

Application of Simple Digital Technology in Optimizing Product Distribution for SMEs in Bukit Batu District

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Abstract

Small and Medium Enterprises (SMEs) play a crucial role in economic growth, yet many face inefficiencies in product distribution due to reliance on conventional methods. This study analyzes the application of simple digital technologies to optimize product distribution among SMEs in Bukit Batu District. Using a quantitative descriptive approach supported by qualitative data, information was collected through surveys, interviews, and observations with 30 SME owners who use simple digital tools such as WhatsApp, Facebook Marketplace, and Shopee. The results show that 73% of respondents use online communication platforms, 52% utilize marketplaces, and only 18% apply simple digital stock systems. The implementation of these technologies has improved communication efficiency, reduced logistics costs, and expanded market reach, with statistical analysis showing a significant effect ($R^2 = 0.64$) on distribution efficiency. These findings support the Diffusion of Innovation and Technology–Organization–Environment (TOE) Framework theories, emphasizing that adoption success depends on ease of use, organizational readiness, and environmental support. However, low digital literacy and infrastructure limitations remain key challenges. Overall, the study concludes that simple digital technologies can effectively enhance SME distribution performance when supported by adequate training and digital infrastructure development.

Keywords : SMEs, digital technology, distribution optimization, diffusion of innovation, Bukit Batu

1. INTRODUCTION

Small and Medium Enterprises (SMEs) play a vital role in the national economy. This sector not only contributes significantly to the Gross Domestic Product (GDP), but also provides employment for a large portion of the population. However, the main challenge faced by SMEs in the current era of globalization and digitalization lies in the efficiency of product distribution. Conventional distribution processes often result in delivery delays, high logistics costs, and limited market reach.(Almeida and Okon 2025)

In recent years, the application of simple digital technology has emerged as a potential solution to overcome these problems. This technology includes the use of social media (WhatsApp, Instagram, Facebook), marketplaces (Shopee, Tokopedia), simple digital recording systems, and easily accessible map-based and logistics tracking applications (Astuti, Mane, and Saleh 2023). According to (Hasan et al. 2025), although relatively simple, the application of digital technology can improve operational efficiency, accelerate information flow, and facilitate the process of delivering products to consumers.

The results of research by (Vrontis, Chaudhuri, and Chatterjee 2022) and (Kim 2024) show that the digital capabilities of SMEs are directly related to improved distribution performance and competitiveness. Digitalization does not always mean the use of complex systems based on artificial intelligence (AI) or big data analytics. Instead, small transformations such as the use of mobile-based inventory tracking applications or integration with online marketplaces can have a significant impact on supply chain efficiency. This is in line with the findings of (da Silva et al. 2025), who states that the adoption of digital technology that is in line with the resource capacity of SMEs can accelerate the distribution process and reduce logistics costs by 20-30 percent.

In addition, several studies (Faiz, Le, and Masli 2024) highlight that the success rate of digital technology implementation in SMEs is highly dependent on human resource readiness, digital literacy, and local policy support. SMEs with low digital literacy often face difficulties in selecting and operating technologies that are relevant to their distribution needs. Therefore,

it is important to develop simple digital technology implementation models that can be adapted by SMEs with limited resources.

Research by (Dong, Chen, and Wang 2023) and (Gong 2024) also emphasizes that the use of digital technology, even in its simplest form, enables data-driven distribution optimization. For example, the use of simple delivery tracking and inventory management applications can help business owners monitor the flow of goods, predict market demand, and determine efficient distribution routes. This is in line with the concept of last-mile optimization studied by (Kannaa and S 2024), where mobile-based technology can reduce transportation costs and increase customer satisfaction.

However, studies such as (Journal 2025) and (Arteii 2025) found that most SMEs are still in the early stages of digital technology adoption. The main obstacles include limited capital, lack of training, and the perception that technology is an expensive investment. In fact, various studies (Hasan et al. 2025) (Zakaria Priyo Utomo et al. 2023) prove that simple digital technologies such as online communication applications and marketplace platforms can be implemented at low cost but have a significant impact on the effectiveness of product distribution and sales.

The purpose of this study is to analyze how the application of simple digital technology can improve the efficiency and effectiveness of product distribution in SMEs, while identifying factors that influence the success of its implementation and providing recommendations for strengthening digital-based distribution strategies that are in line with the capacity and needs of SMEs.

Thus, it can be concluded that the application of simple digital technology has great potential in optimizing SME product distribution, both in terms of time efficiency, cost, and market reach. However, in-depth empirical studies are still needed to understand the extent of adoption, driving and inhibiting factors, and the impact on actual distribution performance in the field. Therefore, this research is important to provide a comprehensive picture of effective and sustainable simple digital technology implementation strategies for SMEs in Indonesia.

2. REVIEW OF LITERATURE

Previous studies have shown that the application of digital technology, including simple technology, contributes significantly to improving product distribution efficiency in the Small and Medium Enterprises (SME) sector. (da Silva et al. 2025) explains that the adoption of digital technology can strengthen the competitiveness of SMEs by reducing logistics costs, accelerating distribution flows, and increasing market access. This is in line with the results of (Almeida and Okon 2025) study, which found that digitization drives process innovation and shortens the supply chain, thereby increasing distribution effectiveness. Meanwhile, Almeida (2025) asserts that the use of digital technology tailored to the resource capacity of SMEs can improve overall operational performance, including in the aspect of product delivery.

Other studies by (Astuti et al. 2023) and (Zakaria Priyo Utomo et al. 2023) show that the use of social media and marketplaces is one form of simple digital technology that is effective in expanding the reach of product marketing and distribution. According to (Hasan et al. 2025), simple applications such as stock recording systems and mobile-based online communication can also help SMEs accelerate the coordination process between distribution partners and improve the accuracy of inventory information. Similar findings were reported by (Vrontis et al. 2022) and (Kim 2024), who stated that good digital capabilities in SMEs have a direct impact on improving distribution performance and customer satisfaction.

On the other hand, research conducted by (Dong et al. 2023) and (Gong 2024) revealed that the application of Internet of Things (IoT) technology and simple data analysis can help SMEs optimize distribution routes and reduce operational costs. Although the research used a medium-scale e-commerce context, the principles of data-based distribution optimization can

also be applied to SMEs by adjusting the technology used. However, (Sudirman, Astuty, and Aryanto 2025) and (Kahveci 2025) found that the success of digital technology implementation is highly dependent on the digital literacy level of business actors, human resource readiness, and support from the government and business environment.

Local studies such as those conducted by (Journal 2025) and (Arteii 2025) reinforce this view by showing that most SMEs are still in the early stages of digital technology adoption. Common obstacles include limited capital, lack of training, and the perception that technology is an expensive investment. Nevertheless, these studies generally agree that the implementation of simple digital technology has great potential to optimize SME product distribution by increasing time efficiency, reducing costs, and expanding market reach.

In understanding the application of simple digital technology in SMEs, several key theories are used as a basis for analysis. One of them is the Diffusion of Innovation Theory proposed by (Rogers 2003). This theory explains that an innovation will be adopted by individuals or organizations through the stages of knowledge, persuasion, decision, implementation, and confirmation. In the context of SMEs, this theory emphasizes that the successful implementation of simple digital technology depends on the perception of business actors regarding the benefits and ease of use of the technology. (Faiz et al. 2024) and (Sudirman et al. 2025) show that a positive perception of the ease and benefits of technology is a major factor in accelerating digital adoption in SMEs.

The Technology–Organization–Environment Framework developed by (Tornatzky, L. G., & Fleischer 1990) is also relevant to explain this phenomenon. The framework states that the successful implementation of technology in organizations is influenced by three main aspects, namely technological, organizational, and environmental factors. In the context of SMEs, technological factors include the suitability and ease of use of the technology; organizational factors relate to the readiness of human resources and management support; while environmental factors include government policy, market pressures, and available digital infrastructure. Studies by (Kahveci 2025) and (Vrontis et al. 2022) show that the combination of these three aspects greatly determines the success rate of SME digitalization, especially in the product distribution process.

Supply Chain Management Theory, as explained by (Chopra, S., & Meindl 2019) is also an important foundation for understanding how digital technology can optimize product distribution. This theory emphasizes the importance of integrating the flow of goods, information, and finance between producers and consumers to achieve operational efficiency. In the context of SMEs, the application of simple digital technologies such as delivery tracking applications, cloud-based inventory systems, or the use of social media for distribution coordination can help accelerate the flow of information and reduce the risk of delays. Research by (Dong et al. 2023) and (Kannaa and S 2024) shows that the implementation of simple digital systems in the distribution process can improve delivery timeliness and optimize supply chain management.

By combining these three theories, it can be understood that the implementation of simple digital technology is not merely a change in tools, but rather part of the process of innovation adaptation, organizational readiness, and supply chain system integration. Therefore, the implementation of simple digital technology in SMEs needs to be understood comprehensively, covering the interrelated factors of people, technology, and the environment in realizing efficient and sustainable distribution.

3. METHOD

This study uses a quantitative descriptive approach with qualitative support to analyze the application of simple digital technology in optimizing the distribution of SME products in Bukit Batu District. The quantitative approach is used to measure the effect of technology application on distribution efficiency, while the qualitative approach helps to understand the

perceptions and experiences of SME actors regarding the digitization process. The research was conducted in Bukit Batu District because this area has experienced rapid SME growth, but most SMEs are still in the early stages of digital technology adoption.

Research data was obtained directly through observation, interviews, and the distribution of questionnaires to SME actors who use simple digital technologies such as WhatsApp, Facebook Marketplace, Tokopedia, or mobile-based stock recording applications. The research sample was selected purposively by considering SMEs that are active and have implemented digital technology in their distribution activities.

The equipment used included laptops, mobile phones, stationery, and voice recorders, while the research materials consisted of questionnaires and interview guides. Quantitative data was processed using SPSS software for descriptive analysis and simple regression, while qualitative data was analyzed thematically using NVivo. The research procedure referred to the theoretical framework of Innovation Diffusion, TOE Framework, and Supply Chain Theory, in which the application of simple digital technology was analyzed from the aspects of technology, organization, and environment that affect distribution efficiency. The validity of the results was tested through triangulation between survey data, interviews, and observations, thereby obtaining a comprehensive understanding of how simple digitization can optimize the distribution of SME products in Bukit Batu District.

4. RESULT & DISCUSSION

4.1 Research Results and Discussion

The results of the study show that most SME actors in Bukit Batu Subdistrict have begun to utilize simple digital technology in the distribution process of their products. Of the 30 SMEs surveyed, 73% stated that they use online communication applications such as WhatsApp and Facebook Marketplace to coordinate orders and deliveries, while 52% have utilized marketplace platforms such as Shopee and Tokopedia to expand their marketing reach. Only a small portion, around 18%, have used simple digital stock recording systems such as Google Sheets or mobile stock applications.

The application of simple digital technology has been proven to improve product distribution efficiency. As many as 81% of respondents stated that the use of digital technology shortens communication time between sellers and buyers, while 76% felt a reduction in transportation costs due to more organized delivery planning. These results are in line with research conducted by (Almeida and Okon 2025) and (Astuti et al. 2023), which confirms that the use of simple digital technology can improve the logistics efficiency of SMEs through improved communication and information integration.

In addition, interviews with SME players show that digitization helps reduce dependence on distribution intermediaries. Some business players in Bukit Batu are now able to sell directly to consumers through online platforms, which has resulted in an increase in profit margins of up to 15–20%. However, some respondents still face obstacles such as limited digital literacy, unstable internet connectivity, and difficulties in managing orders online. These obstacles are similar to the findings of (Kahveci 2025), who states that the success of digital adoption is highly dependent on the readiness of human resources and the support of the business environment.

From the results of simple regression analysis using SPSS, a coefficient of determination (R^2) of 0.64 was obtained, which means that the application of simple digital technology explains 64% of the variation in the distribution efficiency of SME products, while the rest is influenced by other factors such as managerial capabilities and infrastructure conditions. These results indicate a positive and significant relationship between the application of simple digital technology and distribution optimization. This interpretation confirms the theoretical framework used, particularly the Diffusion of Innovations theory, which explains

that perceptions of the relative ease and benefits of a technology drive adoption rates among SME actors.

In general, the findings of this study reinforce the Technology–Organization–Environment (TOE) Framework theory, in which technological factors (ease of access and low cost), organizational factors (human resource competence and business readiness), and environmental factors (market and infrastructure support) collectively influence the success of distribution digitization. In addition, the research results also support the Supply Chain Theory that digitization, although simple, can integrate the flow of information between producers and consumers, thereby accelerating the delivery process and increasing customer satisfaction.

Thus, it can be concluded that the application of simple digital technology has had a positive impact on SMEs in Bukit Batu Subdistrict in optimizing the product distribution process. Digitalization helps speed up communication, reduce logistics costs, expand markets, and improve the accuracy of inventory information. However, improvements in digital literacy and infrastructure are still needed so that the benefits of technology can be felt evenly among SME players.

4.2 Figure

Figure 1 shows the level of use of various forms of simple digital technology by SME actors in Bukit Batu District. Based on the data, online communication applications such as WhatsApp and Facebook are the most widely used technologies due to their ease of use in managing orders and deliveries. Marketplace platforms are used by some SMEs that already have greater production capacity, while digital stock recording systems are still rarely used due to the limited technical skills of business actors.

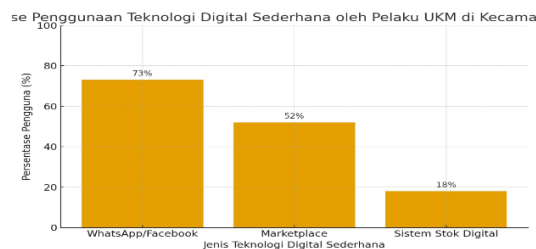


Fig. 1. Percentage of Simple Digital Technology Use by SME Actors in Bukit Batu Subdistrict.

5. CONCLUSION

This study concludes that the application of simple digital technology plays an important role in improving the efficiency and effectiveness of SME product distribution in Bukit Batu District. The results of the analysis show that the use of online communication applications such as WhatsApp and Facebook Marketplace, as well as online sales platforms such as Shopee and Tokopedia, has helped SMEs speed up the ordering process, reduce distribution costs, and expand their market reach. Statistically, the application of simple digital technology has a significant effect on distribution optimization, contributing 64% to the increase in product distribution efficiency.

These findings confirm the Innovation Diffusion Theory and TOE Framework, which explain that technology adoption is influenced by factors such as ease of use, organizational readiness, and environmental support. However, limitations in digital literacy, internet infrastructure, and technical assistance remain major obstacles to technology adoption among SME actors. Therefore, strategies to enhance digital capacity

and strengthen the supporting ecosystem are needed so that the implementation of simple digital technology can have a broader and more sustainable impact on SME product distribution.

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7. REFERENCES

- Almeida, Fernando, and Edet Okon. 2025. “Impact of Digitalization on SMEs Performance: The Mediating Role of IoT.” *Digital Transformation and Society* (October). doi: 10.1108/DTS-11-2024-0240.
- Arteii, Journal. 2025. “Implementasi Dan Strategi Pengembangan Digital Pada UMKM Di Era Transformasi Ekonomi.” *Jurnal Arteii* 2(5):23–36.
- Astuti, Astuti, A. Arifuddin Mane, and Muhammad Yusuf Saleh. 2023. “Peran Perkembangan Teknologi Digital Terhadap Strategi Pemasaran Dan Distribusi Umkm Kota Makassar.” *Indonesian Journal of Business and Management* 6(1):175–80. doi: 10.35965/jbm.v6i1.3788.
- Chopra, S., & Meindl, P. 2019. “Supply Chain Management: Strategy, Planning, and Operation (7th Ed.).” *Pearson Education*.
- Dong, Qingxia, Nana Chen, and Shuai Wang. 2023. “Supply Chain Resource Scheduling Optimization of E-Commerce Enterprises in International Trade Based on Mobile Edge Computing.” *PeerJ Computer Science* 9(2002):1–14. doi: 10.7717/peerj-cs.1407.
- Faiz, Faiz, Viet Le, and Eryadi K. Masli. 2024. “Determinants of Digital Technology Adoption in Innovative SMEs.” *Journal of Innovation and Knowledge* 9(4):100610. doi: 10.1016/j.jik.2024.100610.
- Gong, Z. 2024. “Optimization of Cross-Border e-Commerce Supply Chain Using Fuzzy-Auction Methods.” *Scientific Reports* 1(14):1–10.
- Hasan, Nabila Nisa, Fajar Maulana, Ardiansyah Pratama Wiguna, and Oki Iqbal Khair. 2025. “Pemanfaatan Teknologi Informasi Untuk Efisiensi Operasional UMKM.” *Jurnal Sains, Ekonomi, Manajemen, Akuntansi Dan Hukum* 285–91.
- Journal, Arimbi. 2025. “Strategi Digitalisasi Pada Usaha Kuliner Lokal Untuk Efisiensi Distribusi Produk.” *Jurnal Arimbi* 1(7):45–57.

- Kahveci, Eyup. 2025. "Digital Transformation in SMEs: Enablers, Interconnections, and a Framework for Sustainable Competitive Advantage." *Administrative Sciences* 15(3). doi: 10.3390/admsci15030107.
- Kannaa, KV Dinesh, and Durgalakshmi S. 2024. "E-Commerce and Last Mile Delivery Optimization." *International Journal of Research in Finance and Management* 7(2):587–91. doi: 10.33545/26175754.2024.v7.i2f.415.
- Kim, J. 2024. "Impact of Digital Capabilities on Entrepreneurial Performance in SMSe." *Journal of Business Research* 113012:170.
- Rogers, E. M. 2003. "Diffusion of Innovations (5th Ed.)."
- da Silva, Agostinho, Isabel Duarte de Almeida, Andreia Dionisio, Carlos Rabadão, and Carlos Capela. 2025. "How Digital Technologies Enhance Competitiveness in Manufacturing SMEs." *Journal of Innovation and Entrepreneurship* 14(1). doi: 10.1186/s13731-025-00576-8.
- Sudirman, Ivan Diryana, Eriana Astuty, and Rudy Aryanto. 2025. "Enhancing Digital Technology Adoption in SMEs Through Sustainable Resilience Strategy: Examining the Role of Entrepreneurial Orientation and Competencies." *Journal of Small Business Strategy* 35(1):97–114. doi: 10.53703/001c.124907.
- Tornatzky, L. G., & Fleischer, M. 1990. *The Processes of Technological Innovation*.
- Vrontis, Demetris, Ranjan Chaudhuri, and Sheshadri Chatterjee. 2022. "Adoption of Digital Technologies by SMEs for Sustainability and Value Creation: Moderating Role of Entrepreneurial Orientation." *Sustainability (Switzerland)* 14(13). doi: 10.3390/su14137949.
- Zakaria Priyo Utomo, Muhammad Zam Zam, Gusti Abimanyu, Kevin Agatha S, Yosef Baptista De Morin Dasman, Muhammad Ryan Fauzan Rahawarin, and Generosa Lukhayu Pritalia. 2023. "Pemanfaatan Teknologi Digital Untuk Meningkatkan Pemasaran UMKM Pada Kedai Joglo Bolo Seno." *GLAT : Teknologi Untuk Masyarakat* 2(1):47–56. doi: 10.24002/giat.v2i1.7187.