

Design and Development of a Smart Consignment Application with Automated Document Features for the Consignment Business Model in Indonesia

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Abstract—The consignment business model has become a preferred choice for MSME players in Indonesia, particularly in the food and beverage sector, due to its lower risk without the need to store inventory. However, its implementation faces challenges such as manual invoice processing, record discrepancies between consignor and consignee, and the risk of losing physical documents. This research aims to design the "Konsinyasi Pintar" application with document automation features to support efficient consignment management. The application is built using SwiftUI, SwiftData, and ExpressJS technologies and is equipped with an interactive business statistics dashboard. The research method includes usability testing with consignment business players to ensure the application's suitability. The results show that the application can integrate various management functions, reduce administrative burdens, and speed up consignment business activities by up to 86.1%. The originality of this research lies in integrating document automation technology relevant to the needs of MSMEs in the consignment model in Indonesia. Therefore, this application is expected to provide a competitive advantage for business players by leveraging digital technology for more effective and efficient business processes.

Keywords: Consignment, MSMEs, Document Automation, Dashboard, SwiftUI.

I. INTRODUCTION

The consignment business model is a sales transaction system that operates under a mutual agreement between two parties: the consignor (product owner) and the consignee (retailer) (Mohamadi & Hardiyanto, 2025). This model allows the consignor to supply goods to the consignee for resale without immediate purchase, thereby minimizing storage costs and inventory risks for the consignor (Shaid, 2024). In Indonesia, more than 99% of business units are classified as micro-enterprises. As of 2023, there are approximately 66 million MSMEs (Micro, Small, and Medium Enterprises) operating in the country. The Indonesian Ministry of Trade has launched several programs to support MSMEs, including partnerships with modern retailers to increase domestic market access and foster business growth through collaboration and innovation (Prodjo, 2024).

Consignment has become a preferred business strategy among MSMEs in the food and beverage sector due to its lower operational risks. However, this model is not without challenges. Key issues include unsold goods, inventory discrepancies between consignors and consignees, risks of lost physical documents, and the time-consuming manual process of invoice creation. These problems are compounded when businesses manage inventory across multiple locations or work with numerous partners, creating significant administrative burdens that hinder strategic decision-making and business growth (Sashikirana & Prodjo, 2024).

Previous research has addressed inventory systems and retail partnerships (Setiawan et al., n.d.), but few have provided comprehensive digital solutions tailored to the specific operational pain points of MSMEs using the consignment model. Existing platforms often lack automation features and fail to address the dual-side complexity between consignors and consignees. Moreover, they rarely integrate analytical tools to support decision-making.

To overcome these limitations, this research presents the design and development of a mobile-based application, "Konsinyasi Pintar" (Smart Consignment), developed using SwiftUI and supported by SwiftData and ExpressJS for backend operations. The application introduces document automation features, digital invoice generation, inventory management synchronization, and a business performance analytics dashboard to support MSMEs in streamlining their operations. Usability testing was conducted with actual consignment-based businesses to validate the practicality and user-friendliness of the proposed solution.

The aim of this research is to provide a digital tool that minimizes administrative burdens and enhances strategic management for MSMEs in Indonesia through automation and data-driven insights.

This manuscript is the original result of the author's research, developed using novel ideas and approaches based on the specific needs of consignment-based MSMEs in Indonesia.

II. METHOD

This research applies a Research and Development (R&D) method, specifically adapted from the simplified Borg and Gall model, to design and develop a digital solution for consignment-based micro, small, and medium enterprises (MSMEs) in Indonesia. The objective is to address common challenges in the consignment business model, such as manual documentation processes, inventory mismatches, and administrative burdens.

The R&D methodology involves the following stages:

1. Identification of Potential and Problems

An initial study was conducted to identify pain points experienced by MSMEs using the consignment business model. Problems such as manual invoice generation, document loss, and lack of inventory synchronization between consignors and consignees were found through literature review and preliminary user interviews.

2. Information Gathering and Needs Analysis

Data were collected from stakeholders (MSME owners, store managers, and digital system users) to understand current business workflows and documentation practices. Existing digital tools were also analyzed for comparison.

3. System Design and Application Architecture

The application "Konsinyasi Pintar" was designed using SwiftUI for the frontend and ExpressJS for the backend. SwiftData was used for local data management. The design included key modules such as product management, inventory management, synchronization, document automation, and business performance dashboards.

4. Prototype Development

A working prototype was developed implementing the main features: automated invoice generation, inventory records, and a statistical dashboard. The app was deployed in a test environment on iOS devices.

5. Usability Testing

Usability testing was conducted with selected consignment business users

(both consignors and consignees). Participants were observed performing predefined tasks, and System Usability Scale (SUS) scores were collected to measure the usability of the application.

6. Refinement and Finalization

Feedback from usability testing was used to improve the interface and feature workflow. Modifications were made to simplify navigation and optimize performance for users with limited digital literacy.

This methodological approach ensures that the resulting system is not only functional and technically sound, but also aligned with the real-world needs of Indonesian MSME actors involved in consignment practices.

III. RESULTS AND DISCUSSION

This research resulted in the development of a digital consignment management application designed to assist MSMEs in streamlining the consignment process between consignors and consignees. The implementation process consisted of user research, prototype development, and functional testing. The findings are categorized into several key improvements that distinguish this system from existing solutions.

A. RESULT

The application provides features such as, automated consignment invoice generation, and sales performance dashboards. These functionalities address issues commonly found in traditional manual methods, such as data inconsistency, miscommunication, and delays in documentation. The app uses SwiftUI for the front-end interface and ExpressJS for the backend server, ensuring responsive performance and seamless data communication.

Unlike prior systems that primarily offer basic inventory or POS management, this research introduces a consignment-specific framework that facilitates role-based access

for consignors, consignees. For example, previous platforms like POS-based applications are not tailored to specific consignment management needs, which are critical in consignment workflows. This research demonstrates an improvement in documentation accuracy and process efficiency based on user feedback from user testing.

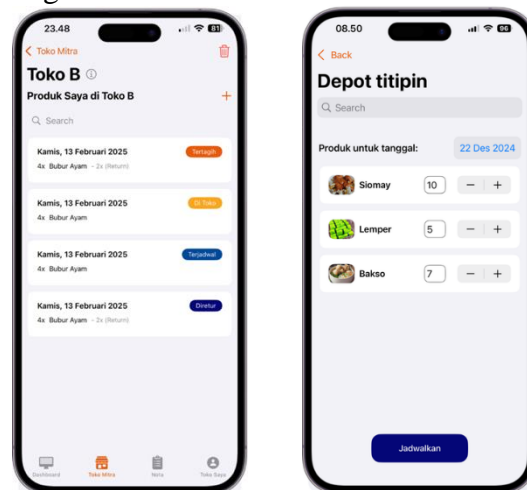


Figure 1. Specific feature for consignment business process.

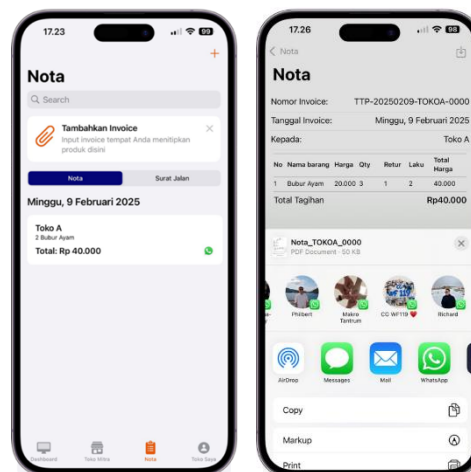


Figure 2. Titipin invoice automation process. The interface is designed to be clear, intuitive, and accessible to MSME users.

B. DISCUSSION

To ensure that the application addresses the identified problem statement namely, reducing the administrative burden in the consignment process the author conducted qualitative verification through interviews

with MSMEs engaged in consignment businesses on May 20 and 22, 2025. The interview results are presented in Table 1 and Table 2.

Table 1. Interview Results with MSMEs A

No	Question	Answer
1	What activities consume the most time in the administrative process of consignment business?	Recording consignment data in the stores.
2	How long does the administrative process take?	Approximately 1 minute to record the consignment for each store.
3	What features and benefits of the application help you the most, and why?	The receipt automation feature, because the automated receipt specifically tailored to consignment needs can directly record the number of returned items.
4	How much administrative time can be reduced by using the Titipin application?	From almost 1 minute to only around 10–15 seconds.

Table 2. Interview Result with MSMEs B

No	Question	Answer
1	What activities consume the most time in the administrative process of consignment business?	Recording consignment data at multiple stores each day.
2	How long does the	Approximately 1–2 minutes to record

No	Question	Answer
	administrative process take?	consignment data for one store.
3	What features and benefits of the application help you the most, and why?	The receipt automation feature and the multi-role feature. The receipt automation is specifically designed for consignment needs, including sold and returned items. The multi-role feature helps streamline the updating and monitoring process.
4	How much administrative time can be reduced by using the Titipin application?	From 1–2 minutes of administrative work per store, it can be reduced to only about 10 seconds.

Based on the interview results with several MSMEs shown in Tables 1 and 2, it can be concluded that the Titipin application helps reduce the administrative burden of the consignment business model. The MSMEs interviewed stated that Titipin has a good and attractive user interface, and all its features are specifically designed to support the consignment model they operate, particularly in reducing the time required for consignment record-keeping. Figure 3 below shows how time efficiency is calculated based on the average data obtained from Tables 1 and 2.

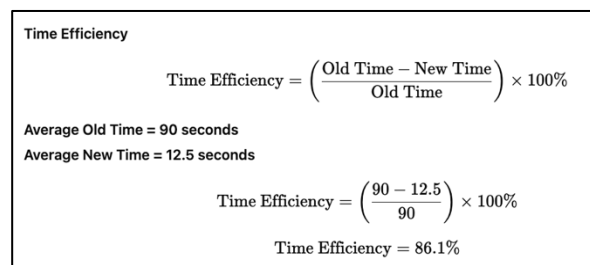


Figure 3. Time Efficiency

On average, respondents stated that the consignment process previously took around 1 minute and 30 seconds. By using this

application, the administrative time can be reduced to just 12.5 seconds, resulting in a time efficiency of 86.1% compared to the manual method previously used.

Additionally, other features such as multi-role are very helpful for them as it simplifies the team-based business processes.

IV. CONCLUSION

This research has successfully developed and implemented a consignment management application tailored to the needs of MSMEs in Indonesia. The system contributes to the digitization of business processes by integrating key consignment functionalities, such as automated invoice generation, inventory synchronization, and role-based dashboards. These features not only enhance operational efficiency but also improve data accuracy and collaboration between consignors and consignees.

By addressing the common issues found in manual consignment systems such as data misalignment, delayed reporting, and lack of transparency the solution presents a significant advancement in how MSMEs can manage their consignment operations. The research also highlights the relevance of combining user-centered design with modern mobile technologies to meet the real-world demands of business users.

In essence, this work contributes to the growing body of knowledge on digital transformation for small enterprises, with practical applications in the consignment sector. It also sets the foundation for future innovations in tailored enterprise software for niche business models

Future research may focus on integrating real-time analytics to monitor sales trends and customer behavior, as well as developing AI-powered features such as demand forecasting. Additionally, expanding the system to support multi-store or multi-region consignment operations could increase its scalability and adoption across broader markets.

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