


MSME business tranformation through mobile e-commerce applications

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Article Info	ABSTRACT
Keywords: Mobile E-commerce, MSMEs Digital Business Growth, Technology Adoption	The expansion of information technology fundamentally alters business operations and social interactions. For MSMEs, e-commerce is emerging as a significant force in digital marketing. Skills deficiencies in technology and restricted market access are obstacles. Mobile e-commerce application adoption offers substantial advantages, including access to international markets, enhanced operational effectiveness, and increased consumer involvement. Adoption of these applications increases the sales and operational efficacy of MSMEs, according to research. For MSMEs, the adoption of mobile e-commerce creates economic expansion and business opportunities. In order to create mobile e-commerce applications that are adaptable to market shifts and user demands, R&D is utilized. The primary functionalities of the application implementation outcomes are as follows user registration, order management, login, item data management, sales, payments, and transaction reports. The application is designed using the UML methodology, which depicts purchasers and system administrators as well as actions that can be executed based on feature requirements.
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INTRODUCTION

The proliferation of information and communication technology has resulted in profound transformations in human interactions and corporate practices. An important consequence of this technology revolution is the emergence of electronic commerce or e-commerce, which has globally transformed the corporate environment[1]. E-commerce has emerged as a significant catalyst for digital marketing and product sales, particularly for MSMEs (Micro, Small, and Medium Enterprises), in the current economic landscape[2]–[4]. MSMEs often face major obstacles in expanding their visibility and competitiveness in digital sales due to limited market accessibility and technology skills[5]. In the swiftly expanding digital age, mobile applications have emerged as the predominant medium via which consumers engage in shopping and interact with many commercial services. MSMEs can gain substantial advantages by incorporating e-commerce mobile applications, including

enhanced access to global markets, expanded client base, improved operational efficiency, and accelerated business expansion[6]–[8].

Previous studies show that the adoption of mobile applications[e-commerce] by MSMEs has a significant positive impact on several key areas[10]–[12]. In terms of increasing sales, research by[13]discusses that MSMEs that use e-commerce mobile applications tend to have a higher increase in sales volume compared to those that only rely on conventional sales[14]–[16]. This is due to wider access to markets, increased attractiveness of products or services, and the ability to reach potential consumers in various locations. In addition, research by[17]–[19]also highlighted improvements in operational efficiency. MSMEs that adopt e-commerce mobile applications often experience improvements in stock management, transaction monitoring, and interaction with customers. This leads to a reduction in operational costs and time required for business processes, allowing MSMEs to focus on innovation and business expansion. Another aspect highlighted is consumer engagement and the formation of stronger relationships between MSMEs and their customers[20]–[22]. E-commerce mobile applications enable MSMEs to interact directly with customers, obtain faster feedback, and provide more personalized service[23]. This not only increases customer satisfaction but also builds deeper trust and loyalty towards the MSME brand or product.

Mobile-based e-commerce enables consumers from many places to access items from MSMEs, so promoting business prospects and contributing to the economic expansion of MSMEs. This study seeks to examine and execute the development of a mobile-centric e-commerce platform to facilitate the marketing and sales of products from micro, small, and medium enterprises (MSMEs) in the industry. This e-commerce platform is anticipated to generate fresh prospects for enterprises to conveniently and effectively offer their products online[24]. Furthermore, this platform is anticipated to enhance market penetration and streamline the interaction between sellers and consumers, while being user-friendly by enabling transactions through consumer devices.

METHODS

The Research and Development (R&D) research method in developing E-Commerce Mobile Applications involves a series of systematic steps[25]–[28]to create or improve e-commerce applications that can be accessed via mobile devices such as cell phones or tablets. The stages that commonly occur in R&D for developing e-commerce mobile applications are:

Needs Identification and Analysis

The initial stage is identifying user and market needs. This involves analyzing e-commerce trends, mobile user preferences, and desired features. Gather information about existing e-commerce applications, analyze their successes and failures, and identify strengths and weaknesses that can be improved[29].

Planning

Developing the concept of the e-commerce mobile application that will be created. This includes features, user interface, security, system integration, and business objectives.

Development

The application development process begins with creating a prototype. It involves a team of developers working on planned functions and features.

Evaluation and Implementation

Blackbox testing can be carried out to determine the functionality of the mobile application that has been developed to determine the suitability of all application features. The R&D method in e-commerce mobile application development requires vigorous iteration, rigorous testing, and rapid response to user feedback to ensure the resulting application can deliver an optimal user experience and meet changing market needs [30], [31].

RESULTS AND DISCUSSION

Analysis of Application Feature Needs

Requirements analysis begins by creating an event list, which is a list of events that occur in a system. Based on the results of the analysis of an e-commerce application for MSMEs, a sequence of application features can be obtained that can support the MSME digital transaction process. There are application features for needs analysis, namely.

1) Login Process

The login process is intended for all users to be able to access product features, orders, payments and others.

2) Process for Managing Goods Data

This process is intended for application administrators to carry out the process of adding, changing and deleting item data according to needs.

3) Sales Data Management Process

This process is intended for application administrators to carry out the process of adding, changing and deleting sales data according to needs.

4) Payment Data Management Process

This process is intended for administrators and consumer application users to carry out the process of adding, changing and deleting payment data according to their needs.

5) Process for Managing User Registration Data

This process is intended for application consumer users in carrying out the profile data registration process.

6) Order Data Management Process

This process is intended for administrators and consumer application users to carry out the process of adding, changing and deleting order data according to product orders that have been made.

7) Generate Report

This process is intended for administrators and consumer application users to view transaction reports that have been carried out based on sales periods.

Application Design

In the application design process, an object-based approach is used, namely using the Unified Modeling Language (UML). In UML there is a use case diagram which is used to explain the processes that can be carried out by each actor of the application.

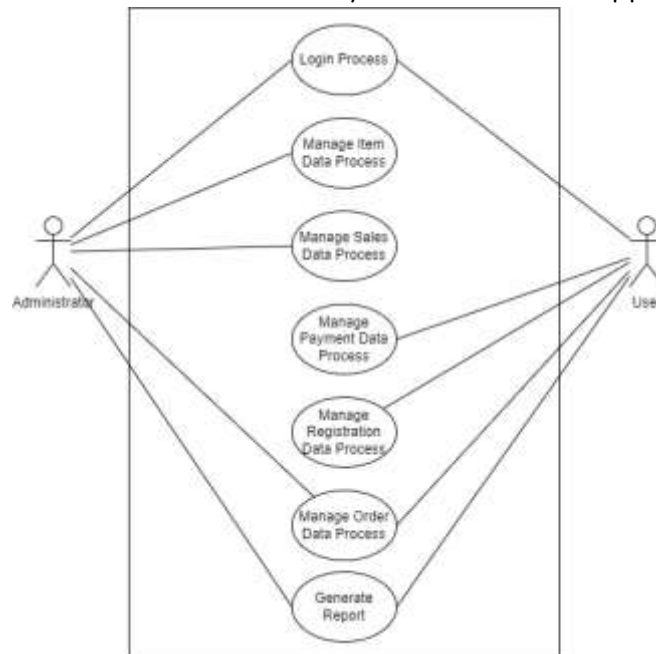


Figure 1. Usecase Diagram for MSME E-Commerce Applications

Based on Figure 1, it can be explained that there are 2 application actors who are application users, namely the system administrator and the buyer. There are several processes that actors can carry out based on the feature requirements analysis in the previous stage. Actor administrators can perform Login Process, Manage Item Data Process, Manage Sales Data Process, Manage Order Data Process, and Generate Reports. Meanwhile, buyer actors can carry out the Login Process, Manage Payment Data Process, Manage User Registration Data Process and Generate Reports.

Application Implementation

Apart from having a user interface in the form of a website, the application that will be built also of course has a user interface in the form of Android. The following is a depiction of the design that has been created, so that later the development of the system can be in accordance with what was previously designed by the author.

Account List Page

As explained above, customers can log in to this e-commerce application if they already have an account. The following is an account registration form that can be filled in by customers before logging in, containing name, email, cellphone number, address and password that will be used later. On this page you can also add a profile photo to be displayed when logging in later.



Figure 2. User Registration Display

Profile Page

After the customer has successfully logged in, what will be displayed next is the profile page according to the data entered previously when registering an account. On this page, customers can also make changes to this data if a replacement process is required by the customer concerned.

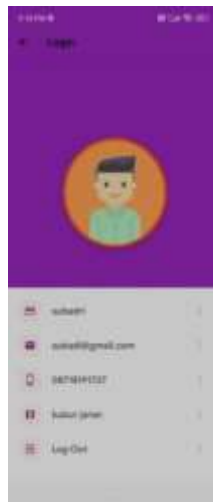


Figure 3. User Profile Page

Item Data Page

If a customer presses one of the product category data, the page that will appear is as below. Data from various products based on categories will be displayed on this page. For more details, look at the following picture

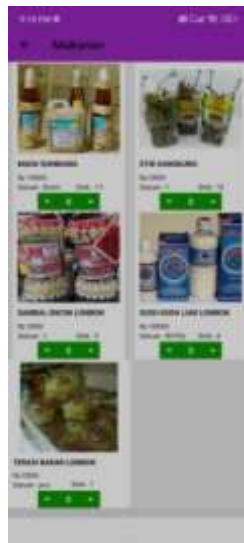


Figure 4. Item Data Page Display

Order Page

This order booking menu functions to accommodate the products that the customer will purchase before making payment. In this menu, the selected products will be displayed along with the total price. Next to the product information there is a delete icon if at any time the customer cancels purchasing a product. If the order has been fixed, the customer can press the order button now to continue purchasing.

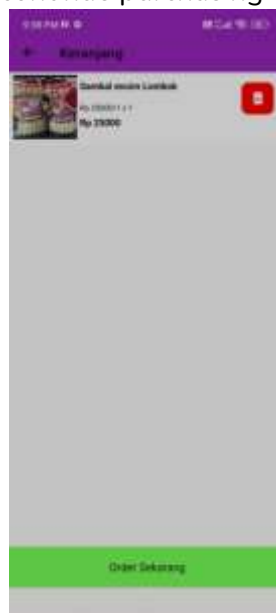


Figure 5. Order page display

Transaction History Page

This transaction history page only contains the date and transaction number. If the payment has been made and validated by the store admin, the date and transaction number columns will change from green to yellow.

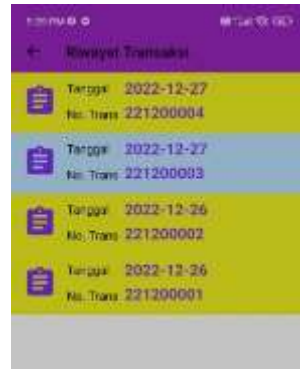


Figure 6. Transaction History Page Display

CONCLUSION

The research concludes that the analysis of the elements of the MSME e-commerce mobile application provides a comprehensive description of the digital transaction process. The primary functionalities encompass authentication, item data administration, sales processing, payment handling, user enrollment, order administration, and transaction reporting. The research and development methodology involves utilizing use case diagrams to illustrate the design and implementation of applications. These diagrams depict players, such as system administrators and customers, along with the actions that can be executed based on the required features. The application implementation encompasses a pre-configured application interface, comprising user registration, order management, login, item data management, sales, payments, and transaction reports. This guarantees that the application adheres to the intended specifications, delivering an excellent user experience for online transactions specifically designed for MSMEs.

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