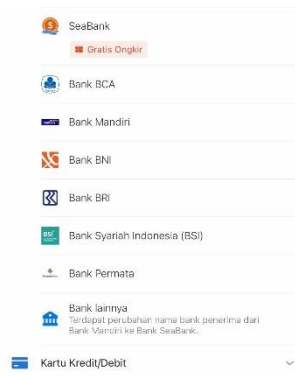


Figure 6. Payment Integration

3. Customer Notifications:

- 1) The application includes a robust notification system that delivers real-time updates to customers, such as order status changes, promotional offers, and discount alerts. Push notifications are utilized to ensure that customers stay informed and engaged, improving their overall shopping experience.
- 2) By keeping customers well-informed about the status of their orders and available promotions, the application fosters greater customer satisfaction, encourages repeat purchases, and helps maintain long-term customer loyalty. This feature is pivotal in building strong customer relationships in the digital marketplace.

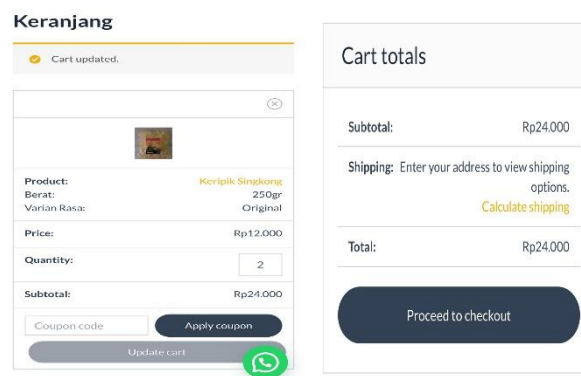


Figure 7. Customer Notification

4. Order Tracking:

- 1) One of the standout features of the application is its order tracking functionality, which allows customers to track their product deliveries in real-time. By providing continuous updates on the location and status of deliveries, MSMEs can offer a more transparent and customer-centric service.
- 2) This feature not only builds trust but also reduces customer anxiety by ensuring that they are always aware of where their order is in the shipping process. Furthermore, the ability to track deliveries empowers customers to plan accordingly, thus enhancing their overall experience with the MSME.



Figure 8. Order Tracking

5. *Analytics Dashboard:*

- 1) The application offers a comprehensive analytics dashboard, which provides MSMEs with valuable insights into their sales performance, including detailed reports on best-selling products, customer demographics, and purchasing trends. This data is crucial for MSMEs looking to fine-tune their business strategies and marketing efforts.
- 2) By leveraging the data presented in the dashboard, MSMEs can make informed, data-driven decisions that enable them to optimize product offerings, target marketing campaigns more effectively, and ultimately increase revenue. This analytical capability is particularly valuable in helping MSMEs transition to a more competitive and informed digital business environment.

TABEL 3
APPLICATION FEATURE DEVELOPMENT PRIORITIES

Feature	Development Priority (%)
Product Catalog	90
Payment Integration	80
Customer Notifications	75
Order Tracking	70
Analytics Dashboard	60

C. *Discussion*

1. *Effectiveness of Digital Solutions for MSMEs*

This application has great potential to enhance the operational efficiency of MSMEs[17]. By integrating product catalogs and digital payments, MSMEs can reduce their dependence on traditional marketing methods, which tend to be more costly. The use of digital technology enables them to run marketing processes more efficiently, boosting competitiveness while reducing long-term operational costs.

2. *Broader Market Reach*

With this application, MSMEs in Central Lampung can expand their reach, not only within the local area but also outside the province. Data shows that using digital platforms can increase market reach[18] to 35% for MSMEs that adopt them. This offers MSMEs the opportunity to reach customers who were previously difficult to access through traditional marketing methods.

3. *Data-Driven Decision Making*

The application's analytics dashboard allows MSMEs to leverage sales data to understand customer buying patterns. This helps them optimize product stock and develop more targeted promotional strategies. Data-driven decision-making enables MSMEs to respond more quickly to market trends and customer needs, thereby improving overall business performance.

4. *Challenges*

- 1) **Digital Literacy:** Many MSMEs still face limitations in understanding and using technology. To address this, intensive training programs are needed to enhance MSMEs' digital literacy and technical skills in operating digital applications.
- 2) **Internet Connectivity:** Some areas in Central Lampung still have limited internet access, which may hinder the implementation of this application. Improving internet infrastructure in these regions is crucial to fully leverage the application.

D. *Connection with Introduction and Literature Review*

The survey data reinforces the background of the problem outlined in the introduction, highlighting the urgent need for MSMEs to adopt digital solutions to enhance their competitiveness. Moreover, these results align with the findings in the literature review, which emphasize the importance of digitalization as a modern marketing strategy to help MSMEs survive and grow in an increasingly competitive market.

IV. CONCLUSION

This research underscores the significant potential of a mobile-based digital marketing application as a strategic solution to address the operational challenges, market access limitations, and the need for data-driven decision-making among MSMEs in Central Lampung. By recommending key features such as an interactive product catalog, integrated payment systems, customer notifications, order tracking, and a data-driven analytics dashboard, the study highlights how such an application can enhance operational efficiency, broaden market reach, and empower MSMEs to implement effective marketing strategies. These features aim to reduce dependence on traditional and costly marketing methods, allowing MSMEs to reach a wider customer base and

gather actionable insights to respond more effectively to market dynamics. However, the research also identifies key challenges that must be addressed, particularly the low digital literacy and limited internet infrastructure prevalent in certain regions. These barriers necessitate targeted interventions, including digital literacy training, infrastructure improvements, and incentivizing adoption to ensure successful implementation of the application. Furthermore, while this study provides valuable recommendations for the development of the application, further research should focus on evaluating the long-term impact of such digital tools on MSME performance in Central Lampung. Cross-regional studies could provide deeper insights into broader trends in MSME digitalization, while exploring the integration of advanced technologies like artificial intelligence could further enhance analytics capabilities and tailor marketing strategies to individual customer needs. By fostering a combination of technological innovation, capacity building in digital literacy, and strategic infrastructure development, MSMEs in Central Lampung can be empowered to thrive in a digital economy, thus enhancing their competitiveness and contributing to a more sustainable, inclusive digital ecosystem.

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